E C O N O M I C S  B U L L E T I N

# The beauty of the contest: A novel approach to experimental beauty contests.

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## *Abstract*

We introduce a novel beauty contest experiment to study the gap between individual preferences and beliefs about collective preferences of physical attractiveness. In the first round, participants vote their 3 favorite ladies; in the second round they vote the 3 ladies they believe were the most voted in the first round.Unlike other beauty contest experiments, our setup does not investigate depth of reasoning in a cognitively intense task. Instead, it is meant to investigate the existence of shared definitions of physical attractiveness, and whether these may be successfully employed as focal points.Our results show that most participants hold mistaken beliefs about collective preferences and overestimate and underestimate how well liked certain ladies are. Regardless of these mistakes, the winning portraits win by a wide margin in both rounds. Moreover, our participants are better at predicting the portraits which will not be the most voted than those which will.

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The judgment of taste […] is not a cognitive judgment, and
so not logical, but is aesthetic – which means it is one
whose determining ground cannot be other than subjective.
- Immanuel Kant, *The Critique of Judgement*

## 1. Introduction

Economists do not care as much as our colleagues in Mathematics and Natural Sciences whether our models and theories are aesthetically beautiful (Lee & Lloyd 2005), but we care a lot for the attractiveness of our colleagues and, when we vote for Vice Presidents and members of the Executive Committee of the American Economic Association, we end up choosing the candidates with better-looking pictures (Hamermesh 2006).[1] This is hardly surprising: voters possess little political information and may select candidates based on their personal characteristics rather than on their political agenda (Downs 1957, Bartels 1996) with the consequence that the attractiveness of a politician is a well-known predictor of her electoral success (e.g. Todorov et al. 2005, Berggren et al. 2007).

Beside the AEA ballots, another way in which beauty entered economics is as the research agenda of what we may call the 'economics of beauty,' which is now becoming an established field. In a seminal paper that appeared in the *American Economic Review*, Daniel Hamermesh and Jeff Biddle (1994) revealed how looks constitute a basis for discrimination in labor markets. They show that a veritable "plainness penalty" and a "beauty premium" exist, which make it more likely for attractive individuals to be hired and promoted, and to earn higher wages than average and unattractive colleagues. Both the penalty and the premium may be large: Chinese women in Shanghai earn 24.6% lower hourly wages if their appearance is below-average, while young American men may expect a 10.1% bonus if their looks are above-average (see also: Frieze et al. 1991, Marlowe et al. 1996, Biddle & Hamermesh 1998, Hamermesh et al. 2000, Harper 2000). In general, the penalties are larger than the premia. These high penalties make it even more advantageous for below-average-looking young males to engage in crime rather than entering regular jobs (Mocan & Tekin 2005).

One explanation that has been proposed for this phenomenon is that schoolteachers seem to have low expectations about the performance of plain-looking children, while they give preferential treatment to better-looking ones (Hatfield & Sprecher 1986), which arguably translate in less human capital formation for the less beautiful (Mocan & Tekin 2005, Mobius & Rosenblat 2006). While it is far from clear why teachers would have differential expectations about their pupils based on looks, if such differential existed, it would arguably be discriminatory. In some industries which require frequent interactions with customers, on the other hand, the penalty and the premium are probably associated with productivity-differentials – as seems the case for advertising firms (Pfann et al. 2000) and even for teaching (Hamermesh & Parker 2004) – and may thus not be truly discriminatory. In a cross-sectional investigation, however, the intensity of customer interactions fails to explain the beauty premium (Hamermesh & Biddle 1994). It has been experimentally shown, moreover, that good-looking participants are (wrongly) believed to be more skilled at a maze-solving task unrelated to physical attractiveness (Mobius & Rosenblat 2006).

Why does beauty affect our perception of others? A pro-beauty bias may be evolutionarily sound, because attractiveness may signal physical health or higher intelligence (Jackson et al. 1995, Langlois et al. 2000). Since both are important

[1] We use (physical/aesthetic) attractiveness/pleasantness as synonyms of beauty throughout the article.

aspects of mate quality (Andersson 1994), the skill to detect beauty is fitness improving, which may explain why most people recognize it and agree on what is beautiful (Langlois et al. 2000). Also, what is considered physically attractive is fairly stable over time, at least within a culture (Hamermesh & Biddle 1994: 1175ff.).

In this paper we regard beauty as a coordination device, in the footsteps of focal points, for an experimental task which could not be more aptly labeled: a beauty contest.

## 2. Economics and Beauty Contests

In one of the most famous passages in the economic literature of all times, John Maynard Keynes (1936, p. 156) likened the investment in the stock market by professional traders

> *to those newspaper competitions in which the competitors have to pick out the six prettiest faces from a hundred photographs, the prize being awarded to the competitor whose choice most nearly corresponds to the average preferences of the competitors as a whole […] It is not a case of choosing those which, to the best of one's judgement, are really the prettiest, nor even those which average opinion genuinely thinks the prettiest. We have reached the third degree where we devote our intelligences to anticipating what average opinion expects the average opinion to be.*

Experimental beauty contest are well established in the economics literature (e.g. Nagel 1995, Ho et al. 1998, Güth et al. 2002). These experiments require the participants to choose a real number from a closed interval, e.g. $I$ [0,100]. Whoever picks the number closest to $p$ times the average (usually with $0 < p < 1$) is the winner of a monetary reward. An experiment like this is dominance solvable: the process of iterated elimination of dominated strategies leads to the unique and stable equilibrium at which every player chooses zero. The simplest strategy would be to choose a random number (zero-order belief). A more elaborate strategy is to form a (first-order) belief on the choices of the others and play accordingly. If everybody else chose at random, for instance, a player would win by choosing $p$ times the mean (i.e. 50). Therefore all players should choose $p \bullet 50$. Yet, if that were the case, one would win by choosing $p^2 \bullet 50$, which is the second-order belief on the first-order beliefs of others… and so on until the $n^{th}$-order (with $n \rightarrow \infty$) belief at which the equilibrium value is reached, $p^n \bullet 50 = 0$, and all players win.

It is curious that these experiments are labeled beauty contests, since they do not deal with one's own versus average preferences but with a cognitively intense exercise. In other words the skill at play is not the prediction of aesthetic tastes, but the calculative inferential skills required to understand the structure of a complex game theoretical setting (Lanteri & Carabelli 2008). Whereas in these experiments a truly omniscient player could in principle be the sole winner by picking the appropriate $p \bullet avg$ number (note that such number would also influence the average), in an actual beauty contest even an omniscient player could be the winner only insofar as he voted with the largest crowd, in a way that is rather reminiscent of a focal point in coordination games (e.g. Schelling 1980). Experimental beauty contests become coordination games of this kind in the case of $p = 1$, where each player must simply guess the average. Such case, too, allows in principle multiple equilibria: if everybody chose 1 (or 2, or 29, or 84) or any other number, then that number would also be the winning number (though we suspect that there would be a very strong focal point at number 50). When designed in this way, however, an experimental beauty contest would better be labeled 'guessing game' (as experimental beauty contests have been customarily called until the mid-90's), since the subjects would really have to make a guess. Such guess, moreover, would certainly not reveal much about any difference

between individual and collective aesthetic preferences. We therefore chose to design an experiment that differs significantly from those mentioned above.

Our interest in beauty contests and in beauty at large is due to the fact that the capacity to make accurate predictions of average opinions and preferences is a useful social skill, with major economic consequences. Although individual preferences are heterogeneous, aggregate preferences are much less so: global markets are winner-take-all (Frank & Cook 1995) arenas, wherein an expert investor capable of predicting a stock-market fad, a fashion designer who brings out the ultimate handbag which every lady would die for, or a writer who drafts a novel all kids love… all make a killing and cash in a fortune. It becomes therefore interesting to investigate whether these successes reflect mere luck or people have the capacity to predict the aggregate preferences of others.

As mentioned, we designed an altogether novel (yet very much traditional) beauty contest experiment to investigate the gap between genuine individual opinions and the average opinion of a population, as well as the capacity of individuals to predict the average preferences of the population of which they are members. We shall therefore present the results of an experiment that more closely maps onto the structure of a beauty contest in its lay meaning of selecting the most beautiful (or that believed to be considered the most beautiful) lady. After expressing their individual votes, the participants in our experiment must vote again, this time coordinating their choice of three ladies, while employing beauty as a focal point of sorts.

## 3. The experiment

On the 8th November 2007, we recruited 71 students of Law at the University of Eastern Piedmont in Alessandria (Italy). At the beginning, all the subjects were given a legal disclaimer, the instructions, the answer sheets and a separate page with high-quality color portraits of some ladies selected from the participants of an international beauty contest (e.g. FIGURE 1).

To ensure internal validity, we wanted to rule out the risk that some subjects had seen the ladies before experiment day. We thus excluded the contestants from Miss Italy and chose instead those from the Miss World pageant. Moreover, since aesthetic preferences are affected by fashions and trends, we wanted pictures that were quite recent. On the other hand they needed to be not too recent, so to again reduce the probability that the subjects who had seen the girls before could remember them.

When they take part in a real world beauty contest, the contestants are assessed along a variety of characteristics (e.g. personality, talent, beauty, etc.) by a jury, which sees them repeatedly and has several occasions to comment on their merits. Because it would have been impractical, alas, to summon all the ladies in person, our subjects merely voted for a picture. In spite of the obvious differences, we also wanted to secure a chance to compare the votes cast by our subjects with the ranking of the actual contest.[2] As of 2004, the Miss World voting system changed to include the preferences expressed by the TV viewers of the finals. The heterogeneity of this extended jury and its bias in voting make it a poor standard of comparison. It thus seemed best to employ the contestants from the 2003 edition.

We were careful to keep the number of portraits manageable, so that the subjects could easily compare them. We decided against using all of 106 misses and instead limited our selection to 36, so that their portraits could all be fitted on a single page

[2] Many beauty queens pursue a career in modelling (and specifically in photo modelling) and conversely many photo models participate in some beauty contest, so there must exist some close relationship between the skills and qualities that make someone a successful beauty contestant and those that make her look good on pictures.

and remain clearly distinguishable. In order to reduce the risk of some participants knowing some of the pageants beforehand and to rule out (as far as possible) any bias that such previous exposure may cause, we deliberately excluded from our selection the Irish contestant, who won the title, the Italian, Albanian, and Moroccan ones, because some of the participants in the experiment were nationals of those countries.[3]

The portraits were arranged within a grid with six rows (identified with the numbers from 1 to 6) and six columns (identified with the letters from A to F). In order to reduce positioning effects, we employed four different grids, each with a unique randomized distribution of portraits. For each grid, therefore, each portrait had a unique code, composed of one letter and one number, corresponding to its position in the grid (e.g. A-6, G-3, etc.).

### 3.1. The treatments

The experimental procedure took place as follows:[4] in the first round, the subjects were asked to vote their three favorite portraits (i.e. express their first-order beliefs), which we call INDIVIDUAL PREFERENCES round. We then collected their answer sheets and distributed a new questionnaire in which they were asked to list the three portraits they believed had been most voted by the others (i.e. their second-order beliefs), which we call MOST VOTED round. This gives us 174 votes for each round. The participants knew that correctly indicating the single most voted portraits would let them enter a raffle for a monetary prize (€ 15). The entire experiment took less than 30 minutes.

We also arranged for 24 people (12 of each gender) to express an INDEPENDENT RATING of the beauty of six portraits (i.e. express their first-order beliefs), reproduced on a smaller portrait sheets (e.g. FIGURE 2), so that each sheet was rated on a 1 to 10 scale by two male and two female raters. The independent raters were selected among our acquaintances, reached through their personal e-mails, and were not paid. We estimate that each devoted roughly three to five minutes fulfilling their task.

## 4. Results and discussion

The results from the standard treatment are reported in TABLE I. In both rounds we observe a strong winner-take-all effect (i.e. the winning portraits win by a wide margin): the top 4 ladies in the INDIVIDUAL PREFERENCES round received 68 votes, in the MOST VOTED round the effect is even more marked: the top 4 ladies obtain 82 votes, in both rounds the least voted ladies received 0 votes. We thus observe greater dispersion in the second round. The Gini coefficient is .58 in the first round and .65 in the second round and the most voted now takes almost all the possible votes now.[5]

On average, in the second turn participants change 1.75 of the 3 portraits chosen in the first turn. The chi-squared test shows that the INDIVIDUAL PREFERENCES and the MOST VOTED distributions are significantly different at the 99% level of confidence (when we included the portraits with less than 5 total votes, the test remains significant, see notes to Table 1). The difference in vote distributions shows that the participants are aware of a gap between individual and collective preferences, that they are capable of a split-judgment, and that they consequently modify their answers.

What about accuracy? In the MOST VOTED round, we predicted a strong clustering of votes. The least voted portraits, for example, should be left at zero. Indeed, eighteen of the ladies received either 0 or 1 votes in the second round, and fifteen of

[3] We dropped the responses from the one participant who correctly identified the contest from which the misses were taken.
[4] Full instructions are available from the corresponding author.
[5] If we limit the analysis to the top 24 observations of each round, so that we avoid the 0's, the coefficients are .42 and .49.

these were also the least voted in the first round. This confirms that our subjects were quite good at voting out the ladies they believed to be sure losers.

Accuracy, however, was much poorer when it came to identifying the top-voted portraits. The podium in the INDIVIDUAL PREFERENCES round (miss Curacao with 19 votes, miss Georgia with 18, and miss Switzerland with 16) received 53 votes. This is the target first-order judgment and we predicted those three ladies to win by a landslide in the second round. They didn't. In the MOST VOTED round, the same ladies receive only 44 votes (Curacao: 12, Georgia: 11, Switzerland: 21). Contrary to our expectations, in the second round, the dispersion of votes for the most voted ladies increases: the Gini coefficient for the top-4 misses is .05 in the first round and .25 in the second round.

In the second round we note two clear patterns: the overestimation of the votes received by some portraits and the underestimation of others. This is what we hoped for, as it is obviously what we would observe if everybody voted for the correct top-3 misses. Our data, however, are less comforting.[6] Two examples show our point.

* In the first round, miss Hungary came in 4$^{th}$, with 15 votes. In the second round, she only received 8 votes. This is especially striking in comparison with miss Brazil, who also was 4$^{th}$ in the first round with 15 votes. In the second round, however, miss Brazil was by far the most voted with 37 votes.

* Miss Curacao, the winner of the INDIVIDUAL PREFERENCES round with 19 votes, scaled down to 12 in the MOST VOTED round. The same result as miss Belarus, who had only received 3 votes in the first round.

When looking at the INDEPENDENT RATING results (TABLE II), we again find that the lowest twenty portraits (i.e. those with an average rating below 7/10) correspond to portraits that received very few votes in both INDIVIDUAL PREFERENCES and MOST VOTED rounds, with the exception of the misses from Aruba, Bolivia, and South Africa. It is at the top of the ranking, however, that we observe unexpected results. Half of the highest rated ladies, including the top two, had received few votes in the standard treatment. Conversely, the winners of the standard treatment had a performance below our expectations.

The participants in our experiments systematically relegate some portraits in the bottom and some in the top positions, which induces us to believe that they are capable both of identifying beauty (and lack thereof) and of predicting what others identify as beauty (and lack thereof). They are, however, not consistent in *ranking* it. In other words, there is a broad, but rough, agreement that some Miss X and Miss Y are beautiful, and that some Miss Z is not so. There is, however, hardly any agreement on whether Miss X is more or less beautiful than Miss Y. This is the problem which ultimately undermines participants' performance in our experiment.

There is no visual-aesthetic clue (e.g. color of hair, eyes, and skin, hairstyle, geographical origin, position in the grid, etc.) that proves especially salient or that prevails as a coordinating focal point. Consequently, there are no features that predict which portraits are considered beautiful, believed to be considered beautiful by the others, underestimated or overestimated. Both the ladies who received more votes in the in the INDIVIDUAL PREFERENCES round and those who received more in the MOST VOTED round display a broad variety of features.[7]

[6] Perhaps the misses relate differently to what participants believe to be the stereotypical canons of beauty, but it was not possible to investigate this hypothesis with our data.

[7] The tests are available from the corresponding author. At the end of the experiment, the participants were requested to comment on their choices and on the reasons that moved them to prefer some ladies to the others. The answers proved of limited practical use since, for instance, the two most common answers were: 'I voted for the prettiest (or synonym) ladies' and 'I voted for the ladies I liked the most.' Even the participants who gave one of two other very common responses – i.e. they voted for the ladies

## 5. Concluding remarks

The skill to predict average opinions is valuable, because it makes it easier to navigate most social contexts. Also the capacity to recognize beauty is important. Attractive traits (e.g. averageness and symmetry) may signal important aspects of mate quality (Andersson 1994) and recognizing them seems a fitness-enhancing skill. If this evolutionary account is true, it may be even more important to guard oneself from – hence discriminate against – poorly looking people, as this may signal genetic makeup of a low quality.[8] Both these skills are important, moreover, because they have large economic consequences.

There exists a veritable "beauty premium" that makes it more likely for attractive individuals to be hired, promoted, and to earn higher wages than their colleagues and an even larger "plainness penalty" that makes it more likely for unattractive people to earn low wages, even when any difference in actual performance is either lacking or, if present, it is not large enough to warrant the difference in pay. It is probable that the advantages given to the beautiful people, if unfair, are not aware and deliberate. Even if someone wanted to hire the best looking person or the person he thinks others will find as the best looking, our experiment shows that this might not be very easy. Therefore, perhaps the pro-beauty discrimination may be a less prevalent phenomenon than one would be lead to believe from the existing literature.

Both the poor performance of our subjects with respect to the most voted ladies and the good performance at finding the least voted ones are therefore of interest.[9] Perhaps there were too many girls to choose from or they were all too consistently beautiful.[10] While recognizing beauty and lack thereof may be evolutionary useful, there seems to exist no comparable advantage in being capable of coordinating through beauty or to predict other people's aesthetic tastes. This is probably a consequence of our having different ideals of beauty and aesthetic tastes, which may be fitness increasing, because it reduces the competition for the same partners.

In the past, psychological and economic research has shown that, although aesthetical pleasantness is a many-layered trait, members of both genders and from different cultures generally agree on attractiveness.[11] Our research exposes some limitations to such agreement: the participants in our study do not seem to agree very much, and they seem to give credit to Kant's observation that the determining factors of beauty are ultimately subjective.

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with the nicest smile or with the most natural look – gave very heterogeneous votes. Since these comments do not affect the payoff, most subjects seemed especially lazy at this stage. Therefore, on other occasions, at the end of different treatments and with different subjects, we conducted oral debriefing sessions instead. These, too, proved of limited help.

[8] This might explain why the plainness penalty is larger than the beauty premium.

[9] However, we do not know whether ranking at the bottom would be more accurate, since we did not ask them to rank the least beautiful portraits.

[10] Having been voted as one of the 20 winners in the actual contest does not predict the votes received in our experiment.

[11] Also in our experiment there were no significant differences between the votes of men and women.

*FIGURE 1. Portraits Sheet (one of four).*


*FIGURE 2. Smaller Portraits Sheet (one of six).*

*TABLE I. Results, Standard Treatment* [(I)]

| ***Miss*** | ***Ind. Pref.*** | ***Most Voted*** | ***Miss*** | ***Ind. Pref.*** | ***Most Voted*** |
|---|---|---|---|---|---|
| Aruba | 6 | 6 | India (*) | 6 | 4 |
| Australia (*) | 6 | 6 | Jamaica (*) | 4 | 0 |
| Bahamas | 0 | 0 | Japan | 0 | 0 |
| Barbados | 0 | 0 | Kazakhstan | 0 | 0 |
| Belarus | 3 | 12 | Namibia | 1 | 1 |
| Bolivia (*) | 7 | 7 | Nigeria | 0 | 0 |
| Brazil | 15 | 37 | Nicaragua | 1 | 2 |
| Cayman Islands | 0 | 0 | Puerto Rico (*) | 4 | 3 |
| Costa Rica | 1 | 3 | Poland | 6 | 1 |
| China (*) | 4 | 0 | Singapore | 3 | 1 |
| Curacao | 19 | 12 | SerbiaMontenegro | 1 | 1 |
| Dominican R. (*) | 3 | 7 | South Africa | 5 | 9 |
| Ethiopia (*) | 0 | 1 | Sweden | 1 | 5 |
| France | 7 | 6 | Switzerland (*) | 16 | 21 |
| Georgia (*) | 18 | 11 | Uruguay | 14 | 8 |
| Guadeloupe | 2 | 0 | Uganda | 1 | 1 |
| Hungary | 15 | 8 | Zambia | 2 | 0 |
| Israel | 1 | 0 | Zimbabwe | 2 | 1 |
| | | | *TOTAL* | *174* | *174* |

(I): $\chi^2 = 48.688$ (p-value = .012). Note that the portraits with 0 votes both in the INDIVIDUAL PREFERENCES and in the MOST VOTED treatments have been dropped from the test. We also performed a test aggregating all the portraits which received less than 5 votes in total (adding together INDIVIDUAL PREFERENCES and MOST VOTED), which is significant.
(*): indicates a contestant who was voted as the recipient of one of 20 prizes in the actual contest.

*TABLE II. Average Rating, INDEPENDENT RATERS*

| | | | |
|---|---|---|---|
| Dominican R. | 9.75 | Costa Rica | 6.75 |
| Hungary | 8.75 | South Africa | 6.75 |
| France | 8.25 | Namibia | 6.5 |
| Switzerland | 8 | Jamaica | 6.5 |
| India | 8 | SerbiaMontenegro | 6.5 |
| China | 8 | Zambia | 6.5 |
| Georgia | 8 | Guadeloupe | 6.5 |
| Puerto Rico | 7.75 | Ethiopia | 6.25 |
| Uruguay | 7.75 | Nicaragua | 6.25 |
| Australia | 7.75 | Zimbabwe | 6.25 |
| Curacao | 7.75 | Bahamas | 6.25 |
| Brazil | 7.5 | Bolivia | 6 |
| Poland | 7.25 | Kazakhstan | 6 |
| Nigeria | 7.25 | Barbados | 6 |
| Singapore | 7.25 | Israel | 6 |
| Belarus | 7.25 | Cayman Island | 5.75 |
| Aruba | 6.75 | Japan | 5.75 |

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