The dissertation committee for Caroline Marie von Bose
certifies that this is the approved version of the following dissertation:

The Economics of
Beautification and Beauty

Committee:

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Thomas Wiseman, Supervisor

____

Daniel Hamermesh

____

Gerald Oettinger

____

Sandra Black

____

Robert Crosnoe

The Economics of Beautification and Beauty

by

Caroline Marie von Bose, B.S.; B.S.; M.S.Eco.

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You can never be overdressed or overeducated.

– Oscar Wilde

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The Economics of Beautification and Beauty

Caroline Marie von Bose, Ph.D.

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Supervisor: Thomas Wiseman

The first chapter examines adolescent beauty as a potential originator of the observed wage premium for adult beauty and finds that adolescent beauty has its own separate effect on adult wages. Adolescent beauty also affects early human capital development, as evidenced by its significant impact on educational outcomes. Changes in beauty over time are shown to be positively correlated with changes in wages for full-time workers, and changes in beauty are generally not correlated with appearance-related choice variables. I explore the possibility that self-confidence and social capital are potential mechanisms through which adolescent attractiveness affects future wages but find that these do not change the magnitude of the effects of adolescent beauty, although they are of themselves significant determinants of wages.

The second chapter examines the effects of personal grooming behaviors on earnings and shows evidence that these effects are due to persistent differences in preferences or productivity between workers displaying different grooming choices and not statistical discrimination on the part of employers. In a longitudinal sample of lawyers graduating from the same law school, men who wear glasses and men with facial hair face an earnings penalty in first-year income and to some extent in subsequent years. Some grooming behaviors are positively correlated with income in the 1970's cohort

and negatively correlated with income in the 1980's cohort (and vice versa), suggesting that fashion signals change relatively quickly. I also find that grooming behaviors are correlated with beauty ratings and that the beauty premium is unaffected by earnings, but the estimated effects of some grooming behaviors partially result from their correlation with beauty. I do not find evidence that grooming behaviors act as a signaling mechanism in the labor market.

The third chapter evaluates the claim that design piracy is beneficial to certain status-goods firms. It builds on Pesendorfer's model of fashion cycles by introducing the possibility of design imitation for a market in which designs are used as a signaling mechanism. There exist equilibria in which both the designer and imitator are active in the market, but there are no conditions under which imitation is profitable to the designer. Under some conditions the presence of a potential imitator will ensure that the designer does not produce at all.

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Chapter 1

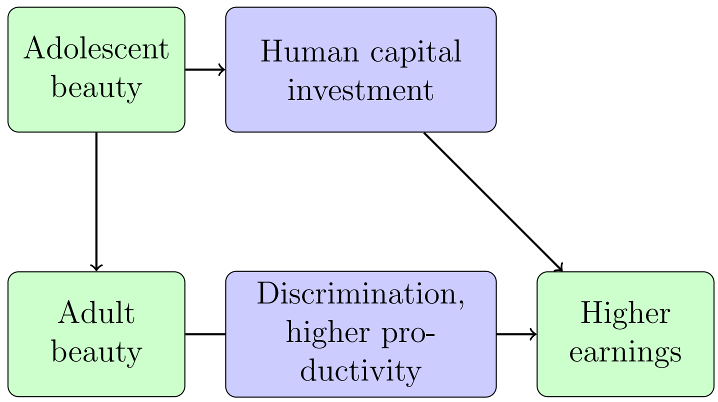
Child Stars vs. Ugly Ducklings: Does adolescent attractiveness contribute to the beauty premium?

1.1 Introduction

Economists have found that physically attractive individuals earn more than their average-looking or downright ugly counterparts [Hamermesh and Biddle, 1994], [Biddle and Hamermesh, 1998], [Harper, 2000], [Hamermesh and Parker, 2004], [Averett and Korenman, 1996]. This effect has been observed in various data and is persistent after controlling for a multitude of other variables. I hope to gain insight into the mechanism by which beauty provides an advantage in achievement and labor market outcomes, particularly by investigating the significance of attractiveness as an adolescent versus attractiveness as an adult. Physical beauty at a young age may contribute to human capital investment during adolescence as good-looking children and teenagers are given more attention by teachers and peers (and possibly even parents [Langlois et al., 2000]), and thus are able to build more human capital as they move through their formative years [Lennon, 1990], [Clifford and Walster, 1973]. Analyzing the effects of adolescent and adult beauty can tell us whether the beauty premium observed in adulthood is simply the residual effect of greater investment during childhood (assuming that those who were attractive in adolescence also tend to be attractive as adults). Investigating the channels through which labor market inequalities arise and knowing which life stages are most important in perpetuating differences in outcomes between groups can lead to more effective policies.

While there is an extensive body of research showing the presence of an earnings advantage for physically attractive adults, there has been no economics research examining the effects on earnings of being physically attractive early in life. However, several papers in both economics and sociology have examined the effects of different types of childhood experiences on adult outcomes. In examining how childhood characteristics can lead to increased adult earnings, Persico et al. [2004] find that the height wage premium results not from adult height, but from adolescent height. In a similar way, physical attractiveness as a young adult may influence a person's social environment and human capital investment, leading to a beauty premium observed later in life. Additional research by Mobius and Rosenblat [2006] suggests that physical beauty may facilitate the development of desirable personality traits such as confidence and cooperation, which is consistent with the hypothesis that the salient characteristic is not beauty itself but rather the confidence and social abilities developed as a result of being beautiful. If this is the case, we should expect adolescent beauty to have an effect since presumably personality traits are developed throughout a person's life. Figure 1 demonstrates the avenues through which adult and adolescent beauty may impact earnings.

Figure 1.1: Potential avenues of causation for the beauty premium



The purpose of this paper is to determine whether the beauty premium springs from adolescent or adult levels of attractiveness (or both), to identify possible channels mediating the effects of beauty, and to investigate the relationship between beauty and appearance-related choice variables. In order to do this, I use data from the National Longitudinal Study of Adolescent Health (Add Health) [Harris and Udry], which contain interviewer ratings of physical attractiveness in four different waves of the survey spanning both adolescence and adulthood. Additionally, the data contain objective measures of grooming and appearance, such as whether the respondent wears glasses or has ever had braces; I use these measures to show that grooming behaviors do not significantly affect perceived physical attractiveness.

I find that variables measuring adolescent beauty are significantly correlated with adult wages even after controlling for measures of adult beauty, making it clear that increased human capital investment and other experiences early in life are significant drivers of the observed earnings differential for attractiveness. Attractiveness at an early age affects human capital investment as measured by GPA and formal education level; furthermore, I find that adolescent beauty has a much larger effect on young men's educational outcomes than young women's educational outcomes. This paper also analyzes the effects of grooming and appearance decisions in order to evaluate the efficacy and profitability of appearance enhancements and to determine that grooming behaviors are not a source of the observed wage premia for adolescent and adult beauty. Other regressions include variables proxying for confidence and social skills, but I do not find evidence that these play a role in the observed effects of either adult or adolescent attractiveness.

The paper is set up as follows: Section 1.2 describes the data and the attractiveness variables used and makes the case that adolescent and adult beauty are distinct. Section 1.3 explores both adolescent attractiveness and adult attractiveness as statistically significant determinants of adult earnings. Next, section 1.4 explains the effects of adolescent beauty on educational outcomes, which are determinants of earnings in addition to being relevant outcomes in their own right. Section 1.5 addresses issues of measurement error by examining concurrent changes in beauty and earnings, showing that changes in earnings are correlated with changes in attractiveness. Finally, sections 1.6 and 1.7 focus on several mechanisms through which beauty may lead to increased earnings, seeking evidence that early experiences enable attractive teens to develop better grooming habits, self-confidence, or social skills.

1.2 The Data

The National Longitudinal Study of Adolescent Health consists of four separate in-home interviews of a nationally representative sample of participants who are in grades 7-12 when the study originates. It includes measures of various health outcomes and risk factors as well as social, economic, psychological, and academic variables. The Add Health data were collected beginning in 1994, with the first wave of the survey being conducted primarily during the 1994 - 1995 school year. The second wave follows up with respondents approximately one year later, during the summer of 1996. Wave III of the survey takes place in 2001 and 2002, and wave IV takes place in 2007 and 2008. This paper uses the public-use portion of the Add Health data.

This analysis primarily focuses on data from waves I and IV for respondents who are working full-time (at least 35 hours per week) when the final survey is administered. Out of 5,109 wave IV respondents, 4625 are working full time; I exclude 555 outliers making less than $2.15 (the federally mandated minimum wage for restaurant servers) and 139 making more than $100 per hour. This leaves 3,931 respondents in the sample; due to instances of missing control variables, this figure drops to 3,909 for the final group of full-time workers, which includes 1,966 women and 1,943 men whose ages range from 24 to 33. For this group of workers, table 1.1 shows the sample means of each of the variables used in the main regressions. The family and demographic variables are collected during the initial wave of the survey, while the education and adult demographic variables are collected concurrently with the wage data.

The estimation strategy used is outlined in the equation below.

$$w_{it} = \beta_0 + \beta_1 a_{i,adolescent} + \beta_2 a_{it} + \beta_3 D_{it} + \beta_4 E_{it} + \epsilon_{it} \tag{1.1}$$

where:

$$\begin{aligned} w_{it} &= i\text{'s wage at time } t \\ a_{i,adolescent} &= i\text{'s adolescent attractiveness} \\ a_{it} &= i\text{'s attractiveness at time } t \\ D_{it} &= \text{a vector of demographic control variables collected in wave I} \\ E_{it} &= \text{a vector of educational control variables collected in wave IV} \end{aligned}$$

Using this basic setup, regressions in the following sections include a variety of control variables listed in table 1.1, including those for demographics, family background, educational acheivement, and family outcomes. Other variations of this specification found in sections 1.6 and 1.7 include a vector of grooming variables, a measurement of self-confidence, and several measures of social capital.

1.2.1 Measures of attractiveness

At the end of each instance of the survey, every respondent is rated by their survey administrator on a five-point scale of physical attractiveness. Since there are four different waves of the survey, this means that each participant has up to four attractiveness ratings over time, although in actuality only 51 percent of the original respondents have data for all four time periods. The first two take place in adolescence, while the second two take place in young adulthood. Since I want to distinguish between the effects of adolescent beauty and adult beauty, it is necessary to establish that this characteristic does change over time and that there are observable differences between these ratings in the different waves and that these differences are larger for ratings that are separated by longer time periods. The instances of the interviewer-rated physical attractiveness variables from the various waves of the study are moderately correlated; unsurprisingly, these correlations are strongest for the waves that are chronologically closer to one another (see table 1.2). The pairwise correlations of these variables between wave IV and waves I and II are the lowest, which is expected given that wave IV took place fourteen and twelve years after waves I and II, respectively. Wave I and wave II are separated by only one or two years, and these two waves have the highest correlations. For all four different interviewer ratings of physical attractiveness, the average pairwise correlation is 0.19 and Cronbach's α is 0.48, which indicates a mediocre level of intertemporal consistency in the interviewer ratings. By way of comparison, Biddle and Hamermesh [1998] find average pairwise correlation of around 0.40 and Cronbach's α equal to 0.75 for a sample in which four different raters score the same photograph of each subject. This leads to the conclusion that adolescent and adult attractiveness are correlated, but there is enough variation to treat them as separate variables.

In order to maximize the number of observations available, most of the regressions in this paper use only data from the first and fourth waves of the survey, which take place when the respondents are 12 - 18 years old and 24 - 30 years old, respectively.

The scale is composed of the following choices: "very unattractive," "unattractive," "about average," "attractive," and "very attractive." For the purposes of this analysis, the lowest two categories are combined into a single "below average" category since together they constitute only 6 to 7 percent of the participants[1]; thus, four categories of attractiveness are created in both adolescence and adulthood. Throughout this paper, the bulk of the analysis of the effects of attractiveness uses these categories, and their cross-tabulation in the two separate time periods can be seen in table 1.3.

1.3 Results

The first major contribution of this paper is to establish that both adolescent attractiveness and adult attractiveness are independently and significantly correlated with adult earnings. Table 1.4 examines this relationship by reporting coefficients when attractiveness measurements from the two time periods are included separately as well as concurrently. In columns 1 - 3, no control variables are present, and the "above average" and "very attractive" categories for adolescents and adults show significant positive correlation with earnings. It would appear since the coefficients for adult and adolescent attractiveness are relatively similar that perhaps these variables are measuring the same thing; however, including variables from both time periods together only slightly diminishes each coefficient. Adding demographic, educational, and grooming controls decreases the coefficients of both adolescent and adult beauty,

[1] In wave I (IV), 2.1 (3.0) percent of respondents are in the "very unattractive" category, while 4.1 (4.0) are in the "unattractive" category.

but the adolescent and adult categories for "very attractive" remain significant when examined alone and together. The coefficients of the "below average" categories are generally negative but never significant, perhaps because this category is smaller or contains more randomness relative to the others.

Columns 4 through 6 add demographic controls from the first wave of the survey which mainly pertain to each participant's upbringing and socioeconomic background; they include race, age, parent income, whether the family ever received government assistance, and mother's education level. Adding these demographic controls reduces the coefficients for the top two adolescent beauty categories by about one-third, suggesting that family background has significant bearing on physical appearance in high school. This is not surprising, especially when considering that good-looking parents are likely to both make more money and have better-looking offspring than average-looking parents. Another theory postulates that intelligent, wealthy men tend to marry good-looking women, so that families with high socioeconomic status are genetically more likely to have attractive, intelligent children [Kanazawa, 2011].

Columns 7 through 9 add controls from the fourth wave of the survey regarding the respondents' educational and family status. These include indicator variables for whether the respondent is currently a full-time student, has graduated college, has finished a graduate degree, is currently married, or has been convicted of a criminal offense other than a minor traffic violation as well as a variable for the number of children the respondent has. Adding these controls somewhat diminishes the correlation of wages and attractiveness, showing a noticeably stronger impact on the adolescent coefficients for men. This suggests that some of the premium on mens' adolescent attractiveness can be attributed the higher levels of education garnered by more attractive young men. We should consider that attractiveness factors into an individual's educational and life decisions; attractive adolescents who expect a monetary return to their looks may choose to pursue higher levels of education than their peers who are less endowed with physical beauty, while less attractive adolescents may expect a penalty for their looks and compensate by investing less effort in human capital development (or choosing an alternate route such as a life of crime, as explored by Mocan and Tekin [2010]); section 1.4 examines this more closely.

The magnitude of the beauty premium is generally the same for men and women here. One difference is that adult men in the "very attractive" category earn a wage premium that is approximately 6 percentage points higher than those in the "above average" category, while women in the "very attractive" category earn a virtually identical wage premium as those who are merely "above average." For women, there may be an upper threshold of attractiveness after which marginal improvements in appearance do not generate returns in the form of increased wages; in fact, it has been suggested that a so-called "bimbo effect" exists, in which beautiful women are perceived as being less competent than their less-attractive peers [Hamermesh, 2011]. Alternately, extremely attractive women may find that their beauty generates higher returns in the marriage market and concentrate their efforts there instead.

Table 1.5 explores the interactions between adolescent and adult beauty by creating indicator variables for nine different adolescent-adult beauty combinations. The average and below average categories are combined, and the omitted category consists of respondents who are in this group during both adolescence and adulthood. These results corroborate the results from the original specification; for example, adults who are rated as "above average" do not have the same wage premium, but instead the magnitude of this premium is dependent on their level of adolescent beauty as well. An interesting exception is that women who are very attractive in both adolescence and adulthood actually have an insignificant 7.2% higher wages, while those who were average or above average in adolescence have wages that are about 20% higher than the control group.

I also consider the return to attractiveness for a more broadly defined measure of well-being by looking at household income rather than considering only the effect on a person's own wages, allowing for the fact that women may pursue returns to attractiveness more aggressively in the marriage market than in the labor market, at least in comparison to men. Table 1.8 shows the results of a regression on log household income for the respondents who are working full-time for whom such data were available, using a slightly smaller subsample of the group used in the original regressions on wages. The variable for household income is a categorical variable with twelve possible annual income ranges. Each respondent is assigned the household income equal to the midpoint of the range, with the exception of the highest category, $150,000 or more; all respondents selecting this option were assigned an income of $225,000. This resolves the potential issue of outliers skewing the results, and assigning the midpoint value of each income range allows household income to be treated as a continuous variable.

Adolescent attractiveness has a much larger effect on household income as compared to only the respondents' own wage level, while the effect of adult attractiveness is not markedly different, which implies that adolescent beauty is strongly correlated with partners' earnings. Beautiful people receive remuneration for their own good looks, but they also apparently pair with other beautiful or otherwise successful people and enjoy the benefits of a spouse's higher wages as well. This suggests that women who are good-looking earlier in life may be less inclined to pursue returns to beauty in the formal labor market but that they garner a similar overall pecuniary benefit compared to good-looking men; considering household income as a whole shows that the effects of attractiveness are largely similar for both genders.[2]

For both own wages and household income, the attractiveness effects seem largely additive rather than replacing one another, implying that both adolescent and adult appearance are important in determining labor market outcomes. Traditional estimates of the beauty premium are similar to the estimated effect here of adult attractiveness alone, suggesting that the gains to adolescent attractiveness are supplementary to the gains for being an attractive adult. The results for men and women are generally similar, although demographic variables have a larger impact on the effects of beauty for women while educational variables have a larger impact on the effects of adolescent beauty for men. After including all of the control variables, adolescent beauty appears to have a relatively lower effect for women than men. In order to

[2]Here I assume that these effects are being driven by a partner's wages and not by other living circumstances leading to higher overall household income. The survey question asks for the cumulative income of everyone who lives in the household and contributes to the household budget, so it ostensibly could include the income of roommates, parents, or other relatives rather than exclusively referring to spouses or romantic partners. About 12 percent of the sample currently lives with one or both parents, and about 16 percent live with more than one other adult. Both of these living situations are correlated with higher household income; however, attractiveness is actually negatively correlated with the probability of living with either parents or roommates, so these living situations would cause the effect of attractiveness on household income to be understated. Furthermore, including indicators for parents or roommates or restricting the sample to married people only does not substantially change the results.

determine why this is so, the section 1.4 examines the effect of adolescent attractiveness on educational outcomes. Discovering how these outcomes differ between men and women should tell us whether the observed differences in the effects of adolescent attractiveness are statistical anomaly or are the result of systematic differences between the experiences of males and females.

1.4 Adolescent attractiveness and educational investment

Adolescent beauty may have a different effect on labor market outcomes of women compared to men if girls make different choices based on their attractiveness than boys do, and analyzing how the sexes differ in their responses to their own attractiveness level as adolescents has the potential to highlight the mechanisms by which adolescent beauty has an effect on adult wages and the disparate incentives faced by young women and young men prior to entering the workforce. In order to explore the various pathways of adolescent choice, tables 1.6 and 1.7 examine the correlation of attractiveness scores with different educational outcomes. In making educational decisions, adolescents consider the expected future gain from incurring costs to become educated. Since beauty has been shown to lead to higher returns in the workplace and beautiful adolescents have a higher likelihood of becoming beautiful adults, we can expect to see attractive adolescents investing more heavily in human capital, anticipating that their educational investments will be more handsomely rewarded than equal investments by their plain-looking peers.

Table 1.6 shows the effects of attractiveness on educational attainment, and it contains the coefficients of adolescent attractiveness from a regression using years of education as the dependent variable. As expected, attractiveness has a significant relationship to academic outcomes such that both the above average and very attractive categories are correlated with obtaining more education. Both genders display a correlation between adolescent attractiveness and educational outcomes, but the effect for young men is almost three times that of young women. Young men who are rated as “very attractive” obtain 0.72 more years of schooling than average, while young women in this category obtain only 0.28 more years of schooling. This could indicate a more prominent societal expectation for men to be the primary breadwinners, a tendency for teachers to focus more attention on young men than young women, or a greater expectation on the part of young men that their looks will be highly rewarded in the job market.

In a further attempt to explore the differences in the effects of attractiveness between genders, table 1.7 shows the estimated effects of adolescent beauty on cumulative high school grade-point average measured on a four-point scale, which is collected during wave III of the survey. The wave III questionnaire is available for only about half of wave IV respondents, which is why GPA is not included as a control variable in the original estimation; nonetheless, examining it here should give some indication of the effect of adolescent attractiveness on high school achievement. Once again, adolescent attractiveness has a higher correlation with academic achievement for the males in the sample than for the females. On a four-point scale, boys who are above average or very attractive have grade-point averages that are 0.20 and 0.26

points higher than those who are average-looking, while girls in those categories do not have significantly higher grades; the statistically insignificant premia for above average and very attractive girls are 0.07 and 0.05, meaning that the effect of beauty on grades is two to four times larger for boys than for girls. Girls in the below-average category do demonstrate significantly lower GPAs by about 0.15 grade points, while boys in the below-average category actually have higher than average GPAs by about 0.11 grade points.

1.5 The correlation between changes in beauty and changes in income

Although I have shown that there is insufficient correlation between adolescent and adult measures of beauty to treat these as if they were measuring the same quality, one may still be tempted to interpret the observed return on adolescent attractiveness as simply a return on the unobserved portion of adult beauty. The wave IV attractiveness rating is an imperfect measure of each respondent's beauty, and the rating from adolescence contains added information regarding each respondent's innate attractiveness. Therefore, the correlation of adult wages with adolescent attractiveness may simply be a representation of the measurement error inherent in the data rather than an estimation of the effects of beauty at different time periods. In fact, beauty may be a primarily static characteristic, and the observed variation across time may be due to discrepancies between interviewers' perceptions of beauty. In an attempt to establish that changes in observed attractiveness are not entirely attributable to measurement error and interviewer subjectivity, this section examines wages and beauty in both wave III and wave IV of the data. In the initial estimation (see equation 1.1), wages in each time period are dependent on both childhood attractiveness, adult attractiveness, and various demographic and educational variables.

The Add Health dataset contains earnings for two different points in time, in wave III, which takes place about seven years after the initial survey, and again in wave IV, which takes place about thirteen years after the initial survey. Although the respondents are still in young adulthood and many of them are still involved in post-secondary schooling during at least one of these time periods, 1,237 of them are working full-time (at least 35 hours per week) and making an hourly wage of \$2.15 to \$100 during both of the latest surveys. Estimating the difference between wages in these two periods allows for an investigation of the effects of a change in attractiveness over the same time period. This approach temporarily ignores the effect of adolescent attractiveness since this is a fixed characteristic once the respondent has reached adulthood, but it has the potential to show that changes in attractiveness are real and are relevant to earnings. It also has the added benefit of eliminating individual fixed effects and any time-invariant personality traits that may be driving the observed effects of beauty. The estimation equation then becomes:

$$\Delta w_{it} = \beta_2 \Delta a_{it} + \beta_3 \Delta X_i + \Delta \epsilon_i \qquad (1.2)$$

Suppose that individual attractiveness does not actually change over time and that variations within an individual's measured attractiveness ratings are a result of imperfect interviewer ratings. Then $a_{it} = a_i + \alpha_{it}$, where a_i is the actual attractiveness and α_{it} is an error term with mean zero. Assuming that $\alpha_{i,3}$ and $\alpha_{i,4}$ are independent (and therefore $E[\Delta a_{it}] = E[\alpha_{i,4} - \alpha_{i,3}] = 0$), first-differencing the wage data from the two adult time periods of the survey would then eliminate any observed effects of beauty.

Table 1.9 shows the results of this regression. It includes variables measuring changes in education, indicating whether a person completed high school, college, or graduate school between waves III and IV, and variables measuring changes in marital status, indicating whether a marriage or divorce took place between the two periods. Additionally, I include indicator variables for each initial grade cohort to account for the possibility that changes in beauty and wages are not linear in age (i.e., the change in beauty from age 18 to 24 may be categorically different than the change in beauty from age 24 to 30). The change in physical attractiveness is calculated by converting the beauty ratings into their percentile counterparts and subtracting these percentiles between wave III and wave IV. This accounts for the fact that the changes from one point to another on the beauty scale are not necessarily linear, but instead differ based on the starting and ending point. For the women, each percentile gain in attractiveness leads to an increase of 0.2 percent in the ratio of wave IV wages to wave III wages, meaning that going from the 25th percentile to the 75th percentile would yield an average wage increase of 10 percent. For the men, the result is negligible but positive; the same increase in attractiveness is correlated with an average wage increase of 1.5 percent. These results show that there is a positive correlation between increases in beauty and earnings, leading to the conclusion that differences between the attractiveness ratings are not random errors but instead represent real changes in beauty over time.

1.6 Endogeneity of beauty and the role of grooming

Unlike other physical characteristics such as race or height, beauty is perceived as being somewhat pliable. Some research provides support for the hypothesis that individuals who invest in non-cognitive human capital in the form of social skills and grooming are rated as being more physically attractive, raising the concern that the beauty premium is partially demonstrating returns for grooming decisions and personality characteristics rather than physical appearance alone. Several psychology studies show that changing personal grooming choices such as clothing [Lennon, 1990] [Brase and Richmond, 2004], makeup [Etcoff et al., 2011], facial hair [Dixson and Vasey, 2012] [Reed and Blunk, 1990] [Neave and Shields, 2008], or glasses [Bartolini et al., 1988] in turn changes perceptions of subjects' attractiveness and personality traits. Hamermesh et al. [2002] find that grooming expenditures are positively correlated with womens' beauty ratings, but that the increased spending on grooming does not pay for itself in the form of higher earnings. Additionally, the existence of a multi-billion dollar beauty industry suggests that there is not only a widespread belief that physical appearance is an important characteristic, but also that it is possible to affect one's perceived level of beauty (or at least to maximize it subject to genetic constraints).

Investigating the degree to which investments in beauty are effectual is of particular importance to interpreting the results of this paper if one believes that the observed return to attractiveness might be measuring an endogenous characteristic. French et al. [2009] and Robins et al. [2011] suggest that the observed effects of adolescent and adult attractiveness are actually a result of respondents' personality attractiveness and level of personal grooming, which both could be interpreted as choice variables or changeable elements of human capital. There is, however, convincing evidence that perception of these traits is confounded with perception of an individual's physical appearance. Several papers indicate that the perception of beauty and other cognitive and non-cognitive skills are somewhat commingled in the sense that physical attractiveness affects the perception of an individual's ability level and personality. For instance, Tews et al. [2009] find that in the absence of personality information, hiring managers mistakenly ascribe more desirable personality characteristics to physically attractive candidates, resulting in statistical discrimination on the basis of physical appearance. Hope and Mindell [1994] find that an attractive person is judged as being more socially competent when performing the same behavior as an unattractive person, indicating that measures of social skills are likely confounded by physical attractiveness.

This potential overlap in perception of beauty, grooming, and personality traits is potentially problematic in terms of establishing causality; if beauty is exogenous, it is a plausible determinant of earnings, but if it is endogenous, then its connection to earnings could be a coincidental byproduct of other decisions and characteristics. Thus, I examine the relationship between beauty and grooming in order to determine whether the beauty premium is primarily a result of innate beauty or of appearance enhancements. The first step in determining the extent to which beauty is malleable is to examine the relationship between perceived attractiveness and measurable grooming decisions. The data contain several of these measures, and examining their relationship to attractiveness ratings demonstrates the impact of grooming on the perception of beauty. Table 1.11 shows the sample means of respondents' physical attractiveness based on several different variables related to grooming and appearance. In the adult surveys, participants are asked about corrective eyewear and whether they wear glasses or contact lenses. In the adolescent surveys, participants are asked whether they have a tattoo, pierced ears, any other piercing, or braces. The survey data also include height and weight for each respondent at each wave of the survey, which allows investigation into how body mass index (BMI) affects attractiveness. To the extent that weight is a choice variable, this provides insight into another channel through which individuals can affect their own level of perceived beauty.

Table 1.11 demonstrates a statistically significant difference in the average attractiveness levels associated with several of the grooming categories; however, this alone is not enough to establish that grooming causes differences in perceived attractiveness. It is possible that people of different attractiveness levels are categorically more or less likely to choose certain grooming behaviors over others because of different income levels, social groups, or desires to conform to social norms. In order to determine whether grooming variables are predictive of attractiveness after controlling for other factors, table 1.12 presents an ordered probit regression of grooming behaviors on beauty, showing how grooming categories and adolescent attractiveness are correlated with adult attractiveness. With a few exceptions, grooming categories are not significant predictors of attractiveness scores. Body mass index has a negative effect on attractiveness for both genders, although the effect is stronger for women. Each extra point on the body mass index scale is associated with a lower probability of being in a higher beauty category. Women with tattoos are generally less attractive, but the effect is not significant after accounting for demographic and educational controls, suggesting that tattoos do not actually change the perception of beauty but are instead a behavior associated with a certain group. For both genders, wearing glasses for vision correction is negatively associated with the probability of being in higher physical attractiveness categories; this is contrast to the insignificant effect of wearing contact lenses. These overall results do not support the idea that early investments in beauty are a significant determinant of adult beauty. With the possible exception of eyeglasses, it appears that of the measurable appearance-related variables in this dataset, the only effective channel for concurrently influencing one's attractiveness is through changes in body weight. Of course, there is a large spectrum of beauty and grooming investments that are not included in this dataset, some of which may also be effective routes to changing personal attractiveness.

Table 1.13 shows the effects of these other appearance-related variables on wages, with and without attractiveness. Grooming investments have some efficacy, although many of them do not appear to influence wages. Including these variables has only a modest impact on the attractiveness coefficients, showing a slightly higher impact on the effects of female attractiveness. This is probably due to the fact that BMI acts as a crude proxy for physical attractiveness, and it affects female beauty more than male beauty. The fact that including these other measures of appearance does little to diminish the magnitude of the coefficients on adolescent and adult attractiveness implies that the return to beauty is unaffected by individuals' grooming habits; these habits may be correlated with earnings, but including them in the regression equation does not significantly impact the relationship between attractiveness and earnings.

Interestingly, men and women who received orthodontic treatment in adolescence earn an average of 6 to 7 percent more per hour than their counterparts, even after controlling for factors such as education level and parent income. To the extent that additional members of the sample set have potentially had their teeth straightened later in life, this figure underreports the value of having a well-ordered smile. Men who report having tattoos in high school have expected hourly earnings that are 11 percent lower than those of their peers. These effects are almost certainly at least partially due to unobservable factors; to the extent that they are measuring reactions to appearance, the effects are understated since any tattoos or braces received after wave II of the survey are unreported. In 2007, 36 percent of 18-25 year-olds and 40 percent of 26-40 year-olds reported having a tattoo [Kohut et al., 2007], compared to only 7 percent of the Add Health respondents, meaning that approximately an additional 30 percent of the respondents became tattooed in the thirteen-year period between the reporting of tattoos and the reporting of wages. Although subject to some degree of endogeneity, these findings affirm that early investments in appearance are somewhat influential in determining earnings but that they are not a contributing factor to the effect of either adolescent or adult beauty on earnings.

1.7 The role of confidence and social capital

One of the possible mechanisms through which adolescent beauty affects adult earnings is through the accumulation of positive personality traits during childhood and young adulthood. Children and young adults may have different social experiences based on their level of physical beauty, causing them to possess different characteristics later in life based on these formative experiences. This section utilizes elements of the Add Health data that provide measurements of social capital and self-rated attractiveness in an effort to determine whether these traits are a driving force of the observed premium for adolescent beauty.

If attractive people tend to be more confident and confident people tend to earn more, this is a potential avenue by which beautiful people have an advantage in the workforce. It could be the case that attractive people feel and act differently from unattractive people in a way that leads to different earning levels, so I use self-rated and interviewer-rated attractiveness as proxies for the internal experience and the external observation of attractiveness. In a section of the survey entitled "Social Psychology and Mental Health," participants are posed the question "How attractive are you?" There are four possible responses, ranging from "not at all attractive" to "very attractive." Table 1.14 shows the tabulation between self-rated attractiveness and interviewer-rated physical attractiveness in wave IV of the survey, and table 1.15 shows the interviewer-rated adolescent and adult beauty means for each level of adult self-rated attractiveness. There is some degree of concordance between self-rated and interviewer-rated attractiveness, although women choosing the highest category of self-rated attractiveness are actually statistically less attractive than average in both adolescence and adulthood.

To assess the effect of confidence on earnings, table 1.16 shows the estimated results of attractiveness and self-rated attractiveness on wages, using "moderately attractive" as the omitted group for the self-rated variables. If part of the beauty premium is due to feeling of attractive rather than actually being attractive, then adding self-rated attractiveness should reduce the effect of interviewer-rated attractiveness. It turns out that including measures of self-rated attractiveness has virtually no effect on the magnitude of either adolescent or adult attractiveness, although women who rate themselves as "slightly attractive" and "not at all attractive" earn an average of 6.3 percent and 32.4 percent less than average, respectively. The coefficients on men's self-ratings have the expected signs but are not statistically significant. The conclusion is that the beauty premium does not operate primarily through self-confidence, at least not in the form of self-perception of attractiveness, but that self-confidence is a salient determinant of wages.

Another way to evaluate the potential human capital advantages of adolescent attractiveness is to use measurements of social capital. The data include several social capital variables from adolescence and one measure of social capital during adulthood. A social network is created for each school sampled, which allows the calculation of each individual's centrality, network density, and in-degree (the number of friend nominations received) in high school. In adulthood, respondents are simply asked how many close friends they have with whom they feel at ease, can talk to about private matters, and can call on for help. If the positive effect of adolescent beauty operates partially through creating a more accommodating social environment during the formative years, then including variables directly measuring social capital should lessen the observed impact of adolescent attractiveness.

Table 1.17 shows the estimation results of regressing log wages on both attractiveness and social capital. This table shows results for a smaller number of respondents than the initial wage regression since the adolescent social network variables are only available for part of the sample, and the coefficients on the attractiveness variables are slightly smaller for this subsample, which is something to keep in mind when interpreting the results and comparing to the original wage regressions. In table 1.17, the results of the social capital regressions show that the inclusion of measures of social capital has very little impact on the effect of either adolescent or adult attractiveness on wages, which does not lend support to the idea that early socialization is a mechanism through which the beauty premium operates. Social capital does, however, have an independent positive effect on wages. Each additional close friendship reported in adulthood is correlated with a 1.7 percent increase in hourly earnings. This result is in concordance with several papers that have documented the positive effects of social capital on labor market outcomes [Granovetter, 1973], [Mouw, 2003]. Measures of social capital during secondary school are generally positive but are not significant after including the demographic and educational control variables, indicating that any positive effect of high school friendships occurs through other channels such as lower attrition rates or higher achievement levels for students who are well-connected. This is in slight contrast to a working paper that finds that adolescent social standing predicts large and persistent earnings differences throughout life [Galeotti and Mueller, 2005]. For the Add Health sample, attractiveness is positively correlated with some of the adolescent social capital variables, but it does not appear that the relationship between the two is a driving force behind the beauty premium.

1.8 Conclusion

Adolescent beauty is positively and significantly correlated with adult earnings, and this effect is in addition to the premium for adult beauty. This implies that physical attractiveness has a cumulative effect over time and that the beauty premium as traditionally estimated is augmented by the effects of adolescent appearance. After controlling for other factors, individuals who are in the top two categories of beauty during adolescence have wages that are 4 to 9 percent higher than those of average attractiveness.

One observable way in which adolescent attractiveness affects adult earnings is through its influence on other variables related to job market outcomes. I show that young men in the top two categories of physical attractiveness generally earn better grades and obtain higher levels of education than those who are average-looking, while young women who are less attractive than average tend to earn worse grades than those of average appearance; adolescent attractiveness has no significant correlation with educational attainment for young women. These correlations provide evidence that young people have rational expectations of encountering beauty-related discrimination in the job market and that young men and young women have different responses to the resulting incentives. When household income replaces individual wages as the dependent variable, the coefficients on adolescent beauty categories are larger and more significant, suggesting that adolescent attractiveness plays an important role in assortative matching.

Although differences in the effects of adolescent and adult attractiveness demonstrate that they are distinct, I further rule out the possibility that the estimated effects of adolescent beauty are due to measurement error by showing that changes in beauty and changes in income covary in a nonrandom way. A first-differences estimation on wages shows that a two-point or larger increase in beauty is significantly correlated with increased hourly earnings, while a two-point or larger decrease in beauty is negatively (but not significantly) correlated with hourly earnings. This has the added benefit of eliminating individual fixed effects, showing that the correlation of beauty and wages is not simply a byproduct of the effects of personality traits or other unobservable factors. This does raise the possibility that increased beauty is in fact a consequence of increased earnings, but I address this concern by examining the association between personal grooming choices and attractiveness. There is strong evidence that body mass index is correlated with beauty, but no other appearance-related choice variables are convincing determinants of physical attractiveness; additionally, including these appearance-related variables in log wage regressions does not diminish the impact of either adolescent or adult beauty, although young men with tattoos have lower earnings in adulthood, while young men and young women with braces have higher earnings in adulthood.

Since adolescent beauty is shown to be a significant determinant of adult wages through both direct correlation and through its influence on educational and relationship outcomes, I investigate whether these effects occur through the channels of increased self-confidence and social skills developed by attractive young people. I find that self-rated attractiveness is somewhat correlated with earnings but that it does not temper the effects of interviewer-rated adolescent attractiveness. Likewise, some measures of social capital are also correlated with earnings, but these measures do not appear to mediate the observed advantages of attractiveness. The premium for adolescent beauty remains robust amidst the consideration of other sources of this premium including adult beauty, grooming and appearance enhancements, self-confidence, and interpersonal skills.

Table 1.1: Sample means of independent and dependent variables

	Full sample	Female	Male
Hourly wage	16.865	15.437	18.102
	(10.277)	(9.268)	(11.047)
Adult attractiveness	3.464	3.514	3.413
	(0.839)	(0.8889)	(0.781)
Adolescent attractiveness	3.591	3.690	3.491
	(0.867)	(0.914)	(0.806)
Demographic controls D_i			
Age	28.889	28.737	29.043
	(1.776)	(1.762)	(1.778)
White	0.692	0.663	0.722
	(0.462)	(0.473)	(0.448)
Black	0.233	0.261	0.204
	(0.423)	(0.440)	(0.403)
Asian	0.036	0.037	0.036
	(0.187)	(0.188)	(0.186)
Mother high school grad	0.806	0.812	0.799
	(0.396)	(0.391)	(0.401)
Mother college grad	0.416	0.418	0.415
	(0.493)	(0.493)	(0.493)
Received government aid	0.236	0.241	0.231
	(0.424)	(0.428)	(0.421)
Family income < \$20,000	0.133	0.129	0.137
	(0.340)	(0.336)	(0.344)
Family income \$20,000 - \$40,000	0.219	0.204	0.234
	(0.414)	(0.403)	(0.423)
Family income \$40,000 - \$60,000	0.203	0.200	0.205
	(0.402)	(0.400)	(0.404)
Family income \$60,000 - \$125,000	0.194	0.195	0.194
	(0.396)	(0.397)	(0.395)
Family income > \$125,000	0.024	0.028	0.020
	(0.153)	(0.165)	(0.140)
Missing family income	0.227	0.243	0.211
	(0.419)	(0.429)	(0.408)
Educational controls E_i			
College grad	0.355	0.420	0.289
	(0.479)	(0.494)	(0.454)
Graduate degree	0.090	0.121	0.059
	(0.287)	(0.326)	(0.236)
Currently student	0.142	0.174	0.110
	(0.349)	(0.379)	(0.313)
Married	0.497	0.518	0.477
	(0.500)	(0.500)	(0.500)
Number of children	0.862	0.954	0.769
	(1.102)	(1.127)	(1.069)
Convicted criminal	0.125	0.049	0.202
	(0.331)	(0.216)	(0.402)

Standard errors are in parentheses.

Table 1.2: Pairwise correlations of interviewer ratings of physical attractiveness across waves

	Physical Attractiveness			
	Wave I	Wave II	Wave III	Wave IV
Wave I	1.000			
Wave II	0.302	1.000		
Wave III	0.183	0.213	1.000	
Wave IV	0.130	0.132	0.160	1.000

All correlations are significant at the 1% level

Table 1.3: Wave I and wave IV attractiveness ratings

	Female				
Wave IV interviewer rating:	Below average	About average	Attractive	Very attractive	Total
Wave I interviewer rating:					
Below average	14	61	32	13	120
About average	49	361	235	58	703
Attractive	57	281	315	104	757
Very attractive	23	133	165	65	386
Total	143	836	747	240	1,966
	Male				
Wave IV interviewer rating:	Below average	About average	Attractive	Very attractive	Total
Wave I interviewer rating:					
Below average	20	64	34	3	121
About average	57	507	307	53	924
Attractive	37	331	266	57	691
Very attractive	17	73	90	27	207
Total	131	975	697	140	1,943

Table 1.4: Regression estimates for the effects of adolescent and adult physical attractiveness categories on (log) adult earnings

Controls:	None			Demographic			Education		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Full Sample ($N = 3909$):									
Adolescent below average	−0.026		−0.020	−0.011		−0.006	−0.029		−0.024
	(0.042)		(0.042)	(0.040)		(0.040)	(0.038)		(0.038)
Adolescent above average	0.111***		0.098***	0.075***		0.063***	0.050***		0.042**
	(0.022)		(0.022)	(0.021)		(0.021)	(0.020)		(0.020)
Adolescent very attractive	0.179***		0.156***	0.129***		0.109***	0.104***		0.090***
	(0.029)		(0.030)	(0.028)		(0.028)	(0.027)		(0.027)
Adult below average		0.016	0.012		0.020	0.017		0.004	0.002
		(0.039)	(0.039)		(0.038)	(0.038)		(0.036)	(0.036)
Adult above average		0.128***	0.112***		0.111***	0.101***		0.086***	0.078***
		(0.021)	(0.022)		(0.021)	(0.021)		(0.020)	(0.020)
Adult very attractive		0.183***	0.157***		0.156***	0.139***		0.113***	0.100***
		(0.034)	(0.035)		(0.033)	(0.033)		(0.032)	(0.032)
Female ($N = 1966$):									
Adolescent below average	−0.036		−0.036	−0.031		−0.031	−0.064		−0.062
	(0.061)		(0.061)	(0.059)		(0.058)	(0.055)		(0.055)
Adolescent above average	0.108***		0.086***	0.075**		0.058*	0.065**		0.054*
	(0.032)		(0.033)	(0.031)		(0.031)	(0.029)		(0.029)
Adolescent very attractive	0.157***		0.129***	0.112***		0.089**	0.108***		0.094***
	(0.039)		(0.039)	(0.038)		(0.038)	(0.035)		(0.036)
Adult below average		0.086	0.082		0.085	0.081		0.055	0.052
		(0.056)	(0.056)		(0.054)	(0.054)		(0.050)	(0.050)
Adult above average		0.156***	0.140***		0.129***	0.118***		0.100***	0.088***
		(0.031)	(0.032)		(0.030)	(0.030)		(0.028)	(0.028)
Adult very attractive		0.212***	0.188***		0.164***	0.149***		0.106***	0.090***
		(0.046)	(0.046)		(0.043)	(0.044)		(0.041)	(0.041)
Male ($N = 1943$):									
Adolescent below average	−0.018		−0.003	−0.011		0.003	−0.012		0.000
	(0.057)		(0.058)	(0.055)		(0.055)	(0.053)		(0.053)
Adolescent above average	0.113***		0.105***	0.081***		0.073***	0.047*		0.042
	(0.030)		(0.030)	(0.029)		(0.029)	(0.028)		(0.028)
Adolescent very attractive	0.213***		0.197***	0.169***		0.152***	0.124***		0.111***
	(0.046)		(0.046)	(0.044)		(0.044)	(0.043)		(0.043)
Adult below average		−0.056	−0.061		−0.052	−0.056		−0.044	−0.048
		(0.055)	(0.055)		(0.053)	(0.053)		(0.051)	(0.051)
Adult above average		0.101***	0.086***		0.093***	0.082***		0.068***	0.061**
		(0.030)	(0.030)		(0.028)	(0.028)		(0.027)	(0.028)
Adult very attractive		0.152***	0.121**		0.157***	0.135***		0.140***	0.125***
		(0.054)	(0.054)		(0.051)	(0.052)		(0.050)	(0.050)

Coefficients denoted by $*$, $**$, and $***$ are significant at the 1%, 5% and 10% levels, respectively. Standard errors are in parentheses.

Table 1.5: Regression estimates for the effects and interactions of adolescent and adult attractiveness on (log) adult earnings using indicator variables

Adolescent	Adult	Full Sample ($(N = 3909)$)	Female ($N = 1966$)	Male ($N = 1943$)
Average	Above	0.074^{***}	0.145^{***}	0.017
		(0.028)	(0.042)	(0.037)
Average	Very	0.146^{***}	0.208^{***}	0.080
		(0.052)	(0.070)	(0.077)
Above	Average	0.049^{*}	0.121^{***}	0.008
		(0.059)	(0.039)	(0.036)
Above	Above	0.119^{***}	0.141^{***}	0.114^{***}
		(0.029)	(0.040)	(0.041)
Above	Very	0.158^{***}	0.203^{***}	0.139^{*}
		(0.047)	(0.060)	(0.076)
Very	Average	0.097^{***}	0.181^{***}	0.016
		(0.039)	(0.051)	(0.062)
Very	Above	0.200^{***}	0.229^{***}	0.204^{***}
		(0.039)	(0.050)	(0.062)
Very	Very	0.113^{*}	0.072	0.319^{***}
		(0.061)	(0.073)	(0.108)

Regressions include D_i and E_i vectors of control variables. Standard errors are in parentheses.

Coefficients denoted by $***$, $**$, and $*$ are significant at the 1%, 5%, 10% levels, respectively.

Table 1.6: OLS regression estimates for the effects of adolescent attractiveness on years of education

	Full Sample : ($N = 5076$)	Female ($N = 2743$)	Male ($N = 2333$)
Adolescent below average	-0.023	0.002	-0.012
	(0.118)	(0.160)	(0.174)
Adolescent above average	0.295^{***}	0.170^{*}	0.441^{***}
	(0.064)	(0.088)	(0.092)
Adolescent very attractive	0.446^{***}	0.277^{***}	0.715^{***}
	(0.084)	(0.107)	(0.139)

Regressions include D_i vector of control variables. Standard errors are in parentheses.

Coefficients denoted by $***$, $**$, and $*$ are significant at the 1%, 5% and 10% levels, respectively.

Table 1.7: OLS regression estimates for the effects of adolescent attractiveness on high school GPA

	Full Sample ($N = 3401$)	Female ($N = 1878$)	Male ($N = 1523$)
Adolescent below average	-0.034	-0.152^{**}	0.113
	(0.052)	(0.067)	(0.083)
Adolescent above average	0.134^{***}	0.070^{*}	0.198^{***}
	(0.029)	(0.038)	(0.043)
Adolescent very attractive	0.136^{***}	0.050	0.262^{***}
	(0.038)	(0.046)	(0.066)

Regressions include D_i vector of control variables. Standard errors are in parentheses.

Coefficients denoted by $***$, $**$, and $*$ are significant at the 1%, 5% and 10% levels, respectively.

Table 1.8: Regression estimates for the effects of adolescent and adult attractiveness on (log) household income

Controls:	None			Demographic			Education		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Full Sample ($N = 3741$):									
Adolescent below average	0.019		0.024	0.038		0.042	0.014		0.019
	(0.051)		(0.051)	(0.049)		(0.049)	(0.046)		(0.046)
Adolescent above average	0.178***		0.163***	0.130***		0.118***	0.098***		0.090***
	(0.027)		(0.027)	(0.026)		(0.026)	(0.024)		(0.024)
Adolescent very attractive	0.249***		0.225***	0.192***		0.171***	0.163***		0.149***
	(0.035)		(0.036)	(0.034)		(0.036)	(0.032)		(0.033)
Adult below average		0.010	0.001		0.016	0.007		−0.003	−0.009
		(0.048)	(0.048)		(0.046)	(0.046)		(0.044)	(0.044)
Adult above average		0.131***	0.108***		0.111***	0.095***		0.084***	0.072***
		(0.026)	(0.026)		(0.025)	(0.025)		(0.024)	(0.024)
Adult very attractive		0.225***	0.187***		0.187***	0.161***		0.138***	0.117***
		(0.042)	(0.042)		(0.040)	(0.040)		(0.038)	(0.038)
Female ($N = 1883$):									
Adolescent below average	0.041		0.040	0.075		0.074	0.023		0.024
	(0.075)		(0.075)	(0.071)		(0.071)	(0.066)		(0.066)
Adolescent above average	0.214***		0.192***	0.150***		0.132***	0.124***		0.113***
	(0.039)		(0.040)	(0.038)		(0.038)	(0.035)		(0.035)
Adolescent very attractive	0.259***		0.230***	0.196***		0.174***	0.175***		0.162***
	(0.048)		(0.048)	(0.046)		(0.046)	(0.042)		(0.043)
Adult below average		0.066	0.053		0.086	0.076		0.043	0.035
		(0.069)	(0.068)		(0.065)	(0.065)		(0.061)	(0.061)
Adult above average		0.162***	0.133***		0.134***	0.115***		0.104***	0.086***
		(0.038)	(0.038)		(0.036)	(0.036)		(0.034)	(0.034)
Adult very attractive		0.247***	0.205***		0.186***	0.158***		0.106**	0.081*
		(0.056)	(0.056)		(0.053)	(0.053)		(0.050)	(0.050)
Male ($N = 1858$):									
Adolescent below average	0.000		0.015	0.020		0.033	0.020		0.033
	(0.069)		(0.069)	(0.067)		(0.067)	(0.065)		(0.065)
Adolescent above average	0.143***		0.135***	0.115***		0.107***	0.079**		0.074**
	(0.036)		(0.036)	(0.035)		(0.035)	(0.034)		(0.034)
Adolescent very attractive	0.251***		0.231***	0.203***		0.183***	0.166***		0.151***
	(0.054)		(0.055)	(0.053)		(0.053)	(0.052)		(0.052)
Adult below average		−0.047	−0.055		−0.045	−0.052		−0.047	−0.055
		(0.067)	(0.067)		(0.065)	(0.065)		(0.063)	(0.063)
Adult above average		0.101***	0.083**		0.090***	0.077**		0.066**	0.056*
		(0.035)	(0.035)		(0.034)	(0.034)		(0.033)	(0.033)
Adult very attractive		0.203***	0.166***		0.199***	0.171***		0.178***	0.158***
		(0.065)	(0.065)		(0.063)	(0.063)		(0.061)	(0.061)

Coefficients denoted by $***$, $**$, and $*$ are significant at the 1%, 5% and 10% levels, respectively. Standard errors are in parentheses.

Table 1.9: First difference regression of percentile change in attractiveness on change in log wages from wave III to wave IV

	Full Sample ($N = 1237$):	Female ($N = 535$):	Male ($N = 702$):
Δ beauty	0.001	0.002**	0.000
	(0.001)	(0.001)	(0.001)
Δ HS	−0.007	−0.125	0.027
	(0.071)	(0.122)	(0.089)
Δ college	0.267***	0.240**	0.299***
	(0.071)	(0.101)	(0.105)
Δ grad	0.507***	0.445***	0.618***
	(0.093)	(0.112)	(0.173)
Married	0.094**	0.069	0.099*
	(0.039)	(0.061)	(0.052)
Divorced	−0.111*	−0.072	−0.150**
	(0.062)	(0.104)	(0.076)

Coefficients denoted by $*$, $**$, and $***$ are significant at the 1%, 5% and 10% levels, respectively. Robust standard errors are in parentheses.

Table 1.10: Sample means of grooming variables

	Full sample	Female	Male
Adolescent BMI	22.555	22.370	22.734
	(4.411)	(4.522)	4.294)
Adult BMI	28.244	28.210	28.277
	(6.631)	(7.334)	(5.869)
Glasses	0.215	0.236	0.194
	(0.411)	(0.425)	(0.396)
Contact lenses	0.066	0.067	0.065
	(0.248)	(0.250)	(0.247)
Pierced ear(s)	0.441	0.709	0.180
	(0.497)	(0.454)	(0.384)
Other piercing	0.026	0.041	0.010
	(0.158)	(0.198)	(0.102)
Braces	0.281	0.319	0.245
	(0.450)	(0.466)	(0.430)

Standard errors are in parentheses.

Table 1.11: Physical attractiveness means by various appearance-related variables

	Female				Male			
	Adolescent		Adult		Adolescent		Adult	
Overweight	3.736	3.523***	3.510	3.547	3.493	3.532	3.357	3.529***
	(0.023)	(0.054)	(0.028)	(0.039)	(0.020)	(0.043)	(0.022)	(0.030)
Obese	3.752	3.121***	3.633	3.293***	3.523	3.160***	3.491	3.276***
	(0.021)	(0.074)	(0.027)	(0.030)	(0.019)	(0.068)	(0.022)	(0.028)
Glasses	3.722	3.659*	3.545	3.439**	3.525	3.395***	3.439	3.357**
	(0.024)	(0.045)	(0.024)	(0.041)	(0.021)	(0.040)	(0.020)	(0.037)
Contacts	3.702	3.782	3.523	3.484	3.500	3.492	3.421	3.460
	(0.022)	(0.078)	(0.021)	(0.092)	(0.019)	(0.074)	(0.018)	(0.071)
Tattoo	3.708	3.696	3.529	3.373**	3.512	3.340***	3.421	3.454
	(0.022)	(0.094)	(0.021)	(0.084)	(0.019)	(0.067)	(0.019)	(0.058)
Pierced ears	3.633	3.738**	3.501	3.528	3.519	3.414***	3.423	3.423
	(0.040)	(0.025)	(0.037)	(0.025)	(0.021)	(0.041)	(0.020)	(0.042)
Other piercing	3.699	3.908**	3.523	3.461	3.500	3.500	3.423	3.450
	(0.022)	(0.114)	(0.021)	(0.094)	(0.018)	(0.154)	(0.018)	(0.153)
Braces	3.690	3.744	3.510	3.542	3.486	3.542*	3.407	3.474**
	(0.025)	(0.038)	(0.025)	(0.038)	(0.019)	(0.064)	(0.021)	(0.038)

Figures denoted by $*$, $**$, and $***$ are significantly different from the mean of the control group at the 1%, 5%, and 10% levels, respectively. Standard errors are in parentheses.

Table 1.12: Ordered probit estimates for the effects of grooming behaviors and adolescent attractiveness on adult attractiveness

	Full Sample ($N = 3756$)	Female ($N = 1851$)	Male ($N = 1905$)
Adolescent below average	-0.171^{**}	-0.040	-0.302^{***}
	(0.079)	(0.114)	(0.111)
Adolescent above average	0.154^{***}	0.165^{***}	0.132^{**}
	(0.041)	(0.060)	(0.057)
Adolescent very attractive	0.239^{***}	0.219^{***}	0.267^{***}
	(0.054)	(0.073)	(0.086)
Wave I BMI	0.004	0.008	-0.003
	(0.006)	(0.008)	(0.008)
Wave IV BMI	-0.030^{***}	-0.036^{***}	-0.022^{***}
	(0.004)	(0.005)	(0.006)
Braces	-0.017	-0.076	0.050
	(0.043)	(0.059)	(0.062)
Pierced ears	0.042	0.071	0.022
	(0.044)	(0.062)	(0.069)
Tattoo	-0.023	-0.171	0.084
	(0.076)	(0.115)	(0.102)
Other piercing	-0.065	-0.086	-0.180
	(0.115)	(0.130)	(0.215)
Glasses	-0.118^{***}	-0.115^{*}	-0.116^{*}
	(0.046)	(0.065)	(0.067)
Contact lenses	-0.046	-0.082	-0.003
	(0.074)	(0.105)	(0.106)

Regressions include D_i and E_i vectors of control variables. Standard errors are in parentheses.

Coefficients denoted by $***$, $**$, and $*$ are significant at the 1%, 5%, 10% levels, respectively.

Table 1.13: Regression estimates for the effects of adolescent and adult attractiveness and grooming behaviors on (log) adult earnings

	Full Sample ($N = 3756$)		Female ($N = 1851$)		Male ($N = 1905$)	
Adolescent below	0.010	0.017	−0.025	−0.017	0.026	0.030
	(0.040)	(0.040)	(0.057)	(0.057)	(0.055)	(0.055)
Adolescent above	0.048**	0.041**	0.057*	0.044	0.050*	0.040
	(0.021)	(0.021)	(0.030)	(0.030)	(0.028)	(0.028)
Adolescent very	0.087**	0.078***	0.084**	0.064*	0.116***	0.102**
	(0.027)	(0.027)	(0.036)	(0.036)	(0.043)	(0.043)
Adult below	0.021	0.016	0.070	0.063	−0.029	−0.041
	(0.037)	(0.037)	(0.051)	(0.051)	(0.053)	(0.052)
Adult above	0.074***	0.069***	0.083***	0.067**	0.059**	0.060***
	(0.020)	(0.020)	(0.029)	(0.014)	(0.028)	(0.028)
Adult very	0.085***	0.083***	0.070*	0.051	0.117**	0.117**
	(0.032)	(0.032)	(0.041)	(0.042)	(0.050)	(0.050)
Wave I BMI		−0.010***		−0.009**		−0.013***
		(0.003)		(0.004)		(0.004)
Wave IV BMI		0.004**		−0.001		0.010***
		(0.002)		(0.003)		(0.003)
Braces		0.064***		0.072***		0.062**
		(0.021)		(0.029)		(0.031)
Pierced ears		−0.029		0.009		−0.054
		(0.022)		(0.031)		(0.034)
Tattoo		−0.084**		−0.036		−0.109**
		(0.038)		(0.057)		(0.050)
Other piercing		0.051		0.069		0.016
		(0.058)		(0.065)		(0.124)
Glasses		−0.036*		−0.027		−0.054*
		(0.022)		(0.030)		(0.032)
Contact lenses		−0.001		0.005		0.011
		(0.036)		(0.051)		(0.051)

Regressions include D_i and E_i vectors of control variables. Standard errors are in parentheses. Coefficients denoted by $***$, $**$, and $*$ are significant at the 1%, 5% and 10% levels, respectively. Standard errors are in parentheses.

Table 1.14: Interviewer and self-ratings of attractiveness

Self-rating:	Not at all	Slightly	Moderately	Very	Total
Interviewer rating:					
Very unattractive	2	23	52	40	117
Unattractive	9	58	67	23	157
About average	39	646	870	251	1,806
Attractive	13	381	813	236	1,443
Very attractive	5	81	213	81	380
Total	68	1,189	2,015	613	3,903

Table 1.15: Sample means of interviewer-rated attractiveness by self-rated attractiveness

	Female				Male			
	Adolescent		Adult		Adolescent		Adult	
Rates self as:								
Very attractive	3.715	3.559**	3.528	3.441*	3.495	3.469	3.399	3.495**
	(0.022)	(0.053)	(0.021)	(0.059)	(0.020)	(0.049)	(0.019)	(0.051)
Moderately attractive	3.637	3.736***	3.441	3.580***	3.449	3.531***	3.348	3.478***
	(0.029)	(0.029)	(0.027)	(0.025)	(0.023)	(0.029)	(0.026)	(0.024)
Slightly attractive	3.688	3.692	3.541	3.449***	3.516	3.436**	3.469	3.295***
	(0.025)	(0.035)	(0.025)	(0.033)	(0.022)	(0.033)	(0.022)	(0.029)
Not at all attractive	3.693	3.457*	3.518	3.314*	3.491	3.485	3.422	2.970***
	(0.021)	(0.161)	(0.020)	(0.152)	(0.018)	(0.145)	(0.018)	(0.134)

Figures denoted by $*$, $**$, and $***$ are significantly different from the mean of the control group at the 1%, 5%, and 10% levels, respectively. Standard errors are in parentheses.

Table 1.16: Regression estimates for the effects of adolescent and adult attractiveness and self-rated attractiveness on (log) adult earnings

	Full Sample ($N = 3903$)		Female ($N = 1963$)		Male ($N = 1940$)	
Adolescent below average	-0.024	-0.024	-0.062	-0.063	0.000	0.000
	(0.038)	(0.038)	(0.055)	(0.054)	(0.053)	(0.053)
Adolescent above average	0.042**	0.038*	0.055*	0.049*	0.040	0.039
	(0.020)	(0.020)	(0.029)	(0.029)	(0.028)	(0.028)
Adolescent very attractive	0.092***	0.089***	0.097***	0.090***	0.111***	0.111***
	(0.027)	(0.027)	(0.036)	(0.035)	(0.043)	(0.043)
Adult below average	0.001	0.005	0.050	0.051	-0.047	-0.045
	(0.036)	(0.036)	(0.050)	(0.050)	(0.051)	(0.052)
Adult above average	0.077***	0.071***	0.085***	0.080***	0.062**	0.057**
	(0.020)	(0.020)	(0.028)	(0.028)	(0.028)	(0.028)
Adult very attractive	0.099***	0.093***	0.088**	0.083***	0.126***	0.119**
	(0.032)	(0.032)	(0.041)	(0.041)	(0.050)	(0.051)
Self-rated very attractive		-0.002		-0.056		0.033
		(0.027)		(0.039)		(0.37)
Self-rated slightly attractive		-0.047**		-0.063**		-0.025
		(0.021)		(0.029)		(0.029)
Self-rated not at all attractive		-0.235***		-0.324***		-0.091
		(0.069)		(0.095)		(0.098)

Regressions include D_i and E_i vectors of control variables. Standard errors are in parentheses. Coefficients denoted by $***$, $**$, and $*$ are significant at the 1%, 5% and 10% levels, respectively. Standard errors are in parentheses.

Table 1.17: Regression estimates for the effects of adolescent and adult attractiveness and social capital on (log) adult earnings

	Full Sample ($N = 2643$)		Female ($N = 1382$)		Male ($N = 1261$)	
Adolescent below average	-0.066	-0.062	-0.126^{**}	-0.128^{**}	-0.016	0.000
	(0.046)	(0.046)	(0.061)	(0.061)	(0.070)	(0.070)
Adolescent above average	0.031	0.028	0.020	0.019	0.060^{*}	0.053
	(0.024)	(0.024)	(0.034)	(0.035)	(0.034)	(0.034)
Adolescent very attractive	0.049	0.051	0.034	0.036	0.101^{**}	0.102^{**}
	(0.032)	(0.032)	(0.041)	(0.041)	(0.051)	(0.051)
Adult below average	0.049	0.058	0.087	0.094^{*}	0.003	0.016
	(0.042)	(0.042)	(0.056)	(0.056)	(0.065)	(0.064)
Adult above average	0.055^{**}	0.051^{**}	0.059^{*}	0.055^{*}	0.045	0.042
	(0.024)	(0.024)	(0.033)	(0.033)	(0.034)	(0.033)
Adult very attractive	0.083^{**}	0.075^{**}	0.067	0.063	0.112^{*}	0.098^{*}
	(0.037)	(0.038)	(0.048)	(0.048)	(0.060)	(0.060)
Number of close friends		0.017^{***}		0.015^{***}		0.016^{***}
		(0.004)		(0.006)		(0.005)
In-degree		0.003		0.000		0.006
		(0.003)		(0.005)		(0.004)
Centrality		0.010		0.019		-0.001
		(0.019)		(0.028)		(0.026)
Network density		-0.042		-0.073		-0.057
		(0.079)		(0.114)		(0.110)

Regressions include D_i and E_i vectors of control variables. Standard errors are in parentheses. Coefficients denoted by $***$, $**$, and $*$ are significant at the 1%, 5% and 10% levels, respectively. Standard errors are in parentheses.

Chapter 2

The economic value of fashion: effects of grooming choices on earnings

2.1 Introduction

In the economics literature and elsewhere, the idea that an individual's physical appearance affects labor market outcomes is abundantly evident. Surveys suggest that when it comes to both hiring and promotion decisions, employers are influenced by various physical attributes such as facial hair, tattoos, nontraditional haircolor, and clothing choices. Additionally, most advice to job seekers highly emphasizes grooming and personal presentation. This suggests that some relevant information is being conveyed through the use of fashion and grooming choices and that making "correct" choices about such matters sends an important signal to employers. Although this idea is prevalent, it has yet to be validated except through anecdotal evidence. This paper uses a large dataset of relatively homogeneous workers and examines the extent to which specific dress and grooming behaviors are correlated with both labor market outcomes and individual measures of ability.

In this paper, I first establish that specific grooming habits are correlated with differences in earnings and then discuss whether these differences spring from unobservable individual characteristics that are also correlated with grooming habits or whether they represent taste-based or stastistical discrimination on the part of employers. Using matriculation photographs of law students along with longitudinal career and earnings data, I estimate the effects of specific grooming practices identified in the photos and then examine how these effects change over time. Persistent differences in earnings based on grooming categories give validity to the conclusion that grooming behaviors are correlated with unobserved factors that influence productivity. Changes in the coefficients of grooming behaviors across cohorts suggest that taste-based discrimination plays a role as well. Statistical discrimination by employers is ruled out as a source of the premium and penalty for distinct grooming behaviors because these differences in earnings do not diminish over time as an employee's true productivity becomes evident.

Prior literature in the labor field has primarily focused on innate characteristics and has attributed earnings differences to discriminatory behavior by employers and consumers; hardly any empirical literature has addressed the question of fashion as a signaling mechanism, but this concept is utilized in the theoretical literature as an untested assumption. By focusing on aspects of appearance that are under an individual's control, I examine the possibility that grooming acts as a signal of underlying human capital. Alternatively, grooming choices may serve no economic purpose or may be a function of an individual's identity and preferences separate from any utility as a labor market signaling device. This paper also examines the economic effect of grooming in relation to the beauty effect, evaluating whether the beauty premium is influenced by grooming choices. I find that the beauty premium is correlated with but totally unaffected by grooming choices, implying that the observed favoritism towards physically attractive employees is not merely a return to their efforts to maintain a stylish appearance.

The next section briefly discusses previous literature addressing the economic importance of physical appearance and fashion and section 2.3 describes the estimation strategy involved in identifying the effects of grooming and distinguishing whether these are due to signaling effects or correlation with unobservable factors. Section 2.4 describes the data used to address the issues at hand, and section 2.5 describes the regression results. Section 2.6 investigates the relationship between grooming choices and beauty ratings and establishes that these have distinct effects even though they are correlated. Finally, section 2.7 concludes and summarizes the results.

2.2 Prior Literature

There are two relevant veins of literature addressing the economic importance of physical appearance. The first is the idea that appearance is pertinent to earnings and employment choices. The "beauty premium" has been well-documented using several data sets with various occupational categories. Economists have focused on several different aspects of appearance such as physical beauty [Hamermesh and Biddle, 1994], natural haircolor[Johnston, 2010], height, or even number of missing teeth. Investigating the impact of missing teeth, Glied and Neidell [2008] find that growing up in a community without flouridated water reduces a woman's earnings by approximately 4%, an effect that they attribute to employer and consumer discrimination on an aesthetic basis. Furthermore, psychologists have found that clothing offers important clues about personal characteristics. For example, one recent study finds that observers can accurately judge the characteristics of an individual based only on viewing a picture of his or her favorite pair of shoes[Gehrsitz, 2012]. Other studies examine a myriad of personal grooming choices such as clothing [Lennon, 1990] [Brase and Richmond, 2004], makeup [Etcoff et al., 2011], facial hair [Dixson and Vasey, 2012] [Reed and Blunk, 1990] [Neave and Shields, 2008], and glasses [Bartolini et al., 1988], demonstrating that perceptions of subjects' attractiveness and personality traits are related to each of these behaviors.

The second area of relevant research explores the use of fashion and conspicuous consumption as economic signaling mechanisms. This literature uses economic theory to explore the nature of changing trends; while this theoretical research is not typically focused on a specific product or behavior but rather a generic "fashion good," a crucial element is the obvious visibility of the fashion in question. The general idea is that consumers adopt distinct behaviors or products at different times in order to interact with other desirable individuals[Pesendorfer, 1995] or to convey important information about themselves or their status in society[Hopkins and Kornienko, 2004] [Bartolini et al., 1988]. These fashionable displays include any number of conspicuous products such as clothing, cars, handbags, and watches; of course, fashion cycles also affect hairstyles and other areas of personal grooming. The analysis in this paper is limited to the few grooming choices that are easily observable in a yearbook photograph of each subject, but the results may have implications for other areas of fashionable behavior as well.

2.3 Estimation Strategy

It is clear that employers value competence and productivity as measured by traditional means such as work experience and GPA. There are two possible reasons why they might also care about an employee's appearance. First, aspects of an employee's appearance may give some indication of his unobservable characteristics that affect competence and productivity, such as loyalty, conformity, or willingness to work hard. The second possibility is that employers care about the appearance itself and how it contributes to profits. Having better-looking or well-groomed employees may directly attract or retain more clients, or it may be conducive to projecting a good image of the company, which indirectly attracts and maintains a client base. If this is the case, they will prefer both candidates who demonstrate high achievement as well as those who demonstrate socially accepted external signals of professionalism and we should see evidence of statistical discrimination on the basis of grooming chioces.

Barring statistical discrimination, taste-based discrimination on the part of employers is another plausible explanation of observed correlations between grooming and earnings. Of course, another possibility is that employers are not actually concerned with employee appearance and that any differences we observe based on grooming habits are a result of individual differences. This would indicate that preferences for certain grooming behaviors are also correlated with individual preferences for certain types of jobs or other factors that affect earnings. In this case, individuals are self-selecting into a subgroup that indicates something about their identity that sets them apart from their peers in statistically evident ways. For instance, we might stereotypically assume that men with beards are more likely to prefer environmental law over corporate tax law or that women who wear glasses are less likely to be trial lawyers than those who do not.

Further distinguishing the cause of these differences in outcomes should focus on determining whether these outcomes seem to be driven by career choices on the part of employees or whether we see patterns more consistent with employer statistical discrimination. Altonji and Pierret [2001] show that when firms statistically discriminate on the basis of easily observable characteristics, the coefficients on these characteristics decrease over time as more information about the employee's true productivity becomes known. The same is not true for taste-based employer discrimination, which may persist over time. Additionally, if there are fundamental differences in either preferences or ability among groups displaying different grooming choices but no statistical employer discrimination, we should expect to see persistent differences in outcomes between these groups.

The estimation strategy used is outlined in the equation below. If grooming choices are used as a basis for statistical discrimination, we should see the coefficient on $G_{i,0}$ decreasing over time as employers gain more information about actual productivity. In reality grooming is not a static characteristic, but in the data grooming is observed only once, at $t = 0$, so any taste-based correlation of grooming behaviors and wages will decrease over time as individuals move in and out of the designated groups and the initial classification of grooming behaviors becomes increasingly noisy. Changing fashions may also affect taste-based discrimination, in which case the coefficients of certain grooming behaviors may change across cohorts. If, however, the observed effects of grooming are due to some correlation with individual fixed effects such as unobserved productivity or personality traits, then we should see the coefficient on $G_{i,0}$ stay the same or even increase over time.

$$W_{it} = \beta_0 + \beta_1 G_{i,0} + \beta_2 P_i + \beta_3 J_{i,t} + \epsilon_{i,t} \tag{2.1}$$

where:

$$\begin{aligned}
W_{it} &= i\text{'s yearly income at time } t \\
G_{i,0} &= i\text{'s grooming choices at time } 0 \\
P_i &= \text{a vector of personal and educational control variables} \\
J_{it} &= \text{a vector of job-related control variables at time } t
\end{aligned}$$

2.4 The Data

In order to evaluate the influence of grooming on earnings, I use a sample of lawyers graduating from the same highly-ranked law school (hereafter referred to as Law School X) in the 1970's and 1980's. In each year, between 300 and 400 students matriculate and graduate from Law School X, and the school conducts follow-up surveys of its students five years and fifteen years after graduation. These surveys include questions regarding earnings directly following law school, current earnings, job characteristics, type of law being practiced, and other demographic information.

In addition to the survey information, the faculty member in charge of the follow-up survey arranged to have information from the school's records merged with the self-reported information from the questionnaire; therefore, the data include information gathered directly from the school's records regarding the students' law school performance and activities. For each student, it includes GPA, class rank, law journal and moot court participation, a composite measure of LSAT score and undergraduate GPA, and information about the type of undergraduate institution attended.

Law School X typically publishes a book containing the photographs of the students in each entering class. Biddle and Hamermesh [1998] were able to obtain these photographs for several entering classes of Law School X. In total, the data contain information for eleven separate cohorts of law students; the classes graduating in the 1970's include the entering classes of 1969 - 1974, after which there is five-year gap in the data, and the classes graduating in the 1980's include the entering classes of 1979 - 1982 and 1984. The five-year follow-up survey is available for most of the students in all cohorts, and the fifteen-year questionnaire is also available for students in the 1970's sample years.

To measure grooming variables, data are gathered from the matriculation photographs of each student. Ideally, we could randomly choose graduating law students, assign them to a group and dictate a set of grooming rules to follow as they go off to their inaugural interviews and subsequent careers; this would allow for the separation of the discriminatory and aesthetic effects of these grooming behaviors from the effects resulting from endogenous differences between the groups. Instead, we observe the grooming choices they display in their photos, which are taken at matriculation for each entering class. In each photograph of a male student, it is observed whether the student wears glasses, whether he has facial hair of any sort, and whether he is wearing a formal jacket and button-down shirt (which in most cases is also accompanied by a tie). In each photograph of a female student, it is observed whether the student wears glasses and whether she has longer than shoulder-length hair.

Tables 2.1 and 2.2 contain the sample means of the control variables used, both for the sample as a whole and by grooming category. Variables listed under P_i are personal variables regarding law school activities and experiences prior to law school, as well as the number of jobs held within the first five years of graduation. The variables listed under $J_{i,5}$ are job characteristics, including years working in the private sector as well as indicator variables for the size of the city in which the individual currently works and number of other lawyers working in the office. Lawyers in the different grooming categories have significantly different means for some variables, but they do not seem to demonstrate systematic differences related to variables that influence productivity or hireability. For instance, men with facial hair are less likely to participate in moot court but more likely to participate in law journal, and they show no significant differences in class rank.

This dataset is used by Biddle and Hamermesh [1998] in the context of examining the possibility of employees switching sectors over time when the return on beauty is greater in the private sector compared to the public sector. Since beauty is a fundamental component to their question, a photograph of each law student is mounted on a separate sheet of paper and scored for attractiveness by four different raters in order to obtain a composite score for each individual's physical attractiveness. In this paper, I use an average of these four beauty ratings (recentered to have a mean of zero and standard deviation of one) to control for inherent beauty, to compare the magnitude of the effects of beauty and grooming, and to examine the possibility that beauty and grooming influence one another.

While earnings data and other variables for the students are available at different time periods, both five and fifteen years after their graduation, there is only one initial photograph of each student. This means that there is no way to detect differences in grooming over time and how those changes might affect outcomes of interest. I believe it is reasonable to assume that grooming behaviors upon law school entrance are positively correlated with the same grooming behaviors later in life; however, this does not mean that, for instance, a man wearing a moustache when entering law school in 1973 will necessarily continue to keep a moustache throughout his life. Over time, people change hairstyles, clothing preferences and eyewear choices; therefore, a wage effect for grooming behaviors might be telling us that employers have a preference for specific behaviors, but it also may be capturing the effect of personality characteristics such as trendiness and cultural capital that can be manifested by different grooming behaviors in different time periods.

2.5 Results

Any investigation of these possibilties must first begin with determining whether grooming behaviors are, in fact, correlated with any measurable employment outcomes. To begin with, table 2.3 demonstrates the correlation between grooming and lawyers' first-year salaries; each grooming behavior is coded as an indicator variable and included in a regression of log wages along with the variables in P_i. For the men in the sample, both glasses and facial hair are significantly correlated with lower first-year income. For men in the 1970's classes, wearing glasses is correlated with a 5% decrease in income, and for men in the 1980's classes, having facial hair of any kind is correlated with a 7.1% decrease in income. Wearing a jacket and button-down shirt is not predictive of a significant difference in wages, possibly because interview attire is somewhat standard and most companies have a dress code of some kind, meaning that clothing choices in the photos have very little to do with clothing choices in the job market. For women in the sample, those in the 1980's classes who wear glasses make an average of 12.5% less than their peers. Women with long hair do not have significantly different wages from those with short hair. Overall, the effects on glasses and facial hair are quite large, and they outstrip the beauty premium, which Biddle and Hamermesh [1998] find to be around 1% for each standard deviation gain in beauty for year one of this sample.

To determine whether these correlations are a result of employer taste-based discrimination, statistical discrimination, or underlying differences between the groups, tables 2.4 and 2.5 take advantage of the longitudinal nature of these data by comparing the coefficients on grooming behaviors over time. Regressions on five-year and fifteen-year wages also include relevant job-related characteristics in $J_{i,5}$ and $J_{i,15}$. Five years after graduation, the male sample shows a continued pattern of correlation between grooming and earnings. The estimated negative effect of glasses for the 1970's male cohort actually grows in magnitude, and the negative effect of facial hair for the 1980's cohort persists as well. For women, the effect of wearing glasses is positive for the 1970's cohort and negative for the 1980's cohort in year one, and both of these effects become considerably smaller in year five. Wearing a jacket for men and having long hair for women continue to be insignificant in determining wages in year one and year five.

For the men in the 1970's sample, table 2.5 shows the regression results of grooming categories on log wages one, five, and fifteen years after their graduation from law school. These results are somewhat ambiguous compared to the year one and year five results, but they show that grooming categories continue to have an association with earnings nearly two decades after the initial photographs were taken. The men who wear glasses continue to have lower than average earnings in each time period, although this effect is only significant in year five. The coefficient on facial hair is negative for first-year earnings, then becomes positive for fifth-year earnings and ends up negative again for fifteenth-year earnings. This provides strong evidence of taste-based discrimination since this cohort's fifteen-year follow-up falls in roughly the same time period as the one-year and five-year earnings of the 1980's cohort; the coefficients on facial hair are negative and significant for each of these.

These regressions show that decisions regarding personal appearance are correlated with economic outcomes. These correlations are persistent over time, even though ostensibly grooming decisions are not. A partial explanation is that there are unobservable differences between these self-selected groups and these differences lead to an observable difference in income based on personal grooming choices. There is no evidence of employer statistical discrimination; if they were to discriminate based on a reliable signal, we would see the coefficients on grooming categories decrease over time as the information from an individual's work history overshadowed the signalled information. There is evidence that employers use taste-based discrimination and that this varies over time as different grooming behaviors are in fashion; the strongest evidence of this is seen in changing views toward facial hair from the 1970's to the 1980's.

To further explore individual differences, tables 2.6 and 2.7 compare the results of the earnings regressions when including and excluding job-related characteristics. Including job-related characteristics in the regressions has a modest impact on the coefficients of the grooming variables, further evidence that grooming categories are related to personality or other unobservable individual differences. It suggests that part of the reason that, for instance, men in the sample with facial hair have lower earnings is because they have different types of jobs. Grooming choices are correlated with job characteristics, but the correlation of grooming and earnings persists even after controlling for job characteristics.

2.6 The relationship between grooming and beauty

Table 2.8 shows that beauty ratings are significantly different from the mean for each measured grooming behavior, and these grooming behaviors are associated with average beauty ratings in predictable ways. Men who dress formally in their photos are on average viewed as more attractive, while those sporting facial hair or glasses have lower average beauty ratings. Women with long hair have higher average beauty ratings, and those wearing glasses are generally rated lower. While these results seem to fit stereotypical ideas of beauty in our society, it is unclear whether the grooming behaviors simply affect the raters' perception of an individual's beauty or whether grooming decisions are a rational response for an individual who already knows his or her level of beauty. For instance, it may be that a less attractive woman chooses not to focus on her appearance, instead developing other comparative advantages, and hence she wears glasses and wears her hair short simply because it is more convenient; a naturally more attractive woman may choose to adopt stereotypically "beautiful" grooming habits by having long hair and wearing contact lenses. Since we do not observe changes in physical appearance over time, it is impossible to separate the "true" level of physical beauty from the observed beauty that may be impacted by grooming behaviors.

Whatever the cause of the correlation between beauty and grooming, it is worthwhile to recognize that the differences in beauty means by grooming category are rather large, with some of the categories showing a difference of almost one standard deviation. In order to ascertain whether the beauty premium is affected by grooming (and vice versa), I examine the effects of grooming and beauty on log earnings, both separately and simultaneously. If the observed effects of grooming behaviors are simply a natural result of their correlation with beauty ratings, then including the variable for physical attractiveness should eliminate any observed effects of grooming. On the other hand, if the beauty premium is mostly a result of individuals' personal grooming efforts, including measures of objective grooming behaviors should lessen the effects of these subjective beauty ratings.

Tables 2.9, 2.10, and 2.11 show regression results for log earnings using beauty and grooming variables as independent variables. The strongest correlations between income and grooming occur in the first year after law school, while the correlations between income and beauty grow in magnitude over time. As seen in table 2.9, grooming has very little impact on the beauty premium for first-year wages. Additionally, beauty has very little impact on the return to most of the grooming behaviors. For men in the 1980's classes, part of the penalty for facial hair appears to be due to its negative correlation with beauty, but men with facial hair have average earnings that are 6.6% less than their clean-shaven cohorts even after controlling for beauty. For women in the 1970's classes, there appears to be a premium for wearing glasses which is in conflict with the beauty premium because of the apparent correlation between glasses and homeliness. When including both glasses and beauty, the coefficients for each increase significantly. For women in the 1980's classes, the opposite seems to be true; there is a penalty for wearing glasses, and this works in the same direction as the beauty premium since women with glasses have lower beauty ratings. Including both variables slightly decreases the effect of each, although glasses are still negatively correlated with first-year earnings for women in this cohort.

The results on fifth-year earnings, shown in table 2.10 are largely similar to the results on first-year earnings. By the fifth year, the beauty premium is fully evident for the men in the sample, and it becomes more obvious that grooming behaviors do not affect the return to beauty in any meaningful way. The seeming increase in the penalty for men who wear glasses in the 1970's cohorts turns out to be a result of the negative correlation between glasses and beauty. After controlling for beauty, the magnitude of the glasses penalty in year five is similar to is magnitude in year one. Similarly, a small part of the effect of facial hair is also due to its negative correlation with beauty. The grooming behaviors for women are not significantly correlated with wages at year five, but the effect of beauty on grooming and vice versa is similarly seen on a smaller scale. This underscores the conclusion that long hair is not significantly correlated with earnings in any way; including beauty in the regressions greatly reduces the coefficient of long hair, implying that any correlation of long hair and earnings is through the association of long hair with increased beauty.

Table 2.11 shows the coefficients on beauty and grooming for the men graduating in the 1970's for whom earnings data are available for three different points in time. Here it is most apparent that beauty plays an increasingly important role in determining earnings as one's career progresses over time. The beauty premium is unobservable in the first-year income, and by the fifteenth year each standard deviation in beauty commands a wage premium of 5.7%. The interactions of beauty and grooming are more complicated for this cohort of lawyers, mostly because the coefficients on grooming do not follow any obvious pattern over time. Part of the observed penalty for wearing glasses in years five and fifteen appears to be due to the negative correlation between glasses and beauty along with the increasing importance of beauty. It also appears that men who are dressed formally in their photos may actually receive lower compensation in later years, but that this effect is mitigated by the fact that these men were rated as being more physically appealing. When controlling for both beauty and grooming, wearing a jacket becomes significantly negatively correlated with year five income; the same effect is seen to a lesser extent in year fifteen although it is not statistically significant.

These results comparing the effects of beauty and grooming are similar to the results in Chapter 1. In both sets of data, some grooming categories are associated with average beauty ratings that significantly differ from the sample mean, but grooming and beauty are separately correlated with earnings. In the data used in Chapter 1, there is some evidence that higher body mass index and wearing glasses have a negative effect on a person's perceived beauty, but the beauty premium is unchanged by the addition of grooming variables. Likewise, several grooming categories are associated with significant differences in average wages, but these correlations are not affected by the addition of beauty variables. Results from both data sets confirm that the beauty premium is separate from and generally not affected by grooming behaviors, and vice versa.

2.7 Conclusion

I find that some personal grooming choices demonstrated in photographs of law students are correlated with later earnings and that these differences in earnings are somewhat persistent over time. In the first year after law school, men who wear glasses in the 1970's cohort earn an average of 5% less than their classmates, and men in the 1980's cohorts who have facial hair earn 7.1% less than their classmates. Women graduating in the 1980's who wear glasses have earnings that are 12.5% less than those of their peers. No effects are found for either men who are dressed in suit jackets or women who have long hair in their photographs. Similar grooming effects for the males in the sample are also seen in earnings five years after law school graduation, although grooming effects for women wearing glasses decrease in magnitude. For the men in the sample for whom data are available at one, five, and fifteen years, the coefficients on the three grooming behaviors do not show a cohesive pattern, although there are significant correlations between grooming and income at different points in the careers of this cohort. It is interesting that the same grooming behavior can have different effects in each of the two decades; this implies that either there are different personality traits associated with these behaviors in different time periods or that employer preferences for these behaviors change over time (perhaps as fashions change).

Each grooming behavior in the data is correlated with beauty ratings that are significantly different from the mean, although causality cannot be determined. However, the earnings premium for beauty is robust to the inclusion of grooming behaviors, indicating that grooming choices are not a major cause of the beauty premium. The coefficients on grooming behaviors are somewhat impacted by the inclusion of beauty in the regressions, suggesting that part of the effect of grooming choices on earnings may be due to the correlation of grooming and physical attractiveness. In the case of women in the 1970's cohort who wear glasses, beauty and grooming effects work in opposite directions since women who wear glasses have higher income but also tend to have lower beauty ratings; when both are included in the regressions, the effect of each one is strengthened. Overall, this shows that beauty and grooming have separate effects on earnings.

I conclude that the grooming habits studied do not serve an important job market signaling function for this group in terms of statistical discrimination. Although grooming is found to have significant correlation with earnings, these correlations generally stay the same over time. This is inconsistent with the stastical discrimination hypothesis, which would suggest that the effects of the discrimination categories decrease over time. It appears that fashion is related to identity and preferences of workers and taste-based discrimination of employers, but that it is not being utilized as a mechanism for stastistical discrimination in the job market for lawyers.

Table 2.1: Sample means of control variables by grooming category (men)

Variable	Full sample	Glasses	Facial hair	Jacket
P1				
White	0.931	0.952**	0.880***	0.944*
	(0.254)	(0.010)	(0.016)	(0.008)
Undergrad in-state	0.332	0.364**	0.359*	0.335
	(0.471)	(0.022)	(0.024)	(0.017)
Undergrad Ivy League	0.138	0.110**	0.142	0.113***
	(0.345)	(0.015)	(0.018)	(0.011)
Undergrad other private school	0.317	0.316	0.277**	0.315
	(0.465)	(0.022)	(0.023)	(0.016)
Years of prior work experience	1.203	1.491**	1.623***	1.329**
	(2.538)	(0.146)	(0.128)	(0.102)
Master's degree	0.071	0.084*	0.117***	0.071
	(0.256)	(0.013)	(0.016)	(0.009)
Doctorate	0.031	0.048**	0.053***	0.036
	(0.174)	(0.010)	(0.011)	(0.006)
Moot court	0.119	0.126	0.097**	0.128*
	(0.324)	(0.015)	(0.015)	(0.012)
Law journal v143	0.230	0.223	0.262**	0.227
	(0.421)	(0.019)	(0.022)	(0.015)
Finish early	0.065	0.069	0.081	0.090***
	(0.246)	(0.012)	(0.014)	(0.010)
Finish late	0.184	0.173	0.183	0.174
	(0.387)	(0.018)	(0.020)	(0.013)
Class rank	175.202	175.430	175.326	179.080
	(107.799)	(4.804)	(5.703)	(3.822)
Judicial clerkship	0.117	0.121	0.152***	0.114
	(0.322)	(0.015)	(0.018)	(0.011)
First job private sector	0.793	0.768	0.751**	0.768*
	(0.405)	(0.020)	(0.022)	(0.015)
Number of jobs	1.811	1.820	1.834	1.747**
	(0.883)	(0.044)	(0.045)	(0.031)
J5				
Years in private sector	3.674	3.634	3.552	3.616
	(1.934)	(0.094)	(0.104)	(0.071)
City population 200,000 - 1 million	0.304	0.306	0.284*	0.356***
	(0.460)	(0.022)	(0.023)	(0.017)
City population 1 - 3 million	0.316	0.297	0.346	0.306
	(0.465)	(0.021)	(0.024)	(0.016)
City population over 3 million	0.158	0.117**	0.125	0.082***
	(0.365)	(0.015)	(0.017)	(0.010)
150 + other lawyers in office	0.302	0.242***	0.290	0.268**
	(0.459)	(0.021)	(0.024)	(0.016)
50 - 149 other lawyers in office	0.236	0.237	0.221	0.251
	(0.425)	(0.021)	(0.022)	(0.016)
16 - 49 other lawyers in office	0.228	0.244	0.221	0.250*
	(0.420)	(0.021)	(0.022)	(0.016)
Other variables				
Currently married	0.651	0.675	0.707***	0.676*
	(0.477)	(0.026)	(0.025)	(0.022)
Age	31.484	32.012***	32.076***	31.755**
	(2.869)	(0.205)	(0.154)	(0.167)
Currently lawyer	0.936	0.939	0.936	0.946
	(0.244)	(0.011)	(0.012)	(0.008)
Hours per week (80's classes only)	52.743	51.861*	53.064	52.821
	(8.562)	(0.707)	(0.667)	(0.579)

Figures denoted by $***$, $**$, and $*$ are significantly different from the mean of the control group at the 1%, 5%, and 10% levels, respectively. Standard deviations are in parentheses.

Table 2.2: Sample means of control variables by grooming category (women)

variable	Full sample	Glasses	Long hair
P1			
White	0.889	0.860	0.937*
	(0.314)	(0.050)	(0.078)
Undergrad in-state	0.382	0.440	0.413
	(0.486)	(0.071)	(0.036)
Undergrad Ivy League	0.142	0.160	0.143
	(0.349)	(0.052)	(0.026)
Undergrad other private school	0.311	0.260	0.286
	(0.463)	(0.063)	(0.033)
Years of prior work experience	1.828	2.740*	1.566**
	(3.332)	(0.623)	(0.234)
Master's degree	0.091	0.100	0.074
	(0.288)	(0.043)	(0.019)
Doctorate	0.019	0.040	0.011**
	(0.138)	(0.028)	(0.103)
Moot court	0.137	0.100	0.164
	(0.344)	(0.043)	(0.027)
Law journal	0.240	0.300	0.212
	(0.428)	(0.065)	(0.030)
Finish early	0.044	0.080	0.058
	(0.205)	(0.039)	(0.017)
Finish late	0.226	0.220	0.180**
	(0.419)	(0.418)	(0.028)
Class rank	190.458	172.900	184.500
	(108.910)	(16.959)	(7.648)
Judicial clerkship	0.172	0.160	0.143
	(0.378)	(0.052)	(0.026)
First job private sector	0.726	0.640	0.693
	(0.446)	(0.069)	(0.034)
Number of jobs	1.963	2.100	1.836**
	(0.913)	(0.149)	(0.062)
J5			
Years in private sector	3.081	2.818	2.961
	(2.035)	(0.319)	(0.164)
City population 200,000 - 1 million	0.241	0.292	0.247
	(0.428)	(0.066)	(0.033)
City population 1 - 3 million	0.338	0.396	0.312*
	(0.473)	(0.071)	(0.036)
City population over 3 million	0.225	0.125**	0.194
	(0.418)	(0.048)	(0.030)
150 + other lawyers in office	0.323	0.317	0.382**
	(0.468)	(0.074)	(0.040)
50 - 149 other lawyers in office	0.183	0.146	0.163
	(0.387)	(0.056)	(0.026)
16 - 49 other lawyers in office	0.179	0.220	0.151**
	(0.384)	(0.065)	(0.029)
Other variables			
Currently married	0.567	0.565	0.607
	(0.496)	(0.074)	(0.038)
Age	32.051	33.191**	31.665**
	(3.722)	(0.694)	(0.265)
Currently lawyer	0.862	0.837	0.848
	(0.345)	(0.053)	(0.027)
Hours per week (80's classes only)	49.556	49.667	49.613
	(10.093)	(1.970)	(0.909)

Figures denoted by $***$, $**$, and $*$ are significantly different from the mean of the control group at the 1%, 5%,and 10% levels, respectively. Standard deviations are in parentheses.

Table 2.3: Coefficients of grooming variables on first-year wages

	All classes	1970's classes	1980's classes
Men	($N = 1608$)	($N = 855$)	($N = 753$)
Glasses	-0.032^{*}	-0.050^{**}	-0.008
	(0.018)	(0.021)	(0.027)
Facial hair	-0.047^{***}	-0.022	-0.071^{***}
	(0.019)	(0.025)	(0.027)
Jacket	0.007	0.013	-0.002
	(0.017)	(0.022)	(0.025)
Women	($N = 407$)	($N = 116$)	($N = 291$)
Glasses	-0.024	0.146	-0.125^{**}
	(0.055)	(0.112)	(0.063)
Long hair	-0.013	-0.007	-0.004
	(0.034)	(0.089)	(0.035)

Coefficients denoted by $***$, $**$, and $*$ are significant at the 1%, 5%, and 10% levels, respectively. Standard errors are in parentheses.

Table 2.4: Correlation of grooming and earnings in years 1 and 5

	All classes		1970's classes		1980's classes	
	W_1	W_5	W_1	W_5	W_1	W_5
Men	($N = 1515$)		($N = 816$)		($N = 699$)	
Glasses	-0.018	-0.051^{***}	-0.026	-0.088^{***}	-0.002	0.011
	(0.017)	(0.021)	(0.021)	(0.026)	(0.028)	(0.034)
Facial hair	-0.037^{**}	-0.024	-0.022	0.004	-0.056^{**}	-0.057^{*}
	(0.019)	(0.022)	(0.025)	(0.031)	(0.028)	(0.033)
Jacket	0.007	-0.020	0.004	-0.025	0.004	-0.012
	(0.017)	(0.020)	(0.021)	(0.026)	(0.026)	(0.031)
Women	($N = 349$)		($N = 98$)		($N = 251$)	
Glasses	0.034	0.006	0.192	0.069	-0.064	-0.006
	(0.058)	(0.069)	(0.132)	(0.129)	(0.066)	(0.087)
Long hair	-0.006	0.045	0.057	0.076	-0.008	0.027
	(0.036)	(0.043)	(0.106)	(0.104)	(0.037)	(0.049)

Coefficients denoted by $***$, $**$, and $*$ are significant at the 1%, 5%, and 10% levels, respectively. Standard errors are in parentheses.

Table 2.5: Correlation of grooming and earnings in years 1, 5, and 15 for men in 1970's classes

Men ($N = 658$)	W_1	W_5	W_{15}
Glasses	-0.022	-0.054^{**}	-0.041
	(0.023)	(0.025)	(0.043)
Facial hair	-0.032	0.030	-0.082^{*}
	(0.027)	(0.029)	(0.050)
Jacket	0.011	-0.040	-0.005
	(0.023)	(0.025)	(0.043)

Coefficients denoted by $***$, $**$, and $*$ are significant at the 1%, 5%, and 10% levels, respectively. Standard errors are in parentheses.

Table 2.6: Correlation of grooming and earnings in year 5 with and without job characteristics

	All classes		1970's classes		1980's classes	
J5	No	Yes	No	Yes	No	Yes
Men	($N = 1566$)		($N = 850$)		($N = 716$)	
Glasses	-0.051^{**}	-0.047^{***}	-0.107^{***}	-0.081^{***}	0.019	0.011
	(0.022)	(0.021)	(0.027)	(0.026)	(0.037)	(0.033)
Facial hair	-0.043^{*}	-0.033	-0.011	0.003	-0.081^{**}	-0.071^{**}
	(0.024)	(0.022)	(0.032)	(0.030)	(0.036)	(0.033)
Jacket	-0.022	-0.013	-0.016	-0.020	-0.033	-0.008
	(0.021)	(0.020)	(0.028)	(0.026)	(0.034)	(0.031)
Women	($N = 367$)		($N = 102$)		($N = 265$)	
Glasses	-0.002	0.006	0.045	0.048	-0.046	-0.011
	(0.073)	(0.064)	(0.131)	(0.120)	(0.091)	(0.079)
Long hair	0.022	0.028	-0.064	0.055	0.050	0.011
	(0.047)	(0.042)	(0.104)	(0.100)	(0.055)	(0.048)

Coefficients denoted by $***$, $**$, and $*$ are significant at the 1%, 5%, and 10% levels, respectively. Standard errors are in parentheses.

Table 2.7: Correlation of grooming and earnings in year 15 for men in 1970's classes with and without job characteristics ($N = 699$)

J15	No	Yes
Glasses	-0.083^{*}	-0.045
	(0.047)	(0.042)
Facial hair	-0.124^{**}	-0.086^{*}
	(0.056)	(0.049)
Jacket	-0.001	0.004
	(0.048)	(0.042)

Coefficients denoted by $***$, $**$, and $*$ are significant at the 1%, 5%, and 10% levels, respectively. Standard errors are in parentheses.

Table 2.8: Sample means of beauty ratings by grooming category

	Full Sample		1970's classes		1980's classes	
Men						
Glasses	2.996	2.531^{***}	2.982	2.446^{***}	3.009	2.665^{***}
	(0.016)	(0.025)	(0.023)	(0.030)	(0.022)	(0.041)
Facial hair	2.911	2.737^{***}	2.862	2.665^{***}	2.969	2.816^{***}
	(0.017)	(0.025)	(0.024)	(0.035)	(0.024)	(0.035)
Jacket	2.780	2.965^{***}	2.664	2.913^{***}	2.859	3.077^{***}
	(0.019)	(0.021)	(0.030)	(0.026)	(0.025)	(0.034)
Women						
Glasses	3.134	2.575^{***}	3.167	2.487^{***}	3.123	2.629^{***}
	(0.030)	(0.078)	(0.057)	(0.133)	(0.036)	(0.096)
Long hair	2.980	3.185^{***}	2.917	3.194^{***}	3.009	3.168^{**}
	(0.040)	(0.046)	(0.094)	(0.071)	(0.048)	(0.066)

Figures denoted by $***$, $**$, and $*$ are significantly different from the mean of the control group at the 1%, 5%, and 10% levels, respectively. Standard errors are in parentheses.

Table 2.9: Regression results of beauty and grooming variables on first-year wages

	All classes			1970's classes			1980's classes		
Men	($N = 1608$)			($N = 855$)			($N = 753$)		
Beauty	0.020^{**}		0.014	0.012		0.001	0.029^{**}		0.027^{**}
	(0.008)		(0.009)	(0.010)		(0.011)	(0.013)		(0.014)
Glasses		-0.032^{*}	-0.022		-0.050^{**}	-0.050^{**}		-0.008	0.007
		(0.018)	(0.019)		(0.021)	(0.024)		(0.027)	(0.028)
Facial hair		-0.047^{***}	-0.044^{**}		-0.022	-0.022		-0.071^{***}	-0.066^{**}
		(0.019)	(0.019)		(0.025)	(0.025)		(0.027)	(0.027)
Jacket		0.007	0.003		0.013	0.013		-0.002	-0.010
		(0.017)	(0.017)		(0.022)	(0.022)		(0.025)	(0.025)
Women	($N = 407$)			($N = 116$)			($N = 291$)		
Beauty	0.017		0.018	0.028		0.060	0.025		0.018
	(0.017)		(0.018)	(0.042)		(0.046)	(0.017)		(0.018)
Glasses		-0.024	-0.006		0.146	0.205^{*}		-0.125^{**}	-0.107^{*}
		(0.055)	(0.058)		(0.112)	(0.121)		(0.063)	(0.066)
Long hair		-0.013	-0.018		-0.007	-0.027		-0.004	-0.010
		(0.034)	(0.035)		(0.089)	(0.090)		(0.035)	(0.036)

Coefficients denoted by $***$, $**$, and $*$ are significant at the 1%, 5% and 10% levels, respectively. Standard errors are in parentheses.

Table 2.10: Regression results of beauty and grooming variables on fifth-year wages

	All classes			1970's classes			1980's classes		
Men	($N = 1566$)			($N = 850$)			($N = 716$)		
Beauty	0.035^{***}		0.032^{***}	0.037^{***}		0.030^{**}	0.030^{**}		0.032^{**}
	(0.010)		(0.010)	(0.012)		(0.014)	(0.016)		(0.016)
Glasses		-0.047^{**}	-0.023		-0.081^{***}	-0.055^{**}		0.011	0.027
		(0.021)	(0.022)		(0.026)	(0.028)		(0.033)	(0.034)
Facial hair		-0.033	-0.025		-0.003	0.004		-0.071^{**}	-0.064^{**}
		(0.022)	(0.022)		(0.030)	(0.030)		(0.033)	(0.033)
Jacket		-0.013	-0.023		-0.020	-0.031		-0.008	-0.016
		(0.020)	(0.020)		(0.026)	(0.026)		(0.031)	(0.031)
Women	($N = 367$)			($N = 102$)			($N = 265$)		
Beauty	0.038^{**}		0.040^{**}	0.047		0.066	0.031		0.018
	(0.019)		(0.021)	(0.045)		(0.054)	(0.022)		(0.023)
Glasses		-0.002	0.038		0.048	0.119		-0.011	0.018
		(0.064)	(0.067)		(0.120)	(0.133)		(0.079)	(0.081)
Long hair		0.028	0.016		0.055	0.017		0.011	0.002
		(0.042)	(0.042)		(0.100)	(0.104)		(0.048)	(0.048)

Coefficients denoted by $***$, $**$, and $*$ are significant at the 1%, 5% and 10% levels, respectively. Standard errors are in parentheses.

Table 2.11: Correlation of beauty, grooming and earnings in years 1, 5, and 15 for men in 1970's classes

Men ($N = 658$)		W_1			W_5			W_{15}	
Beauty	0.005		−0.001	0.034***		0.036***	0.056***		0.057***
	(0.011)		(0.012)	(0.012)		(0.013)	(0.020)		(0.023)
Glasses		−0.022	−0.023		−0.054**	−0.023		−0.041	0.009
		(0.023)	(0.025)		(0.025)	(0.028)		(0.043)	(0.047)
Facial hair		−0.032	−0.032		0.030	0.039		−0.082*	−0.067
		(0.027)	(0.027)		(0.029)	(0.029)		(0.050)	(0.050)
Jacket		0.011	0.011		−0.040	−0.054**		−0.005	−0.028
		(0.023)	(0.024)		(0.025)	(0.026)		(0.043)	(0.044)

Coefficients denoted by $***$, $**$, and $*$ are significant at the 1%, 5% and 10% levels, respectively. Standard errors are in parentheses.

Chapter 3

Copyright couture: Should designers have intellectual property rights for their creations?

3.1 Introduction

In this age of myriad product choices and extensive branding, consumers purchase goods not only for their material value but also for their symbolic value; aside from practical uses, possessions have social meanings attached to them as well. "It seems an inescapable fact of modern life that we learn, define, and remind ourselves of who we are by our possessions" [Bartolini et al., 1988, p. 160]. When buying positional goods, part of what a consumer is purchasing is a sense of cachet or style that transcends the strict utilitarian value of an item. Of course, firms try to magnify the appeal of this intangible characteristic by devoting resources to building up the image of their products; in fact, it has even been suggested that producers and advertisers create the demand for status goods by embuing products with social and psychological properties. [Galbraith, 1958] [Mason, 2000] Part of what makes these types of goods interesting is that the social meaning of an item can change over time based on societal perceptions and the groups of consumers currently using the product. Demand for products is constantly shifting as different trends come to the forefront and consumers try to stay abreast of which goods are socially desirable.

This turnover in which certain items are currently "fashionable" results in cycles of new products being released, sold to some or all of the population, then falling out of favor as still newer versions are released. For example, the retail clothing industry exhibits continual fashion cycles wherein consumers adopt new styles of clothing even though their older clothing is still fully functional. "Clothing is clearly the classic product of fashion-oriented behavior, but fashion also touches consumers' aesthetic choices ranging from autos and housing to foods and music. Indeed fashion-oriented behavior has even been identified with intellectual pursuits of science, literature, arts, and education" [Sproles, 1981, p. 116]. Hence, though this analysis is centered on the example of retail clothing, it can be applied to a range of other goods as well, particularly those that are positional or socially visible products.

Firms employ the strategy of making superficial updates to a product's design or appearance that are nearly irrelevant to its functionality but that, nonetheless, entice consumers to replace their current "unfashionable" product with the newest model. A characteristic associated with this phenomenon is that fashionable products are copied by firms other than the one originating the design. In contrast to most other types of intellectual property, a designer does not have well-defined property rights over clothing and other extrinsic design innovations under U.S. law. Limited legal protection is available for certain types of trademarks and design innovations, but the process of obtaining a patent is quite lengthy and would likely take longer than the duration of the item's popularity [Scafidi, 2008]. Perhaps because of this lack of intellectual property protection, it is common to see "knockoffs" of conspicuously fashionable goods such as purses, wallets, and watches.

Purportedly, designers encourage (or at least condone) this sort of imitation in order to speed up the rate at which their designs become obsolete. Unhindered by intellectual property law, rampant design imitation supposedly increases the speed at which innovation takes place while simultaneously increasing designers' profits. "More fashion goods are consumed in a low-IP world than would be consumed in a world of high IP protection precisely because copying rapidly reduces the status premium conveyed by new apparel and accessory designs, leading status-seekers to renew the hunt for the next new thing" [Raustiala and Sprigman, 2006, p. 48]. It has even been suggested that copying is endemic to the success of and "a core activity" of the fashion industry [Hilton et al., 2004, p. 4].

Although some believe that imitation benefits designers, the fact that designers themselves fight against it provides evidence to the contrary. Since 2006, a series of bills have been introduced in the United States Senate that would provide increased intellectual property protection to apparel designs. The latest version of this bill, the Innovative Design Protection and Piracy Prevention Act, is endorsed by both the Council of Fashion Designers of America and the American Apparel and Footwear Association, who claim that imitations are harmful to the industry as a whole and to individual designers whose fashions are copied and sold for lower prices than the designers themselves charge.

In this paper, I examine the two conflicting viewpoints on the merits of imitation. In short, does the presence of an imitator cause designers to make greater profits than they would if no imitation were allowed, and how does imitation affect consumers and total surplus? To answer these questions, I build on a model of fashion cycles put forward by Pesendorfer [1995]. His model lends itself well to the study of design imitation; in it, fashion cycles arise from designers' profit-maximizing behavior and from consumers' use of fashion as a tool for social screening. The role of fashionable products in facilitating social matching leads to a cycle wherein a designer periodically releases new designs which gradually disseminate throughout the population, beginning with "high" types and moving on to "low" types. When a design has disseminated through enough of the population that its value decreases below a sufficient level, the designer creates a new fashion (with a corresponding higher price) that can then be used as an effective signaling device for the high types. The cycle repeats, and each newly innovated fashion eventually loses value as a means of matching as the designer lowers the price and sells to low types, necessitating the conception of yet another style that can be sold at a premium price and used by high types to match with one another. Note that the fashion good is more valuable to a consumer the longer it remains "in style" and is still viable as a matching signal.

Building on Pesendorfer's model, this paper expands the framework to include a potential imitator. The designer periodically releases new styles and a string of potential imitators can choose to enter the market and copy each original design. In this environment, there exist equilibria in which the designer and an imitator both produce each design, in which only the designer produces, and in which no design is produced; for each of these equilibria, there exists an equilibrium of the imitator-free game in which the designer earns greater profits. Consumer welfare is highest in the equilibrium in which no design is produced, and the imitator always earns zero profits in equilibrium. These results demonstrate that extending legal protections to fashion and other external design elements would be beneficial to designers and possibly to consumers.

3.2 The Model

An important assumption of this model is that people associate with others who wear the same type of clothing or who use the same status-signalling products. Part of the purpose of fashion goods is to signal one's quality or other unobservable traits in order to associate with desirable people, presumably those with high levels of human or social capital. If high types derive more utility from mixing with other high types and low types derive more utility from mixing with other low types, then fashion does not command a premium price. Both groups adopt their own norms and signaling habits in order to interact with members of their own group. This can be seen in the case of certain subcultures with very distinct styles of dress and grooming; their fashions, though distinctive, are not expensive or commercially mass-produced because the fashions have little value to those outside the subculture. On the other hand, if certain fashions are adopted by groups that many people desire to emulate or interact with, designers make positive profits and we see fashion cycles occurring.

Creators of fashion goods have authority to coordinate demand for their designs, whether through advertising, reputation, or luck; that is, the items they produce are widely accepted as signals of quality along some desirable dimension of human capital. The process by which this authority is gained will be left to further research, and I will simply assume that there is a single designer whose designs facilitate a matching process. I also include the possibility of entry into the market in the form of a string of "copycat" designers. These short-lived players act consecutively and, lacking the means to coordinate demand themselves, can exercise the option to imitate the original designer's goods. The designer can innovate new styles for a fixed cost c_d, while the imitator only has the option to copy an existing design for a fixed cost $c_i = 0$. The imitators cannot solve the consumer coordination game, perhaps due to lack of advertising budget, insufficient reputation, or the expense and ingenuity involved in creating entirely new designs, but they can copy any existing design at zero cost. This captures the idea that entry into the market is difficult for a designer who must solve the coordination game, but very easy for the imitators, who face low costs and few barriers to entry. Since the changes being made are only superficial design changes instead of fundamental advances in technology, an imitator can easily copy the design at a negligible cost after the designer has borne the cost of creating the design idea and communicating the change to consumers. Once the fixed cost of innovating a design has been paid, additional units can be produced at zero marginal cost by both the designer and imitator.

I assume that consumers either cannot or choose not to distinguish between the two products and that both serve the same matching function. Higgins and Rubin, studying the counterfeiting of trademarked goods, explain that "consumers do not really care if the product is counterfeit as long as it appears genuine to an outside observer" [Higgins and Rubin, 1986, p. 212]. The purpose of an external design or trademark is to show that its consumers are part of a certain group; therefore, any imitation which will allow the consumer to join the "in" group falls into the same category as the original design. I assume that consumers are indifferent about who produces the good; what matters is that it remains a valid signal in the coordination game. The copied goods can take the form of direct, illegal counterfeits or simply designs that are inspired by or reminiscent of the original design. In fact, designers themselves often copy their own successful designs through collaborations with department stores or having multiple brands under the same parent company [Hilton et al., 2004]. The identity and affiliation of the imitator is not taken into account in the model, although the issue of whether the designer and imitator are affiliated could have important implications for the designer's willingness to condone the imitation.

There is a unit measure of consumers, of whom α are high types and $1 - \alpha$ are low types. For a generic consumer q, if $q \leq \alpha$, q is a high type, and if $q > \alpha$, q is a low type. This could be any dimension of personal characteristics or human capital that is believed to be signalled via status goods. Consumers engage in a matching, or "dating" game wherein each is randomly matched with another consumer who uses the same design. This could represent an array of social situations as well as labor applications such as job interviews or business pairings. For example, a homeowner matches with a realtor who drives the same type of expensive car. Utility is based on the quality of a match rather than on the design directly, capturing the idea that the main purpose of positional goods is to increase prestige and social capital. Each type of consumer receives higher utility from matching with a high type; however, high types place a larger premium on having a high match. That is, $u(h,h)-u(h,\ell) > u(\ell,h)-u(\ell,\ell)$. Each consumer has quasi-linear utility such that a consumer of a type i matched with a consumer of type j spending m units of money on a design receives total utility $u(i,j)-m$. Thus, using a design is only useful insofar as it increases the probability to a consumer of matching with a high type.

Consumers cannot distinguish the designer's product from the imitator's product; however, they are aware of the most current design. The designer creates a sequence of fashionable designs, $n \in 1, 2, ...$ Assume that design n is only innovated after designs $1, ..., n-1$ have already been created. Consumers can use only one design at a time, and all consumers observe the design used by each individual. The design can hence be representative of any category of status goods that precludes multiple designs being used at once; for example, it could represent an individual's choice of car, clothing, or mobile phone. An individual may choose to use no design, which will be denoted as choosing design $n = 0$. Define $\mu_i(n)$ as the fraction of consumers of type $i \in h, \ell$ who are currently using design n. The following conditions apply to the matching technology:

(i) If $\mu_\ell(n) + \mu_h(n) > 0$, for $n = 0, 1, ...$, then a consumer who uses n meets a high type with probability $\mu_h(n)/\left[\mu_h(n) + \mu_\ell(n)\right]$

(ii) If $\mu_\ell(0) + \mu_h(0) = 0$, then a consumer who uses no design ($n = 0$) meets a low type with probability 1.

(iii) If $\mu_\ell(n) + \mu_h(n) = 0$, then a consumer who uses design n meets a high type with the same probability as a consumer who uses no design ($n = 0$).

Suppose the designer has the ability to coordinate demand for the latest good and that all consumers have the same endowment of "old" designs $1, ..., n-1$. Demand for fashion occurs when a consumer has a higher probability of meeting a high type when using the latest fashion rather than an out-of-date item. Thus, consumer i's single-period willingness to pay for fashion n is given by the difference in utility from matching with a high type instead of a low type multiplied by the increase in probability of meeting a high type by using the fashion in that period. Suppose consumers $[0, q)$ are using design n.

If the marginal consumer q is a high type, he will certainly be matched with a high type by using the design. If he chooses not to use the design, he will remain in the pool of consumers $[q, 1]$ which are not using the design, and will be matched with a high type with probability $(\alpha - q)/(1 - q)$. Thus, the value to consumer q of design n is $v_h \left(1 - \frac{\alpha - q}{1-q}\right) = v_h \left(\frac{1-\alpha}{1-q}\right)$, where $v_h \equiv u(h, h) - u(h, \ell)$. He will purchase the design if the price is less than or equal to the value of the design. All consumers $q' < q$ also find it profitable to purchase and use the latest design.

If the marginal consumer q is a low type, then the choice is either to purchase the design and be in a pool of consumers of whom α/q are high types or to not purchase the design and match with a low type with probability 1. Thus the value of the latest fashion is $v_\ell \frac{\alpha}{q}$, where $v_\ell \equiv u(\ell, h) - u(\ell, \ell)$.

This willingness to pay can be captured in a function that is dependent on the quantity of the good in the market in any period. The signalling value of the fashionable good is given by:

$$f(q) = \begin{cases} \frac{1-\alpha}{1-q} v_h & \text{if } 0 \leq q \leq \alpha \\ \frac{\alpha}{q} v_\ell & \text{if } 1 \geq q > \alpha \end{cases}$$

This function gives the value to a consumer q of consuming the fashionable design in a period for which consumers $[0, q]$ are using the design and consumers $(q, 1]$ are not. It increases until the point where $q = \alpha$, then decreases as low types enter the "fashionable" group. The signalling value of the fashion reaches its maximum when the groups are perfectly divided; high types purchasing the design can be guaranteed a match with another high type, and low types do not purchase the design and are matched with other low types. From the standpoint of efficiency in matching, it would be ideal to always have perfect separation of types in this manner; however, this may not occur given the incentives of the designer and imitator. Setting an optimal price would be quite straightforward if it were a singular occurrence, but to analyze fashion cycles it is necessary to describe behavior in more than one period.

If possible, the designer would prefer to innovate only once, selling the item to only high types for a price equal to their willingness to pay to match with other high types forever. There are two main reasons why this does not constitute an equilibrium. First of all, in reality most goods are not perfectly durable and need to be replaced periodically. The second reason, which is of more importance to this model, is that the single-innovation strategy is not incentive compatible for the designer or the imitator. Having sold the design to all the high types, the designer and imitator would want to further capitalize on the fashionable design by selling it at a lower price to low types in future periods. Even if the designer were to seek to elongate the fashion cycle and build a reputation for less frequent design changes, the imitator would certainly have an incentive to reap the rewards of selling to the lower social capital consumers. Over time, each design loses value as it is sold to more and more consumers. In the words of Simmel [1904, p. 138], "As fashion spreads, it eventually goes to its doom".

The timing of the model is as follows:

(i) At the beginning of a period, the designer chooses whether to produce a new style or continue selling an older style and what price to charge. The imitator simultaneously chooses whether to copy the latest existing design and what price to charge.

(ii) After the designer and imitator have made their decisions, consumers then choose which design to purchase and use. A consumer can only use one design at a time.

(iii) At the end of each period, each consumer is matched with another and derives utility based on the type of individual to whom he is matched. I follow Pesendorfer's matching technology; that is, each consumer is randomly matched with another who uses the same design. Consumers who use no design are matched to a low type with probability 1.

At the start of a period, the current design has been sold to $q \in [0, 1]$ fraction of consumers. The designer and imitator each choose whether to enter the market at all (through innovation for the designer or through imitation for the imitator), as well as a price level in each period, denoted by $p_{m,t}$, for $m = i, d$. The prevailing price in a period is given by $p_t = \min\{p_{d,t}, p_{i,t}\}$, and whichever charges the lower price sells to all the consumers whose willingness to pay is greater than or equal to the price charged. If both charge the same price, I assume that consumers choose to buy from the original designer because they have a slight preference for the original design. This tiebreaking rule does not affect equilibrium results.

The designer has the following payoff:

$$R_i(0) = \sum_{t=1}^{\infty} \delta^{t-1}[p_t q_{d,t} - c_d(\eta_t)] \tag{3.1}$$

Here, $\eta_t = 1$ for periods in which the designer innovates and zero otherwise. In the first period after an innovation, the designer creates a new fashion and is the only supplier in the market; thus, she chooses the price for this period. For periods in which an innovation does not occur and an imitator is present, the price the designer obtains for her designs is dependent on both her own choice of price and the imitator's choice of price.

When $y_t = 0$, an innovation has occurred in that period and the imitator has not yet had time to copy the currently fashionable design; therefore, the imitator's output $q_{t,i}$ and profit in this period are equal to 0. One can think of the period length as being the length of time necessary for the imitator to be able to copy a design and the designer to be able to create a new design. A longer period corresponds with a lower δ, while a shorter period length corresponds with a higher δ. Since the imitator does not last longer than one fashion cycle, his value of production is just the sum of revenues in each period minus the cost of imitation:

$$R_i(0) = \sum_{t=1}^{T} \delta^{t-1} p_t q_{i,t} - c_i \tag{3.2}$$

He will imitate if the revenue stream from imitation is larger than the cost of imitation. Here, T is the number of periods for which the design stays popular. Note that in any period in which the designer and imitator are producing, the equilibrium price must be zero. If not, either could increase profits by slightly lowering its price and selling to all the consumers. Also note that there is an endless stream of potential imitators, so even if the designer were able to reach a collusive agreement with one imitator to charge a nonzero price, another would have an incentive to enter the market and undercut this price.

3.3 Results

I consider subgame perfect equilibria that satisfy:

(i) Consumers who do not already own the current design n_t make their decision of whether or not to purchase n_t only on the basis of its current price. Thus, consumer demand for n_t can be characterized as an acceptance function $P(\cdot)$ such that consumer q will purchase the design if and only if $p_t \geq P(q)$.

(ii) All previously innovated designs $n < n_t$ have an equilibrium price of zero. For design n_t, the realized demand in any period is determined by the optimal behavior of consumers.

I follow Pesendorfer in referring to such equilibria as weak Markov coordination (WMC) equilibria.

Theorem 1. *If* $c_d \leq \max\{\alpha f(\alpha), f(1)\}$*, there exists a pure-strategy WMC equilibrium in which the designer innovates in each period and the imitator copies each design in the period after an innovation if the designer does not sell to all consumers. For such an equilibrium,*

(i) Consumers are worse off than if no fashion existed.

(ii) There exists an equilibrium of the monopoly designer game in which the designer earns (weakly) higher profits.

(iii) Total welfare in this equilibrium is lower than it would be without imitation.

(iv) The imitator never produces the currently fashionable good.

(v) The equilibrium is unique if $\alpha f(\alpha) - c_d > (1-\alpha)f(1)$ *or if* $\alpha f(\alpha) < f(1)$*.*

In this equilibrium, the designer sells to either all the high types (if $\alpha f(\alpha) > f(1)$) or all consumers (if $\alpha f(\alpha) \leq f(1)$); if the imitator observes that the designer sells to $q' < 1$ consumers, he will imitate the design, enter the market in the next period, and sell to the remaining consumers. This constitutes an equilibrium from the designer's perspective because she will not earn any additional revenue by allowing the design to stay popular for more than one period. Knowing the imitator will enter in the next period and that price competition will drive the price of the design to zero, she chooses to maximize single-period revenue and innovate in the next period. The imitator is indifferent between entering and not entering, so he enters and sells the most recent unfashionable design (n_{t-1}) to all of the remaining consumers in the period in which the designer sells the most recent fashionable design n_t to either all of the high types or all of the consumers.

For part (i), note that without the existence of a fashion good, each consumer is matched with a high type with probability α and a low type with probability $1-\alpha$. Each high type receives expected utility of $\alpha u(h,h)+(1-\alpha)u(h,\ell) = \alpha v_h + u(h,\ell)$, and each low type receives expected utility $\alpha u(\ell,h)+(1-\alpha)u(\ell,\ell) = \alpha v_\ell + u(\ell,\ell)$. Under the equilibrium described in theorem 1, when the newly innovated design is sold only to high types, each high type receives expected utility of $u(h,h) - v_h = u(h,\ell)$ and each low type receives expected utility of $u(\ell,\ell)$. When the newly innovated design is sold to all consumers, they match with a high type with the same probability as they do when no fashion exists but have to pay the price of the design; high types receive expected utility $\alpha v_h + u(h,\ell) - \alpha v_\ell$ and low types receive expected utility $\alpha v_\ell + u(\ell,\ell) - \alpha v_\ell = u(\ell,\ell)$. In either case, both types of consumer are worse off in this equilibrium than they would be if no design were available.

Part (ii) is true because the designer has the option to innovate each period even when there is no possibility of imitation; any other equilibrium of the monopoly designer game must then result in at least the same profit level or else the monopolist would simply choose to innovate in each period.

For part (iii), note that the designer is worse off with imitation and the imitator earns zero profits in equilibrium. Then to show that total welfare is higher without imitation, all that remains is to consider consumer welfare. For the equilibrium in which the designer sells only to high types in each period (when $\alpha f(\alpha) \geq f(1)$), consumers are worse off than they are in any equilibrium without an imitator. In fact, consumers in this equilibrium already have the lowest possible utility; both high and low types receive the utility they would receive from being matched with a low type, which they can always get by using no design. Therefore, any equilibrium must give them (weakly) higher utility or else they would choose the outside option to not use a design. For the equilibrium in which the designer sells to the entire market in each period (when $\alpha f(\alpha) \leq f(1)$), low types receive the utility they would receive from matching with a low type, so they are at least as well off in any other equilibrium. For high types, they receive a random match from the total population and pay a price equal to αv_ℓ, ending up with total expected utility $u(h, \ell) + \alpha(v_h - v_\ell)$. In other equilibria, high types may pay a higher price, but their willingness to pay increases only with the increase in expected quality of a match. Although high types may be charged a higher price in an imitator-free equilibrium, the designer correspondingly earns higher profits as match efficiency is increased, so overall welfare is at least as large in any equilibrium without an imitator.

Part (iv) is true because the imitator does not have time to copy the currently fashionable good before it goes out of style. Instead, he produces each design the period after it is popular, selling to all the low types for a price of 0.

Part (v) follows from the fact that once the designer has sold to all the high types in the first period, she receives higher profits by immediately innovating again than by selling to the low types. Likewise, if it is more profitable to sell to all of the consumers instead of only the high types, the designer will innovate each period in order to maximize profits; any other equilibrium would yield strictly lower profits. If this condition is not met, the designer may randomize between innovating and not innovating in the second period after an innovation. Such a mixed-strategy equilibrium is explored in theorem 3.

Theorem 2. *If $c_d > \max\{\alpha f(\alpha), f(1)\}$, there exists a unique WMC equilibrium in which no design is produced.*

If $c_d > \max\{\alpha f(\alpha), f(1)\}$, the designer can only earn positive profits if the design is popular for more than one period. However, if the imitator observes an innovation, he knows the designer will charge a positive price in more than one period, so he will enter the market with probability one in the period after an innovation, driving the price down to zero. This would lead to negative profits for the designer, so she never innovates.

Unlike in the monopoly designer case, an equilibrium does not guarantee an infinite stream of innovations. Pesendorfer describes an environment in which fashion cycles inevitably arise in the existence of a status signalling good, but in the presence of imitation this is not necessarily the case. Interestingly, although the imitator does not actively produce the current design in the equilibria described in theorems 1 and 2, his potential presence still has an effect on the equilibrium behavior of the designer. Under certain conditions, the possibility of imitation ensures that no design will be created and therefore no signals are introduced into the consumer matching game.

Theorem 2 refutes the idea that piracy encourages more innovation in status goods markets and sets forth conditions under which no design can be profitably produced. If the cost of desigining an original good is higher than the revenue earned by selling to all the high types or to all consumers in one period, then the designer can never recoup all of her costs, and thus it is never optimal to create a design. In this case, imitation prevents the production of a socially desirable good.

Theorems 1 and 2 show that there is no condition in which the designer is better off in the presence of an imitator. They consider equilibria of the game in which only the designer produces the currently popular good. In reality we sometimes observe imitation of fashion goods; it could be the case that this imitation only occurs after an item is no longer an acceptable signal as in Theorem 1, but it is also possible that imitation occurs while a design is still popular. In order to consider equilibria in which both the designer and imitator are actively producing the fashion good, I focus on a mixed-strategy equilibrium in which the designer randomizes between innovating and not innovating in the second period after a new design is introduced.

Theorem 3. *If $c_d \leq \alpha f(\alpha)$, $\alpha f(\alpha) - c_d \leq (1-\alpha) f(1)$, and $\alpha f(\alpha) \geq f(1)$, there exists a mixed-strategy WMC equilibrium in which the designer randomizes between innovating and not innovating in the second period after a new design is introduced and the imitator randomizes between entering and not entering in the period after a new design is introduced. For such an equilibrium:*

(i) Consumers are better off than they are in the pure-strategy equilibrium described by theorem 1 but worse off than they would be if no fashion existed.

(ii) There exists an equilibrium of the monopoly designer game in which the designer earns (weakly) larger profits.

In this equilibrium, the designer sells to all high types in the first period after an innovation and then either innovates in the next period or sells to the low types in the second period after an innovation. If she does not sell to all the high types in the period after an innovation, the imitator knows that the designer will definitely charge a positive price in the next period and will enter with probability one. If $\alpha f(\alpha) < f(1)$, the designer would simply sell to the entire market in each period, and if $\alpha f(\alpha) - c_d > (1-\alpha)f(1)$, it is always more profitable for the designer to immediately innovate again than to allow the design to remain popular for another period. In order for the designer to be indifferent between innovating again immediately and allowing the design to be popular for one more period, she must earn the same amount of profit for each action. Denote $v_0 = \alpha p_0 - c_d + q\delta v_0 + (1-q)\delta v_1$ as the continuation value of innovating in the next period and $v_1 = (1-p)(1-\alpha)p_1 + \delta v_0$ as the continuation value of allowing the design to remain popular for another period, where p is the probability that the imitator enters the market and q is the probability that the designer innovates immediately in the next period following an innovation. The designer charges a price $p_0 = f(\alpha) + \delta(1-p)(1-q)f(1)$ in the period in which she innovates, capturing the fact that high types will pay the expected value of the match in both that period and the potential match if the design remains popular for another period (the maximum value of the design in the period after an innovation is $f(1)$ since that is the prevailing price when the designer sells to all the low types). In the period after an innovation, the designer charges a price $p_1 = f(1)$ if the imitator does not enter the market and 0 otherwise. Setting $v_0 = v_1$ yields $(1-p) = \frac{\alpha f(\alpha) - c_d}{f(1)[(1-\alpha) - \alpha\delta(1-q)]}$; p is between 0 and 1 for $q \geq 1 - \frac{(1-\alpha)}{\alpha\delta}$ and $q \geq 1 + \frac{\alpha f(\alpha) - c_d - (1-\alpha)f(1)}{\alpha\delta f(1)}$ (the first is always satisfied when the second is satisfied), which implies that if $\alpha f(\alpha) - c_d \leq (1-\alpha)f(1)$, there exist a range of possible equilibria in which $q \in [1 + \frac{\alpha f(\alpha) - c_d - (1-\alpha f(1))}{\alpha\delta f(1)}, 1]$ and $p = 1 - \frac{\alpha f(\alpha) - c_d}{f(1)[(1-\alpha) - \alpha\delta(1-q)]}$.

The imitator is indifferent between entering and not entering since he earns zero profits in either case, but equilibrium behavior requires that he mix between the two instead of always entering as in the equilibrium described in theorem 1. This could correspond to a situation of imperfect enforcement of intellectual property law in which an imitator would like to enter the market in each period but is forced to desist with probability $(1-p)$. In this case, p is exogenous and q is chosen by the designer so as to maximize v_0. Another justification for this type of equilibrium is that in actuality, the cost of imitation is nonzero so imitators must earn positive profits in at least some periods. Suppose that there is some small cost of imitation $c_i > 0$ and that marginal costs are also nonzero for the imitator and designer. If we assume that $MC_d = MC_i + \epsilon$, then the resulting price in each period is equal to MC_d, netting an expected positive profit for the imitator in some periods, which justifies the cost of imitating some designs.

Part (i) is true because, under the equilibrium described in theorem 1, each high type receives expected utility of $u(h,h) - v_h = u(h,\ell)$ and each low type receives utility of $u(\ell,\ell)$; in this mixed-strategy equilibrium, low types receive the same expected utility for periods in which a new design is innovated but a higher utility in periods in which a design remains popular for a second period (utility for these periods is $u(\ell,\ell)$ when only the designer is in the market and $\alpha u(\ell,h) + (1-\alpha)u(\ell,\ell)$ when the designer and imitator produce); high types receive expected utility of $u(h,\ell)$ for periods in which an innovation takes place, $\alpha u(h,h) + (1-\alpha)u(h,\ell) - v_\ell$ for periods in which a design remains popular for a second period and only the designer produces, and $\alpha u(h,h) + (1-\alpha)u(h,\ell)$ for periods in which the designer and imitator produce a popular design. However, both types are still better off with no fashion than in this equilibrium; with no fashion, each high type receives expected utility of $\alpha u(h,h) + (1-\alpha)u(h,\ell) = \alpha v_h + u(h,\ell)$, and each low type receives expected utility $\alpha u(\ell,h) + (1-\alpha)u(\ell,\ell) = \alpha v_\ell + u(\ell,\ell)$, and these are weakly higher than utility in any period of the equilibrium described in theorem 3.

Part (ii) is true because the continuation values with a monopoly designer are the special case of this equilibrium in which $p = 0$ and $q = 1$; since v_0 is decreasing in p, the designer's profits are greater without an imitator than in any equilibrium of this type in which $p > 0$.

These results show a variety of effects on designers. Imitation unequivocally has a negative effect on designers and gives them an incentive to innovate more often than they otherwise might. This is especially interesting given the recent technology advances that allow imitators to more quickly and easily copy popular designs. It indicates that imitation is likely to become increasingly harmful to designers as the cost of imitation decreases.[1] Ever-shortening supply chains are allowing fashion imitators to surreptitiously produce copies of popular runway designs in a very short amount of time. In the model, the interpretation of this behavior is that imitators would rather shorten the periods so as to enter the market and make profits. However, this means that the designer is less likely to be able to recoup the initial investment of creating a design, leading to less innovation overall as imitation becomes easier.

[1] "Today, a pattern can be based upon an Internet broadcast of the runway show and transmitted electronically to a low cost contract manufacturer overseas. A gradual easing in import quotas, begun in 1995, has increased scale and thereby lowered overseas manufacturing costs. Electronic communications and express shipping ensure that prototypes and finished articles can be brought to market quickly. As a result, thousands of inexpensive copies of a new design can be produced, from start to finish, in six weeks or less." [Hemphill and Suk, 2009a, p. 124]

3.4 Conclusion

This paper adds to the literature on status goods and fashion cycles and specifically addresses the issue of whether design goods should have intellectual property protection. It uses a model in which consumers engage in social matching by using status goods produced by a single designer and copied by a string of (potential) imitators. Some literature has suggested that design imitation leads to more innovation, higher profits for designers, and shorter fashion cycles. These results show that design imitation may indeed lead to more frequent innovation and shorter fashion cycles if the cost of designing a good is low enough, but that this increased innovation does not benefit designers or consumers; in the equilibrium in which a new design is created every period, total welfare is lower than in any equilibrium that occurs in the absence of imitation. In the three types of equilibria explored, the designer's profits are lower than they would be in an equilibrium with no imitation; additionally, consumer welfare is higher when no fashion is produced than it is when the designer and imitator are in the market together. Of the three types of equilibria, the best one for consumers is the one in which no fashion is created.

I show that if the cost of designing a good is high enough, then no design will be produced in equilibrium. Under these circumstances, the possibility of imitation makes it so that there is no way for a designer to profitably produce a fashion good, so innovation is thwarted entirely. Under other conditions, the designer alone produces each current status good or the designer and imitator both produce. The imitator always earns zero profits in equilibrium.

Together, these results lead to the conclusion that design imitation is not innocuous from the designer's standpoint and that designers have a credible claim on protection for their designs. This is particularly true when the cost of originating a design is very high; in this situation a lack of design protection means that no innovation will take place, which is in direct contrast to the monopoly designer situation in which infinite innovations occur. Contrary to some claims, I do not find any evidence that design imitation is ever beneficial for the designer.

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Vita

Caroline von Bose was born in Fort Worth, TX and grew up in Arizona, California, and Texas. She graduated from Mansfield High School in 2000, where she was publicly recognized as both a Pokémon Master and a National Merit Scholar. She went on to graduate from Arizona State University with Bachelor of Science degrees in Mathematics and Economics. She spent several years working in the insurance industry and serving as a missionary before entering the University of Texas at Austin in fall 2007. In her spare time, she enjoys riding bicycles and reading fashion blogs (but not at the same time).

The author may be reached at cvb@utexas.edu.

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