

# Why Do I Like People Like Me?\*

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## Abstract

In this paper we extend the standard model of statistical discrimination to a multidimensional framework where the accuracy of evaluators depends on how knowledgeable they are in each dimension. The model yields two main implications. First, candidates who excel in the same dimensions as the evaluator tend to be preferred. Second, if two equally productive groups of workers differ in their distribution of ability across dimensions group discrimination will arise unless (i) evaluators are well informed about the extent of these differences and (ii) evaluators are allowed to take candidates' group belonging into account in their assessments. These results suggest that in some cases blind evaluations may generate discriminatory outcomes.

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# 1 Introduction

The fact that individuals might be treated differently according to exogenous characteristics such as gender, age or race has been well documented in the literature. Most of the evidence refers to the labor market, where differences in wages or hiring and promotion that cannot be accounted for by differences in productivity have been observed.<sup>1</sup> Discriminatory behaviors have also been observed in housing decisions (Massey and Denton 1993), lending (Hunter and Walker 1996), car selling (Ayres and Siegelman 1995) or even in the refereeing of academic papers (Blank 1991; Fisher et al. 1994).

In the economics literature, two distinct general sets of explanations have been proposed to explain the origin and persistence of discrimination. On the one hand, taste models, as in Gary Becker's (1957) seminal work, suggest a preference-based motivation for the existence of discrimination. The difference in wages between two equally productive groups of workers arises because employers, customers or co-workers dislike interacting with employees that belong to certain groups. On the other hand, statistical models of discrimination argue that, in the presence of information asymmetries about the real productivity of workers, the group-belonging of an individual can be considered as a signal that provides additional information. In this context, taking into account an individual's group affiliation may be a rational response to its informational content. Groups of workers may differ in their expected productivity (Phelps 1972, Lazear and Rosen 1990) or in the reliability of the observable signals (Aigner and Cain 1977, Cornell and Welch 1996). Arrow (1973) proposes an alternative model where employers' asymmetric beliefs about the human capital investments of members of different groups are self-confirming and discriminatory outcomes can be thought of

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<sup>1</sup>For a survey see, for instance, Altonji and Blank (1999).

as the result of a self-fulfilling prophecy. Coate and Loury (1993) further formalize this approach.<sup>2</sup>

In this paper we extend the standard model of statistical discrimination presented by Phelps (1972) introducing two novel features. First, we allow for the existence of multiple dimensions of ability. These dimensions can be understood either as different tasks that the worker needs to undertake, or as separable skills that are required to perform a single task. Second, we assume that the capability of an employer to evaluate quality at a certain dimension increases with her knowledge of that dimension.<sup>3</sup> This assumption is consistent with experimental evidence, where it has often been found that, in many dimensions, individuals who are less competent are also relatively less accurate at evaluating ability.<sup>4</sup>

Combining these features the model yields the following two predictions. First, we show that a similar-to-me-in-skills effect arises in the evaluation. Since individuals can assess knowledge more accurately at those dimensions where they are more knowledgeable, an employer who makes an optimal use of the available information will give relatively more weight to signals observed in dimensions where she is most knowledgeable. As a result, given any two equally productive candidates, the employer will tend to give a higher valuation to the candidate who excels in the same dimensions as she does. Second, the model shows that, even if members of different groups are equally productive, group discrimination might arise if groups differ in

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<sup>2</sup>For a recent review of theoretical models of statistical discrimination see Fang and Moro (2010).

<sup>3</sup>It may be possible to rationalize this assumption within a categorical model of cognition (Fryer and Jackson 2008). According to this model, evaluators process information with the aid of categories. If the number of categories is limited, those types of experiences that the evaluator faces less frequently are more coarsely categorized. As a result, evaluators would make less accurate predictions when confronted with such experiences. We thank an anonymous referee for making this point

<sup>4</sup>Knowledgeable people are more accurate in their evaluations in the field of chess (Chi 1978), physics (Chi et al. 1982), grammar (Kruger and Dunning 1999) or academic performance (Everson and Tobias 1998).

their distribution of ability across dimensions.<sup>5</sup> In particular, group discrimination will arise if (i) employers are not fully aware of the extent of these differences or (ii) employers are perfectly informed but cannot condition their evaluations on candidates' group-belonging. The intuition behind this result is the following. Employers will tend to give more weight to signals that have been observed in those dimensions where they are more knowledgeable. In principle this favours candidates belonging to the same group as the employer, as they are more likely to excel precisely in these dimensions. Still, a well-informed evaluator who was allowed to take into account the group belonging of candidates might adjust her priors appropriately. This would not only be efficient from an informational point of view but, as well, it would yield similar average evaluations across groups of candidates.

The model proposed in this paper differs in several ways from Phelps (1972) and from other related models of statistical discrimination (Aigner and Cain 1977, Cornell and Welch 1996). These models rely on the existence of some exogenous group difference in the quality of signals. Here the source of discrimination is an exogenous group difference in the distribution of quality across dimensions, but all groups are being evaluated with the same accuracy. There are also substantial differences in terms of the predictions of the model in at least two respects. First, standard models predict that among highly productive candidates, those belonging to the evaluator's group will tend to be hired but, when all candidates are relatively unproductive, those who do not belong to the employer's group will tend to be preferred, given that the observed (low) signal is a weaker indicator of their productivity. Still, up to our knowledge there is no empirical evidence sup-

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<sup>5</sup>Following Aigner and Cain (1977), we consider group discrimination as the situation where "groups that have the same average ability may receive different average pay" (pp.178). Note that in a multidimensional framework the term *same ability* should be interpreted as meaning *same total ability* rather than *same ability at every dimension*.

porting the latter implication, this is, the reversal of the race and gender gap for low productivity levels. In contrast, in the (multidimensional) model proposed here those candidates akin to the evaluator tend to be preferred for every level of productivity. Second, in standard models, hiding the identity of candidates eliminates discrimination. In this framework the opposite is true: evaluators will tend to prefer candidates from their own group unless they are allowed to take into account candidates' group belonging. In sum, when the accuracy of evaluators at each dimension depends on how knowledgeable they are, blind evaluations may generate discriminatory outcomes.

## 2 The model

Let us consider the case of an individual  $i$  whose total quality  $q_i$  depends on his abilities or skills in a number  $D$  of different dimensions or fields. These fields can be understood as different tasks that the worker needs to undertake or as separable skills that are required to perform a single task. For simplicity, we will assume that candidate's total productivity is equal to the sum of his quality at each dimension  $\left[ q_i = \sum_{d \in D} x_{id} \right]$ .

Candidates' abilities are assumed to be exogenously given and independently and normally distributed. Without loss of generality, we impose two simplifying assumptions on the populational distribution of quality. First, we restrict the variance of quality to be equal across dimensions and normalize it equal to one. With this constraint we want to avoid a more general case where ability may vary systematically more along certain dimensions. Second, we assume that an individual's ability along a certain field is independent of his ability along any other dimension. In other words, the knowledge of an individual's ability in one dimension does not provide any information about

his ability in any other dimension.<sup>6</sup> This is,  $\mathbf{x}_i \rightarrow N(\mathbf{p}, \mathbf{I})$ , where  $\mathbf{p}$  is a  $D \times 1$  vector of mean abilities and  $\mathbf{I}$  is an identity matrix.

In this multidimensional framework let us consider the case where individuals' total productivity is not observable but an evaluator  $h$  can observe some imperfect signal of candidates' ability at each dimension. These signals could be interpreted as the result of some tests or job interviews and their value will be a function of the candidates' true ability at each field plus an error term  $\eta$  which is assumed to be independently and normally distributed with zero mean and finite variance.

$$y_{id} = x_{id} + \eta_{id}^h \quad \text{where } \eta_{id}^h \rightarrow N(0, \sigma_{\eta_d^h})$$

Moreover, let us assume that in each dimension the accuracy of the signal is independent of the quality of the candidate:  $E(x_{id}\eta_{id}^h) = 0$

Given the above assumptions, the evaluator will infer the quality of candidate  $i$  in dimension  $d$  as the weighted sum of the signal observed in this dimension and the distributional prior, where the weight given to the signal will depend on how accurately this signal is perceived by the evaluator:

$$E_h(x_{id}/y_{id}) = \gamma_d^h y_{id} + (1 - \gamma_d^h) p_d \quad (1)$$

where  $\gamma_d^h = \frac{E_h(x_{id}y_{id})}{E_h(y_{id}y_{id})} = \frac{1}{1 + \sigma_{\eta_d^h}^2}$  and the conditional expected total productivity is equal to:

$$E_h(q_i/y_{i1}, \dots, y_{iD}) = \sum_{d \in D} [\gamma_d^h y_{id} + (1 - \gamma_d^h) p_d]$$

This is, employer  $h$  will take relatively more into account those signals

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<sup>6</sup>As long as there exists some kind of multidimensionality, this is, provided that quality in different dimensions is not perfectly correlated, dimensions could always be appropriately redefined such that this condition is satisfied.

that she observes in fields where she can assess information more accurately.

## 2.1 Similar-to-me-in-skills effect

Let us define an evaluation as being complex if an evaluator's relative ability to assess quality is positively related to her own quality. In a context where, without loss of generality,  $D$  is equal to two, an evaluation is complex if, given an evaluator  $h$ :

$$x_{h1} > x_{h2} \implies \sigma_{\eta_1^h} < \sigma_{\eta_2^h}$$

It easily follows that when the evaluation is complex, an evaluator who makes an optimal use of the available information will give a larger weight to those signals that have been observed in that dimension where her own ability is larger. This is,

$$x_{h1} > x_{h2} \implies \gamma_1^h > \gamma_2^h \tag{2}$$

As a result, faced with two equally productive candidates  $i$  and  $j$ , evaluator  $h$  will tend to give a higher evaluation to the candidate who excels in the same dimension where she herself is best. More precisely,

**Proposition 1** *Similar-to-me-in-skills effect*

$$q_i = q_j, x_{h1} > x_{h2} \ \& \ x_{i1} > x_{j1} \implies E_h[q_i] > E_h[q_j]$$

**Proof.** The difference in the expected quality of the two candidates is equal to:

$$\begin{aligned}
E_h [q_i] - E_h [q_j] &= E_h \left[ \sum_{d=1,2} (\gamma_d^h y_{id} + (1 - \gamma_d^h) p_d) \right] - E_h \left[ \sum_{d=1,2} (\gamma_d^h y_{jd} + (1 - \gamma_d^h) p_d) \right] = \\
&= \sum_{d=1,2} (\gamma_d^h x_{id} + (1 - \gamma_d^h) p_d) - \sum_{d=1,2} (\gamma_d^h x_{jd} + (1 - \gamma_d^h) p_d) = \sum_{d=1,2} \gamma_d^h (x_{id} - x_{jd})
\end{aligned}$$

which is positive since  $q_i = q_j \implies x_{i1} - x_{j1} = x_{j2} - x_{i2} > 0$  and  $x_{h1} > x_{h2} \implies \gamma_1^h > \gamma_2^h$ . ■

## 2.2 In-group bias

In this subsection we investigate whether the existence of the above similar-to-me-in-skills effect can generate an in-group bias. Consider that individuals may belong to two different groups  $g_1$  and  $g_2$  defined according to gender, age, or some other easily observable and exogenous characteristic and let us assume that candidates' total productivity is independent of group belonging:

$$E [q_i / i \in g_1] = \bar{q}^{(g_1)} = \bar{q}^{(g_2)} = E [q_j / j \in g_2]$$

This assumption does not prevent the possibility that members of the two groups tend to excel in different dimensions. More particularly, let us represent the existence of group-related variations in the distribution of quality in the following way:

$$x_{id} = p_d^{(g)} + \mu_{id} \quad d = 1, 2; i \in g$$

where  $p_d^{(g)}$  is the expected ability in dimension  $d$  of individuals in group  $g$  and  $\mu$  is assumed to be normally and independently distributed with zero mean and finite variance. For simplicity, we consider the case where the distribution of quality across groups is symmetric so that the following condition

is satisfied:

$$p_1^{(g_1)} = p_2^{(g_2)} \ \& \ p_2^{(g_1)} = p_1^{(g_2)} \quad (3)$$

In this set up, evaluators estimate candidates' quality in a similar way as in (1). Given that  $y_{id} = x_{id} + \eta_{id}^h$ , it follows that in each dimension the relationship between quality and signal, net of the group effect, will be equal to  $x_{id} - p_d^{(g)} = \gamma_d^h (y_{id} - p_d^{(g)}) + u_{id}$ . Thus,  $E_h(x_{id}) = E_h[\gamma_d^h y_{id} + (1 - \gamma_d^h) p_d^{(g)}]$  where  $\gamma_d^h = \frac{\text{Var}(\mu_{id})}{\text{Var}(\mu_{id}) + \text{Var}(\eta_{id}^h)} = \frac{\sigma_\mu}{\sigma_\mu + \sigma_{\eta_d^h}}$ .

In our analysis we will distinguish between two possible situations. First, employers may take into account candidates' observable signals of quality but do not condition their evaluation on candidates' group belonging. Second, we study the case where the evaluators condition their evaluation both on the observed signals of quality and candidates' group belonging.

### 2.2.1 Blind evaluations

Let us define blind evaluations as those where evaluators do not condition their evaluation on candidates' group belonging [ $E_h[x_{id}] = p_d \ \forall i; d = 1, 2$ ].<sup>7</sup>

When members of different groups are, on average, equally productive but differ in their distribution of ability, if the evaluator does not or cannot take into account candidates' group belonging, individuals belonging to her own group tend to be favored.

**Proposition 2** *Blind evaluations yield discriminatory outcomes*

$$\begin{aligned} \bar{q}^{(g_1)} &= \bar{q}^{(g_2)}, p_d^{(g_1)} \neq p_d^{(g_2)} \ \& \ E_h(x_{id}) = E_h(x_{jd}) = p_d \implies \\ &\implies E_h(q_i) > E_h(q_j) \quad i, h \in g_1, j \in g_2, d = 1, 2. \end{aligned}$$

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<sup>7</sup>It is possible also to think about a more general model where evaluators are allowed to use the information provided by signals in order to infer the group belonging of the candidate. The extreme case where signals are fully informative about the group belonging of candidates would be equivalent to the non-blind evaluation scenario shown below.

**Proof.** Without loss of generality let us assume that members of group  $g_1$  tend to excel in dimension one  $\left[ p_1^{(g_1)} > p_2^{(g_1)} \right]$ . Let us also for simplicity consider the case where the evaluator  $h$  is a typical group  $g_1$  member such that  $x_{h1} > x_{h2}$ .

$$\begin{aligned}
E_h(q_i) - E_h(q_j) &= E_h \left[ \sum_{d=1,2} (\gamma_d^h y_{id} + (1 - \gamma_d^h) p_d) \right] - E_h \left[ \sum_{d=1,2} (\gamma_d^h y_{jd} + (1 - \gamma_d^h) p_d) \right] = \\
&= \sum_{d=1,2} \left( \gamma_d^h p_d^{(g_1)} + (1 - \gamma_d^h) p_d \right) - \sum_{d=1,2} \left( \gamma_d^h p_d^{(g_2)} + (1 - \gamma_d^h) p_d \right) = \\
&= \sum_{d=1,2} \left[ \gamma_d^h \left( p_d^{(g_1)} - p_d^{(g_2)} \right) \right] = \{\text{by (3)}\} = (\gamma_1^{(h)} - \gamma_2^{(h)}) (p_1^{(g_1)} - p_1^{(g_2)}) > 0
\end{aligned}$$

since, from assumption (2),  $\gamma_1^{(h)} > \gamma_2^{(h)}$ . ■

Evaluators assign a higher valuation to candidates that excel in the same dimensions as they do and, since the distribution of ability across fields is group dependent, this bias favors candidates that belong to the same group as the evaluator. Not taking into account group priors is not only informationally suboptimal but, moreover, it generates discriminatory outcomes.

### 2.2.2 Non-blind evaluations

If employers observe that employees belonging to certain groups tend to perform better on certain dimensions, it is likely that employers will update their beliefs and will take into account this information in their evaluations, at least, as long as they are allowed to do so. If the evaluator can condition her evaluation both on the observed quality signals and on the group belonging of the candidates, then any two equally productive candidates will tend to obtain the same valuations independently of group belonging.

**Proposition 3** *Non-blind evaluations yield non-discriminatory outcomes*

$$\begin{aligned} \bar{q}^{(g_1)} &= \bar{q}^{(g_2)}, p_d^{(g_1)} \neq p_d^{(g_2)}, E_h(x_{id}) = p_d^{(g_1)} \not\approx E_h(x_{jd}) = p_d^{(g_2)} \implies \\ &\implies E_h(q_i) = E_h(q_j) \quad i, h \in g_1, j \in g_2, d = 1, 2. \end{aligned}$$

**Proof.**

$$\begin{aligned} E_h(q_i) - E_h(q_j) &= E_h \left[ \sum_{d=1,2} \left( \gamma_d^h y_{id} + (1 - \gamma_d^h) p_d^{(g_1)} \right) \right] - E_h \left[ \sum_{d=1,2} \left( \gamma_d^h y_{jd} + (1 - \gamma_d^h) p_d^{(g_2)} \right) \right] = \\ &= \sum_{d=1,2} \left( \gamma_d^h p_d^{(g_1)} + (1 - \gamma_d^h) p_d^{(g_1)} \right) - \sum_{d=1,2} \left( \gamma_d^h p_d^{(g_2)} + (1 - \gamma_d^h) p_d^{(g_2)} \right) = \bar{q}^{(g_1)} - \bar{q}^{(g_2)} = 0 \end{aligned}$$

■

In summary, if well-informed employers may condition their evaluation on the group belonging of candidates, the outcome of evaluations will be independent of employers' group belonging.

### 3 Conclusion

In this paper we build on the standard model of statistical discrimination where an employer must select a candidate in a context of imperfect information. Our main departure from the traditional framework is to allow for the existence of multiple dimensions of ability and to make the accuracy of the evaluation at each dimension depend on the evaluators' knowledge of this dimension. The model yields two main results. First, it rationalizes the existence of a similar-to-me-in-skills effect which favours candidates who excel in the same dimensions as the evaluator. Second, the model casts doubts on the capability of blind evaluations to eradicate discrimination. If groups of individuals differ in their distribution of ability across dimensions, group discrimination may arise unless evaluators are well informed about the extent

of these differences and, moreover, they can condition their assessments on candidates' group belonging. Several reasons may prevent evaluators from taking into account the group belonging of candidates. Evaluators may not be aware of the existence of differences in quality profiles across groups. This may happen when groups have little interaction, perhaps because the size of the minority is relatively small,<sup>8</sup> or in the presence of a number of cognitive biases such as observational selection bias, availability bias or anchoring that can generate a divergence between individuals' perception of other groups' quality at each dimension and their true quality distribution. As well, even if evaluators are well informed about these differences, they may be restricted not to use this information. This is the case, for instance, in many firms and institutions where evaluators are explicitly instructed not to consider candidates' group belonging or candidates' identity is kept anonymous (as in Blank 1991 or Goldin and Rouse 2000). Paradoxically, in the framework considered here, these policies may aggravate discrimination.

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<sup>8</sup>As it would increase the cost of rationality. See for instance Fryer and Jackson (2008).

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