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NOBEL BEAUTY

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Nobel Beauty*

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Abstract

We consider the effect of physical attractiveness, assessed using publicly available pictures of top scientists, on their probability of winning the Nobel Prize. There is now an extensive body of literature that finds that physically attractive people receive non-negligible benefits in the labor market, marriage market and social life. In contrast, we find that attractiveness is negatively correlated with the probability of being awarded the Nobel, with the magnitude of this effect being non-negligible. We discuss the potential mechanisms that could explain this result.

Keywords:. Contests; prizes; productivity; discrimination.

JEL Codes: I20; J24; J70; O30

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1 Introduction

Physical attractiveness affects individual wellbeing in a number of ways. Some accrue directly while others derive from interactions with others. With respect to the former, attractive people tend to be happier, more confident and have better mental health than their less fortunate peers (Farina et al., 1977; Buddeberg-Fischer, Klaghofer and Reed, 1999). They also tend to be in better physical health (Rhodes et al., 2003; Thornhill and Gangestad, 2006). Among the latter, attractive individuals have more success in the marriage market and produce more children (Jokela, 2009; Gangestad and Scheyd, 2005). They are perceived as more competent (Todorov et al, 2005), trustworthy (Little, 2012), are more trusting themselves (Smith et al., 2009), and are also more likely to be helped by strangers (Benson, Karabenick and Lerner, 1976).

Physical attractiveness also has important impact on economic outcomes. The seminal contribution by Hammermesh and Biddle (1994) finds that plain looking people suffer a wage penalty, while attractive people earn more than those with average looks (height also has a positive effect on earnings, see Persico, Postlewaite, and Silverman, 2004). Johnston (2010) complements this finding by showing that blonde women earn substantially higher wages than women whose hair is another color. According to Price (2008), the preference for blondes extends beyond the labor market: he finds that blonde fund raisers receive more generous donations for charitable causes than brunettes. Patacchini, Ragusa, and Zenou (2012) find that attractive women are at an advantage when applying for jobs: in an experiment with fake CVs accompanied by pictures, they found higher call-back rates for attractive low-skilled women but little difference for high-skilled ones. Sala et al. (2013) argue, similarly, that facial beauty has a significant return with respect to labor market outcomes and occupational prestige alike.

The benefits of beauty are not limited to the labor market. Hammermesh (2006) finds that attractive-looking economist are more likely to be elected as officers of the American Economic Association. According to Berggren, Jordahl, and Poutvaara (2010), attractive politicians do better in local elections. Belot, Bhaskar and van de Ven (2012) analyze the Weakest Link TV show and find attractive contestants are less likely to be voted out of the game by the other contestants, even when keeping them in the game is costly. Berggren, Jordahl, and Poutvaara (2016), finally, suggest that right-wing politicians tend to be prettier, which they explain as a result of the economic advantages of beauty: attractive people earn more and therefore tend to support less redistribution.

Academic achievements also seem to be influenced by physical appearance. Deryugina and Shurchkov (2015) find that attractive female undergraduate students do better in college. This is confirmed by Hernández-Julián and Peters (2015) who find that pretty female students do better. Importantly, their result only applies to students who attend classes in person. Those who participate in online courses do not benefit from being attractive. This suggests that the gains from attractiveness may reflect the behavior of teachers (who favor attractive students and/or give them more help and attention) rather than some innate characteristic that is signaled by good looks. Finally, Paphawasit and Fidrmuc (2017) find strong returns to beauty

in research: good-looking academics tend to publish in higher-ranked journals and their articles also attract more citations.

Physical attractiveness therefore seems akin to an asset with monetary (and non-monetary) rate of return. This asset may be to a large extent an endowment acquired at birth: beauty can be perceived as a signal of good health, innate ability, fertility, and good mental faculties. Yet, it is also something that can be enhanced by deliberate investment. Not surprisingly, both men and women the world over spend vast resources on cosmetics, beauty products and cosmetic surgery that help them maintain and enhance their looks (see Lee, 2015).

In this paper, we offer additional evidence on the effects of physical attractiveness on research and academic achievements. To the best of our knowledge, Paphawasit and Fidrmuc (2017) and this paper are the only contributions so far to consider the effect of beauty on research outcomes and academic recognition. While the former paper is concerned with a broad cross-section of academics (all in the discipline of economics), in this paper, we focus only on top scientists. Specifically, we consider scientists who won, or were predicted to win, the Nobel Prize in physics, chemistry, medicine and economics between 2002 and 2014. Besides actual winners of the prize, our sample collects all researchers listed in the Thompson Reuters Science Watch Hall of Citation Laureates: an annually updated list of researchers seen as likely to be awarded the Nobel Prize, based on their citations.[5] As such, our analysis is based on scientists who are, arguably, at the very top of distribution of talent and productivity. That also means that winners and non-winners should be rather similar in terms of their research productivity. We had the scientists' pictures evaluated by a large group of undergraduate students in economics in the UK. In our analysis, we seek to establish whether those scientists who go on to receive the Nobel Prize tend to be more or less attractive than those who failed to win the prize.

In the next section, we describe the data used in our analysis in more detail. This is followed by discussion of the results. The last section concludes.

2 Data

The Nobel Prize is an award established out of the legacy of Alfred Nobel upon his passing in 1886, to be awarded annually in in chemistry, literature, peace, physics, and physiology/medicine, with the first prizes awarded in 1901. The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel, generally referred to as the Nobel Prize in economics, was established separately by the Sveriges Riksbank in 1968 on the occasion of its 300th anniversary. The scientific prizes, in physics, chemistry, physiology/medicine and economics, are awarded by the Nobel Committee of the Royal Swedish Academy of Sciences, based on nominations received from a pool of experts contacted by the Committee (this includes the members of the Royal Swedish Academy of Sciences, previous laureates, and selected professors and scientists in the discipline). The prizes are to be awarded for major and path-breaking discoveries. The Prize can be shared by up to three individuals and cannot be awarded posthumously. The unsuccessful nominations (and the identity of the

[5] See http://sciencewatch.com/nobel/hall-citation-laureates.

nominators for either successful or unsuccessful candidates) are kept confidential for 50 years.[6] The laureates receive a gold medal, diploma, and cash prize (currently SEK 8 million), and a significant boost to their reputation, prestige and general wellbeing.[7] The original scientific prizes were awarded more than 100 times (107 in physiology/medicine, 108 in chemistry and 110 in physics); the economics prize was awarded 48 times. On average, the economics and chemistry prizes were shared by 1.6 laureates, while the physics and medicine prizes were awarded to 1.9 and 2 laureates on average, respectively.[8]

Given the 50 year lag in releasing nominations, no information is available on the contenders beyond the mid 1960s; as the economics prize was only established in 1968, no information on nominations has been released for this discipline yet. Therefore, we use the predictions by the Thompson Reuters Science Watch Hall of Citation Laureates web site, and the actual awards of the Prize, to compile our data set of contenders. Thomson Reuters has been analyzing citations data to predict the most likely Nobel Prize winners from 2002 onwards (note that not all actual laureates have appeared on the Thompson Reuters list). Summary statistics are reported in Table 1 (full details of all scientists included in our data set are in the Appendix, which is available upon request)..

The Nobel prize laureates account for 37% of our sample, suggesting that Thompson Reuters is rather successful in identifying the researchers likely to receive this distinction. The four disciplines are approximately equally represented: medicine accounts for 27% of the sample, the highest share, while the lowest share is that of economics, with 22%. These small differences may reflect different attitudes to collaborative research in the four disciplines: scientists who collaborated on an important achievement often receive the Nobel Prize together. The top scientists are predominantly males: women account only for 3.6% of the sample. Women are slightly more represented among the actual winners, nevertheless, where they account for 5.8%. By disciplines, women appear most often in medicine, accounting for 5.7% of scientists, with all other disciplines having less than 3% (physics being the worst with 2.4%).

Age refers to the scientist's age when first listed as a likely candidate for the Prize, or when awarded the Prize, whichever comes first. Success typically comes towards the end of one's professional career: the average scientists was awarded the Nobel Prize, or predicted to receive it, when 64 years old.

Besides basic information on the scientists, we also obtained their pictures, either from their professional websites or from Wikipedia. We showed the pictures to undergraduate students in Economics at Brunel University and asked them to rank the attractiveness of the scientists, from 0 (lowest) to 10 (highest). The students were asked to take account of the age and gender of the scientists when making their assessment, and to evaluate their general attractiveness rather than their own personal preferences about the person in question.

[6] For further details on the nomination process, see http://www.nobelprize.org/nomination/.

[7] Rablen and Oswald (2008) find that scientists who won the Nobel Prize live 1-2 years longer than those who were nominated but failed to win it. They attribute this gain mainly to the boost in status enjoyed by the laureates.

[8] This contrasts sharply with the literature prize, which was awarded 109 times, with only 4 of these awards shared by two laureates. See http://www.nobelprize.org/nobel_prizes/facts/.

Overall, 105 students participated in this exercise, with the average picture evaluated by 21 students (ranging from 15 to 23). Students were shown the pictures on the screen in a classroom, with 2-3 seconds per picture, and were asked to write down the score on a paper form without consulting with others.

Undergraduate students do not find top scientists particularly attractive, with the average attractiveness score being only 3.5 out of 10. Figure 1 shows the pictures, average score and discipline of the three scientists who were considered most handsome by our sample of students. Economics appears to be not only dismal but also ugly science: no economist made it to the top three scientists. Therefore, we report the top three economists in Figure 2. Finally, since only one out of the six scientists depicted in Figures 1-2 won the Nobel Prize, Figure 3 shows the three most attractive laureates.

Some student assessors' scores seem unreasonably low or high (including one student who ranked all pictures as 0). Therefore, as a robustness check, we excluded all assessments with the average score lower than 1 (there were 14 such cases) or higher than 8 (1 case). The basic statistics on the assessors are reported in panels B (full set of assessors) and C (restricted set) of Table 1. The average age of the assessors is 21.5 and 60% of them are male. Female assessors are somewhat kinder to our set of scientists than male assessors, with their average score being 3.4 compared to 3.3 among male assessors. Once we drop very low and very high assessors, the situation reverses, with average female assessor score of 3.5 and 3.6 for male assessors.

The nature and composition of the picture can potentially affect how the assessors perceive the person depicted in it. Therefore, we report also basic information on the pictures: whether it was black and white (16.7%), headshot (showing head and shoulders only, 91.7%), whether the scientist is wearing a suit in the picture (68.5%), and what is the resolution of the picture.

3 Do Attractive Scientists Have an Advantage?

To analyze whether attractiveness plays a role in determining which scientists win the Nobel Prize, we create a binary variable taking the value of 1 if the scientist has been awarded the Nobel Prize by 2014 and 0 otherwise. Note that it is possible that some scientists who have not received the Nobel Prize by 2014 are going to get the award in the future (unless they die before receiving it); this will bias our results downwards, against finding any significant effects. It is also important to note that as we consider only top scientists, the differences in productivity among them should be very small. Whether one is awarded the Nobel Prize could therefore be considered almost random. Alternatively, it is possible that the final choice is affected by factors not related to the scientists' research productivity, for instance, the prominence of particulars topics or the perceived impact of their research.[9] Physical appearance could be another such marginal factor.

We estimate the following probit model:

[9] An example of changing views on scientific merit is the Black-Scholes formula, which earned Robert Merton and Myron Scholes the 1997 Nobel Prize in economics. This formula was later credited with helping bring about the Global Financial Crisis. See https://www.theguardian.com/science/2012/feb/12/black-scholes-equation-credit-crunch.

$$P(Y = 1|X) = \Phi(Sex, Age, Score, Discipline, B\&W, H\&S, Suit, Resolution)$$

where Y is the dependent variable indicating whether the scientist has been awarded the Nobel Prize by 2014 or not. The variable of interest is *Score*, the average attractiveness score of each scientist. The other variables are the scientist's gender, age, discipline, and the picture characteristics (whether the picture is black and white, head and shoulders, whether the person is wearing a suit, and the resolution of the picture). We start by estimating the most parsimonious regression specification, relating the dependent variable only to the attractiveness score, and then gradually add additional explanatory variables. The regression results (marginal effects evaluated at means of variables) based on the full set of assessors are reported in Table 2.

In the first column, we explain the probability of being awarded the Nobel Prize only with the average attractiveness score. The effect of beauty is negative: being attractive presents a disadvantage. The estimated effect is statistically significant at 5% and large: moving up one point on the 0-10 scale reduced the probability of receiving the prize by 8% (so that each one-standard-deviation increase in attractiveness reduces the probability by 3.9%). Adding the scientists' gender and age (column 2) weakens the effect of beauty slightly. This is not surprising, given that gender and age are both likely to be important determinants of perceived attractiveness. Allowing for the effect of attractiveness to be nonlinear (column 3) suggests that the relationship may be hump-shaped, with the peak effect at 3.2, half a point below the average attractiveness. In other words, average-looking scientists have a better chance of getting the Nobel Prize than either the good looking ones or those with worse than average looks.

As for the impact of individual characteristics on the probability of getting the Nobel Prize, age appears with a positive coefficient but is not significant in most regressions. Somewhat surprisingly, being a male is associated with lower probability of winning the award. This does not mean that women are more likely to win the prize than males. Indeed, as the descriptive statistics demonstrate, there are very few women among the Nobel Prize laureates. However, they are even fewer in our full sample (5.8% among the winners and 3.6% overall): the women included in our sample of top scientists have a higher probability of becoming Nobel Prize laureates than the men in our sample.

Finally, column (4), we add we add discipline dummies and picture characteristics. The attractiveness score is still negative but just outside the 10% significance range.[10] Top scientists in the field of chemistry and especially economics are less likely to win the Nobel Prize once they are included in our sample. This may be because it is more common in some disciplines to award the prize to multiple scientists than in others: in economics, the average prize has 2 laureates in our sample, compared to 2.4 in chemistry, 2.5 in medicine and 2.6 in physics. Another possibility is that citations, which is what Thomson Reuters uses to make their predictions, are a worse predictor of winning the award in some disciplines than in others. Among the picture characteristics, black and white photo and wearing a suit are both strongly associated with winning the Nobel Prize. This is not surprising, given that the

[10] Given the small sample size and the relatively large number of explanatory variables included in this regression, the low significance level is to be expected.

official pictures of the Nobel laureates published on the web site of the Nobel Foundation tend to be black and white and feature the (male) laureate wearing a suit (see Figure 2-2).

So far, we considered both male and female scientists together. In columns (5)-(8), we replicate the analysis for males only (given the small number of females in our sample, a separate analysis for women is not possible). The results are very similar, and the negative effect of physical attractiveness is even stronger, both in terms of coefficient size and its significance: an increase in attractiveness by one point (one standard deviation) lowers the probability of winning the Nobel Prize for males by 10% (6.9%). One notable difference when considering only men is the significantly positive effect of age.

In Table 3, we report the results based on the restricted set of assessors. In columns (1)-(4), we drop the assessors whose average score is lower than 1 or higher than 8. In the next four columns, we also drop those whose assessments of scientists' attractiveness that tend to vary little (defined as standard deviation of assessments per assessor lower than 0.6). The results (for both male and female scientists together) are very similar to those reported in Table 2: being attractive significantly lowers the probability of getting the highest scientific distinction.

4 Conclusions

We consider the effect of physical attractiveness on the probability of receiving the Nobel Prize. The previous literature has found plentiful evidence that attractiveness brings about benefits in the labor market, personal life and marriage, and even research (at least in terms of quality of academic publications and number of citations). The literature is inconclusive, nevertheless, as to whether these gains are due to discrimination in favor of attractive people or whether physical beauty is a signal of better health, higher intelligence, or competence.

In our analysis, we collected pictures of 324 top scientists in physics, chemistry, medicine and economics: these researchers were either predicted to be awarded the Nobel Prize, or have actually received it. We had these pictures rated for their attractiveness by a broad sample of UK undergraduate students. Somewhat surprisingly, we find that being more attractive reduces the probability of receiving the Nobel Prize. When we allow for the relationship being non-linear, it appears hump-shaped, with average-looking scientist having the best odds of being awarded the Nobel. The magnitude of the effect is potentially large: assuming the relationship is linear, each one-standard-deviation improvement in attractiveness is associated with approximately 3.9% reduction in the probability of winning the Nobel Prize. Given that winng the Prize is a very unlikely outcome, a probability difference of this magnitude is not negligible.

Our results reveal correlation rather than causality and we cannot tell what mechanism drives our findings. One possible explanation is discrimination, whereby the nominators and/or the selection committee (subconsciously) consider attractive scientists as less serious and not fitting the expectations that they have about what a top scientist looks like. A google image search for 'typical scientist' very clearly demonstrates the stereotypes that we hold about what a scientist should look like. Such a search produces few images of persons who would be generally considered attractive (being male, older, with eye glasses and bad hair

apparently are among the chief hallmarks of achievement in science). Even fewer of them are women (let alone attractive women), suggesting that female scientists are especially likely to suffer from such stereotyping. Therefore, a top scientist whose appearance does not fit our expectations may have a harder time convincing others their merits. This is in line with a recent result by Gheorghiu, Callan and Skylark (2017), who find that attractive scientists are less likely to be seen as 'good scientists' by the participants in their experiment.

Another possibility, however, is that attractive scientists have better alternative options besides top research. Looking good boosts one's labor market performance and promotion chances, so that attractive academics may be more likely to take up leadership positions with more responsibilities, better pay, higher administrative burden, and less time for pure science. Good looking researchers also have richer options in their social, love and family spheres of life. Therefore, attractive scientists may devote less time and effort to the kind of research that would be likely to lead to a path-breaking contribution that would earn them the Nobel Prize. The limited information that we have on our sample of scientists does not allow us to discriminate between these two alternative hypotheses.

Finally, it is interesting that the impact of physical attractiveness is different for top and mainstream scientists. In related research, Paphawasit and Fidrmuc (2017) consider the effect of good looks on publication quality (journal rank and impact factor) and citations of a broad cross-section of academics in the discipline of economics, and find a positive relationship of both outcomes with physical attractiveness. Therefore, attractive persons are more successful even in research, except at the very top of the distribution of talent.

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Table 1 Summary Statistics

A. Scientists	**N**	**Mean**	**Std. Dev.**	**Min**	**Max**
Nobel Prize Winner	324	0.373	0.484	0	1
Male	324	0.966	0.181	0	1
Age	318	63.745	10.831	34	94
Attractiveness Score	324	3.464	0.693	2.04	6.55
Attractiveness (restricted set)	324	3.867	0.732	2.19	6.65
Physics	324	0.259	0.439	0	1
Chemistry	324	0.241	0.428	0	1
Medicine	324	0.272	0.445	0	1
Economics	324	0.228	0.420	0	1
Black & white	324	0.167	0.373	0	1
Headshot	324	0.917	0.277	0	1
Suit	324	0.685	0.465	0	1
Resolution	324	701425	2117773	5184	2E+07
B. Assessors (full set)	**N**	**Mean**	**Std. Dev.**	**Min**	**Max**
Male	101	0.604	0.492	0.000	1.000
Age	99	21.5	1.4	19.0	27.0
Av. Score Male Assessors	61	3.299	1.639	0.000	8.929
Av. Score Female Assessors	40	3.4	1.4	0.3	5.8
C. Assessors (restricted set)	**N**	**Mean**	**Std. Dev.**	**Min**	**Max**
Male	90	0.578	0.497	0.000	1.000
Age	89	21.4	1.4	19.0	27.0
Av. Score Male Assessors	52	3.595	1.165	1.212	6.833
Av. Score Female Assessors	38	3.5	1.2	1.3	5.8

Notes: The restricted set of assessors omits those with average scores below 1 (14 assessors) or above 8 (1 assessor).

Table 2 Beauty and the Nobel Prize (full set of assessors)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	M+F	M+F	M+F	M+F	M	M	M	M
Score	-0.080**	-0.069*	0.573*	-0.059	-0.100***	-0.072*	0.709*	-0.063
	(.039)	(0.041)	(0.349)	(0.047)	(0.041)	(0.042)	(0.415)	(0.048)
Score squared			-0.090*				-0.111*	
			(0.047)				(0.059)	
Male		-0.302*	-0.359**	-0.305*				
		(0.161)	(0.181)	(0.181)				
Age		0.004	0.005*	0.002		0.005*	0.006**	0.003
		(0.003)	(0.003)	(0.003)		(0.003)	(0.003)	(0.003)
Chemistry				-0.162*				-0.173**
				(0.089)				(0.088)
Medicine				-0.067				-0.119
				(0.085)				(0.087)
Economics				-0.209**				-0.226***
				(0.090)				(0.090)
Black & white				0.717***				0.702***
				(0.110)				(.110)
Head & shoulders				0.165				0.201*
				(0.110)				(0.116)
Suit				0.197***				0.207***
				(0.068)				(0.070)
White				0.034				0.039
				(0.101)				(0.100)
Resolution				1.21e-09				7.24e-09
				(1.45e-08)				(1.39e-08)
N	324	318	318	317	313	307	307	306

Notes: Marginal effects evaluated at means, with robust standard errors in parentheses. Significance levels denoted as: *** 1%, ** 5%, and * 10%.

Table 3 Beauty and the Nobel Prize (restricted sets of assessors)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	M+F	M+F	M+F	M+F	M+F	M+F	M+F	M+F
Score	-0.079**	-0.066*	0.480	-0.062	-0.079**	-0.067*	0.177	-0.063
	(0.038)	(0.040)	(0.347)	(0.046)	(0.037)	(0.039)	(0.247)	(0.045)
Score squared			-0.070				-0.032	
			(0.044)				(0.032)	
Male		-0.294*	-0.330**	-0.297*		-0.295*	-0.312*	-0.296*
		(0.160)	(0.169)	(0.179)		(0.159)	(0.164)	(0.178)
Age		0.004	-0.005	0.002		0.004	0.004	0.002
		(0.003)	(0.003)	(0.003)		(0.003)	(0.003)	(0.003)
Chemistry				-0.162*				-0.162*
				(0.089)				(0.089)
Medicine				-0.068				-0.064
				(0.085)				(0.085)
Economics				-0.206**				-0.205**
				(0.091)				(0.091)
Black & white				0.720***				0.720***
				(0.110)				(0.110)
Head & shoulders				0.165				0.165
				(0.109)				(0.109)
Suit				0.196***				0.198***
				(0.068)				(0.068)
White				0.042				0.043
				(0.102)				(0.102)
Resolution				1.76e-09				1.74e-09
				(1.45e-08)				(1.45e-08)
N	324	318	318	317	324	318	318	317

Notes: Marginal effects evaluated at means, with robust standard errors in parentheses. Significance levels denoted as: *** 1%, ** 5%, and * 10%.

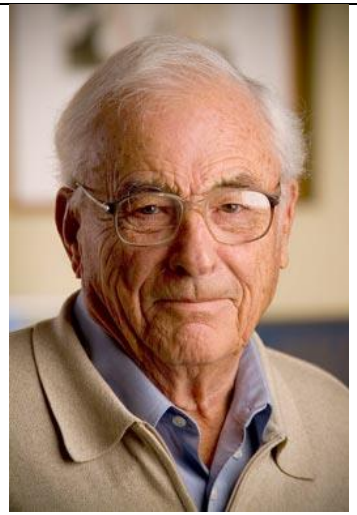
Figure 1 Three Most Attractive Top Scientists: All Disciplines

		
1. Nicholas B. Lydon (6.55, Physiology/Medicine)	**2. Jacqueline K. Barton (5.82, Chemistry)**	**3. Juan Ignacio Cirac (5.22, Physics)**

Figure 2 Three Most Attractive Top Economists

		
1. David E. Card (4.73)	**2. Edmund S. Phelps (4.65)** **Nobel Prize 2006**	**3. Philippe M. Aghion (4.61)**

Figure 3 Three Most Attractive Nobel Prize Laureates

		
1. May-Britt Moser (5.06), **Nobel Prize in Chemistry 2014**	**2. Willard S. Boyle (5.00)** **Nobel Prize in Physics 2009**	**3. Carol W. Greider (4.86)** **Nobel Prize in Physiology/Medicine 2009**