Having it Easy: Consumer Discrimination and Specialization in the Workplace

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Abstract

Most studies analyzing the adjustments of workers to discrimination focus on sorting decisions, such as occupations workers pursue. We instead analyze on-the-job adjustments, focusing on the effects of discrimination by consumers. Specifically, using extraordinary data from a large-scale restaurant, we investigate the effects of an outward yet immutable physical trait - symmetry of the facial attributes of workers - on trade offs workers make, and the extent to which the trade offs are shaped by consumer preference for the trait. A large scale restaurant is well-suited for studying these issues because, as with many jobs in the services sector, workers must trade off quality of service for the quantity of consumers they serve. Using a combination of observational data and data generated by a field experiment, we find consumers have a preference for the trait and that preferred workers deliver lower service quality. Instead they specialize in serving more consumers. The findings imply that when outward physical traits substitute for service quality in consumer preferences, preferred workers specialize in tasks having no services component because consumers punish them less for poor performance. We conclude that consumer discrimination shapes comparative advantage and, in doing so, generates earnings inequality in the workplace.

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Occupations in the modern economy typically require workers to carry out several tasks, where the allocation of effort across tasks is, at least to some degree, at the discretion of

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the worker. As such, workers who wish to maximize earnings should choose to specialize in tasks where they have a comparative advantage. In the classic Roy [1951] model,[1] for example, workers with the same skills carry out their tasks in the same way and earn the same amount. The theory is at odds with a large body of empirical work showing workers who have similar skills, but differ only in outward physical traits, have different earnings. A common reason given for the earnings disparities is the adjustments workers make in response to discrimination. For example, in response to anticipated employer discrimination, the trait may influence the types of jobs and occupations a worker pursues, thereby creating disparities in wages across otherwise identical workers. There are, however, few empirical studies examining whether and why earnings disparities emerge in the workplace itself. This is important because, even after workers have sorted into particular jobs and occupations, the same trait may continue to be a source of earnings disparity amongst workers.

In this view, the role of comparative advantage is not limited to sorting across jobs and occupations. The outward physical traits of workers may also shape comparative advantage in the workplace and, consequently, induce workers with similar skills to specialize in different tasks. But this then begs the question: how could outward physical traits alone be a source of comparative advantage at work? The answer may lie with the nature of work in the modern economy. Many jobs today, particularly those found in the ever-expanding services sector,[2] require interactions with consumers. If consumers, for example, buy more from workers who possess traits they prefer, and workers earn more when they sell more, then consumers can shape the opportunity costs of these interactions. This in turn influences the tasks workers focus on and how much they earn.

Using data from a large-scale North American restaurant franchise, we study the effects of an outward physical trait - symmetry of the facial attributes of workers - on the trade off between the service quality waiters deliver and the number of consumers they serve, and the implications for hours of work, overall sales, and tip rates. The wealth of detail in the data combined with intimate knowledge of the inner-workings of the workplace allows us to draw conclusions about whether consumers favor workers with symmetric faces, and how this

[1] For early, yet modern, formalizations of the Roy model see [Borjas, 1987] or [Heckman and Honore, 1990]. Many studies use the Roy model to examine the effects of comparative advantage on sorting decisions, such as those relating to the pursuit of higher education [Willis and Rosen, 1979], the choice of industry [Heckman and Sedlacek, 1985] or occupation [Miller, 1984], job assignments [Foster and Rosenzweig, 1996], union status [Lemieux, 1998], and the region to live in [Dahl, 2002].

[2] The rise of the service sector is one of the most stark economic developments of the last several decades. In the United States, for example, the service sector currently comprises 62.9 percent of U.S. GDP (CIA World Factbook).

favoritism affects worker behavior and performance. Importantly, it allows us to determine whether favoritism originates in a preference for symmetry or in the information symmetry may convey about characteristics such as trustworthiness or product knowledge that are not directly observable to the consumer.

The venue has a couple of features that are particularly useful for the present study. First, the scale of production - approximately 3000 customers visit the firm each week - introduces a trade off between the service quality workers deliver and the number of consumers they serve. In restaurants of any scale, workers can sell - and earn - more by attending to the wants of consumers. At large-scale restaurants, however, workers can also sell more by serving more consumers. This is important because, without a tradeoff, it is impossible to study the role of comparative advantage in the workplace. Second, the process matching workers with consumers is exogenous. An exogenous matching process is important because it ensures that consumers are randomly assigned a bundle of worker traits.[3]

Facial symmetry is a useful trait in this context because there is a general agreement - across cultures and countries - that symmetric faces have greater appeal than asymmetric ones.[4] There are two reasons why the general agreement is useful for empirical studies of this nature. The first reason is that it helps circumvent having to control for consumer attributes in our empirical analysis. If consumers were to differ in how they rank symmetry, then we would require information on consumer attributes to distinguish the effects the trait has on worker behavior and performance. The second reason is that workers are more likely to know whether consumers prefer their endowment of symmetry. If there was some ambiguity about the value of the endowment to consumers, as is typically the case with other traits, then the responses we observe might be attributed to a lack of information on the part of workers rather than a consumer preference for the trait itself.[5]

We find that workers substitute facial symmetry for service quality in generating sales. In particular, we show that workers with more symmetric faces pay less attention to the consumers they serve and, in doing so, serve more consumers. The finding suggests that the

[3][Persico, 2009] discusses the pitfalls when only one attribute, such as race, is exogenously assigned to a party with the opportunity to discriminate.

[4]Social psychologists argue the agreement partly originates in the fact that symmetry is a signal of the ability to reproduce [Thornhill and Gangestad, 1999]. Other characteristics that signal the ability to reproduce include youth in females, and resource control (and the willingness to share) in males [Mulford et al., 1998].

[5]One might argue that symmetry influences interactions with coworkers. While this might be true in general, peer effects are an unlikely factor here because the job of workers in our setting is highly individualistic. In addition, in the case where peer effects continue to matter, we can control for these effects in our empirical analysis because the peer group changes from shift to shift.

natural advantage that facial symmetry bestows allows workers to shift attention towards consumer volumes. Using the fact that symmetry matters for interactions with consumers, but not for the number of consumers served, we argue this finding is consistent with the trait being a substitute for service quality in the demand functions of consumers. More generally, the findings imply favored workers have a lower opportunity cost of specializing in tasks without a services component, as consumers punish them less for poor performance.

We provide evidence that the substitutability of symmetry and service quality in consumer demands has its origins in the preferences of consumers. There are two main reasons a consumer may reward a worker with a more symmetric face. The first is that the consumer has a direct preference for symmetry. The second is that symmetry is informative about worker traits the consumer does not observe, such as product knowledge or trustworthiness. In these regards, we provide two pieces of evidence implying the consumer has a direct preference for facial symmetry.

First, we exploit the fact that products are sold in a particular order (appetizers and drinks, then main course, and finally deserts). If symmetry simply conveys information about product knowledge or trustworthiness, the effect of symmetry on sales (of these items) should diminish at later stages of the consumer-worker interaction. We show this is not the case.[6] Second, we argue the information about worker productivity contained in facial symmetry should play no role in determining the tips a worker receives because, at this point of the meeting, there are no further product exchanges between the worker and the consumer. As a result, there is no need for the consumer to use facial symmetry to infer the product knowledge or trustworthiness of the worker. We show in fact, that workers with symmetric faces receive higher tip rates. Both pieces of evidence are consistent with consumers having a direct preference over the facial symmetry of workers, rather than with facial symmetry possessing informational content about a latent worker trait.

We use data generated by the field experiment in [Kapoor, 2010] to provide causal evidence that workers substitute facial symmetry for service quality in sales. One criticism of our approach thus far is that because we use observational data, worker behavior may be explained by unobserved differences across individuals. The field experiment holds worker characteristics fixed, and exogenously rewards workers with a bonus for serving more consumers. By doing so it exogenously lowers the opportunity cost of serving more consumers,

[6]This test resembles ones economists typically use to study statistical theories of discrimination. One of the more notable applications of this strategy is found in [Altonji and Pierret, 2001], who present evidence suggesting easy-to-observe worker characteristics are less useful to firms once they learn of worker productivity.

and allows workers to reduce service quality without sacrificing their earnings. If symmetry is a substitute for service quality, then the exogenous reward for volume has the same effect on worker behavior as an exogenous increase in symmetry. As a consequence, if the response to bonuses resembles the response to having a more symmetric face then we can conclude that facial symmetry indeed substitutes for service quality. This is, in fact, what we find.

Finally, we study the implications for the welfare of workers. We show daily productivity for workers with above-average facial symmetry is 2.4 percent higher than their below-average coworkers, as above-average workers sell just $30 more per shift. We also show that there is a 1.1 percent difference in tip rates between above-average and below-average workers. This workers with above-average facial symmetry earn 3.5 percent more per shift. Additionally, above-average workers earn more and work fewer hours than below-average workers, implying below-average workers are unambiguously worse off. As workers in the services sector commonly face the trade off we analyze here, our conclusions should apply more broadly to the role of a consumer preference for outward traits in other service-sector jobs.

This study bridges two important strands of the economics literature, while also contributing to each in their own right. The first strand is a large body of empirical work analyzing the economic consequences of comparative advantage among workers. In contrast with past studies, we analyze the effects of comparative advantage in the workplace, where workers are often asked to carry out several tasks at the same time.[7] An analysis of the workplace allows us to shed light on why outward physical traits can affect comparative advantage. While previous studies investigate the impact of cognitive and noncognitive skills [Heckman, Stixrud, and Urzua, 2006], we investigate the impact of a trait that has no ostensible role for the skill and dexterity of workers. We show the traits affect comparative advantage because consumers value them and because these values shape the production function workers face. Although the notion that consumers shape comparative advantage is not new [Borjas and Bronars, 1989], ours is one of the first studies to provide direct evidence on whether and why this is the case.

By doing so we contribute to a second strand of the economics literature, one that examines the consequences of discrimination. Despite being a channel through which labor market discrimination might arise [Becker, 1957], there is little direct evidence that con-

[7] [Almlund, Duckworth, Heckman, and Kautz, 2011] explore several theoretical models of comparative advantage where workers carry out several tasks, focusing in particular on the role of personality traits in worker decisions. [Autor, Levy, and Murnane, 2003] also draw on a task-based model of comparative advantage, using it to explain the relationship between computerization and increases in the demands for college-educated workers.

sumers discriminate against workers. In order to draw inferences about its presence studies typically rely on the behavior of firms or workers, rather than that of consumers, and on the assumption consumers prefer interacting with persons similar to themselves.[8] The present study differs from past studies by exploiting direct information on consumer behavior to investigate whether consumers discriminate against workers. It does this without assuming consumers prefer interacting with similar individuals.

A major challenge for researchers studying economic discrimination is in identifying the sources for discrimination, whether it is because of a preference for interacting with select individuals or because of incomplete information about the productivity of others. Efforts to distinguish between the theories extend to studies of racial profiling,[9] lending,[10] professional sports leagues [Price and Wolfers, 2010], as well as several other domains. A common strategy for distinguishing the theories uses improvements in the information of discriminating agents to test for the presence of statistical discrimination, while assuming the information leaves preferences unchanged [Persico, 2009]. While the strategy allows the researcher to rule out statistical discrimination, it does not allow the researcher to rule out discrimination based on preferences. We use a test that allows us to directly rule out preferences as a source for discrimination. In turn, we offer some of the first direct evidence that economic agents have a preference for the physical traits of others.

Ultimately, we are able to show that by shaping comparative advantage consumer preferences for worker traits are an important determinant of earnings inequality in the workplace. Although our intention is not to explain the various wage premia for outward physical traits, as doing so typically requires samples of workers across firms, the study does speak to studies attempting to do so.[11] In this regard, our contribution is in exploring the role of workplace

[8] A recent notable study is [Leonard, Levine, and Guiliano, 2010], which investigates the impact of consumer discrimination (based on race) on the overall sales of retail establishments. The study finds consumers are fairly insensitive to the racial composition of employees. Other notable studies include [Holzer and Ihlanfeldt, 1998], who finds the racial composition of consumers affects the race of new hires, [Neumark et al., 1996], who finds the sex composition of consumers affects the gender of new hires, [Borjas and Bronars, 1989], who hypothesize that consumer discrimination explains why able minorities select out of self-employment. For more references see [Leonard, Levine, and Guiliano, 2010] and [Holzer and Ihlanfeldt, 1998].

[9] Recent examples include [Brock, Cooley, Durlauf, and Navarro, 2012], [Persico, 2009], [Antonovics and Knight, 2009], and [Anwar and Fang, 2006].

[10] See [Ross and Yinger, 2002] for a review of the literature on discrimination in mortgage lending. Recent examples of discrimination in other lending contexts include [Cohen-Cole, 2011] and [Pope and Sydnor, 2011].

[11] Previous studies examining the relationship typically investigate differences in job advertisements [Kuhn and Shen, 2013], the capacity to bargain for higher wages [Mobius and Rosenblat, 2006], hiring decisions [Goldin and Rouse, 2000], the choice of occupation ([Mocan and Tekin, 2010] and [Biddle and Hamermesh, 1998]), the skills or experiences workers acquire before entering the labor market ([Case and Paxson, 2008], [Persico, Postlewaite, and Silverman, 2004], and [Neal and Johnson, 1996]).

behavior for generating disparities in earnings.

1 The Trade off at Work

In this section we construct a simple model to guide our empirical analysis. The model delivers testable predictions about worker behavior when their physical traits and the quality of service they offer affects earnings. In the model workers deliver a level of service quality that trades off their earnings per consumer for the number of consumers they serve. The additional time spent attending to the wants of individual consumers, while potentially increasing the earnings from each consumer, necessarily implies that workers serve fewer consumers.

The trade off ultimately depends on the interplay between physical traits and service quality in consumer demand. Specifically, when traits substitute for service quality in generating earnings, workers with more symmetric faces reduce service quality in order to serve more consumers. The substitutability gives workers possessing the trait a comparative advantage elsewhere, making it more profitable to focus on other tasks. In the present context, the substitutability between service quality and facial symmetry makes consumer volume more profitable for these workers. By the same token, when traits and service quality are complementary, workers who possess the trait deliver higher service quality because it is more profitable to do so. Since the earnings of workers equals expenditures by consumers, the substitutability in earnings reflects an inclination by consumers to exchange the traits for service quality in their demands.

We assume workers take consumer preferences as given and, in turn, allocate their effort across two earnings generating activities: sales to each consumer and the number of consumers they serve. Formally, let $E(t, \mathcal{S})$ represent the total earnings of a worker with facial symmetry $\mathcal{S}$ who exerts effort t on average to providing service over the course of a shift. t is a composite effort measure, encompassing such things as table maintenance (*e.g.* removing dirty dishes, checking satisfaction with the meal), and spending time with consumers (*e.g.* discussing and recommending menu items). We use service effort and service quality interchangeably throughout, as we assume that higher effort on the worker side translates to higher quality from the perspective of the consumer. We have by definition:

$$E(t, \mathcal{S}) = e(t, \mathcal{S})n(t) \tag{1}$$

where $e(t, \mathcal{S})$ represents earnings per consumer and $n(t)$ the number of consumers served.

Earnings per consumer is a function of the tip rate the worker receives as well as the sales made.[12] Since it equals the expenditure of the consumer, the nature of the relationship between facial symmetry and service quality in consumer expenditure determines the its nature in $e(t, \mathcal{S})$.[13]

We assume that delivering better quality service increases earnings per customer. We also assume diminishing returns to service quality, $\frac{\partial^2 e(t,\mathcal{S})}{\partial t^2} \leq 0$, and that consumers have a positive but diminishing taste for worker facial symmetry, $\frac{\partial e(t,\mathcal{S})}{\partial \mathcal{S}} > 0$ and $\frac{\partial^2 e(t,\mathcal{S})}{\partial \mathcal{S}^2} \leq 0$. Finally, we assume that the provision of service quality decreases the number of consumers served at a weakly increasing rate: $n'(t) < 0$ and $n''(t) \leq 0$.[14]

We illustrate the trade off that a worker with facial symmetry $\mathcal{S}$ faces when deciding on the quality of service to provide. The optimal choice $t^*(\mathcal{S})$ satisfies

$$\frac{\partial e(t^*(\mathcal{S}), \mathcal{S})}{\partial t} n(t^*(\mathcal{S})) + \frac{\partial n(t^*(\mathcal{S}))}{\partial t} e(t^*(\mathcal{S}), \mathcal{S}) = 0. \tag{2}$$

The first term captures the gain in total earnings that comes with a marginal increase in service effort. The second term represents the loss in total earnings that comes with with a marginal increase in service effort. We can re-write equation 2 as:

$$\frac{\partial e(t^*(\mathcal{S}), \mathcal{S})}{\partial t} \frac{t}{e(t^*(\mathcal{S}), \mathcal{S})} = -\frac{\partial n(t^*(\mathcal{S}))}{\partial t} \frac{t}{n(t^*(\mathcal{S}))} \tag{3}$$

The elasticity of earnings with respect to service effort equals the elasticity of volume with respect to effort at $t^*(\mathcal{S})$. We denote $\epsilon_{e,t}(\mathcal{S})$ as the left-hand side of Equation (3) divided by t, and $\epsilon_{n,t}$ as the right-hand side of Equation (3) divided by t.

A graphical depiction of $\epsilon_{e,t}(\mathcal{S})$ and $\epsilon_{n,t}$ are found in Figures 1 and 2. The figures depict the optimal solution for two types of workers, one with facial symmetry $\mathcal{S}''$ and the other with $\mathcal{S}'$, where $\mathcal{S}'' > \mathcal{S}'$. Figure 1 illustrates the case where symmetry and service quality

[12] Workers are paid tips by consumers and hourly wages by the firm. Consumers have full discretion over tip rates, and tips are not shared with other waiters. In addition, waiters all earn the same hourly wage.

[13] We note here that the number of consumers served does not *directly* depend on the facial symmetry of the worker. As we discuss below, this feature of our setting is crucial for empirically identifying whether physical traits and service quality are substitutes or complements in generating earnings.

[14] The assumptions on n are based on the realities of the production setting. n is decreasing in t because workers work a fixed number of hours and because there is a mechanical relationship between hours worked and time spent with individual consumers. When workers spend more time with individual consumers, the hours of work are spread around fewer consumers. The second assumption says that the opportunity cost of providing service quality is increasing in service quality. This is analogous to the standard convex cost of effort assumption.

are complementary in generating consumer expenditure ($\frac{\partial^2 e(t,\mathcal{S})}{\partial t \partial \mathcal{S}} > 0$). Figure 2 illustrates the case where they are substitutes in generating consumer expenditure ($\frac{\partial^2 e(t,\mathcal{S})}{\partial t \partial \mathcal{S}} < 0$).

Figure 1: Symmetry and Quality of Service are Complements

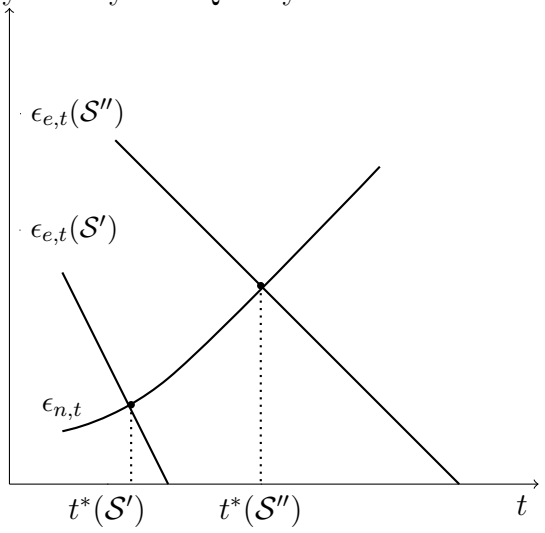
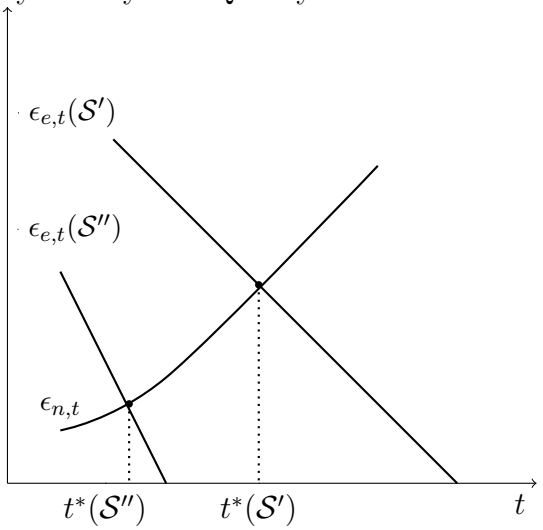


Figure 2: Symmetry and Quality of Service are Substitutes



This result provides a lens for interpreting data on the service quality workers provide. If we observe workers with symmetric faces spending more time with consumers, this is evidence that facial symmetry and service quality are complements in earnings, and therefore in consumer demand. On the other hand, if they spend less time with consumers, this

is evidence that facial symmetry and service quality are substitutes in both earnings and demand.

The model illustrates why the absence of a direct relationship between $\mathcal{S}$ and $n(t)$ is important for identifying a relationship between facial symmetry and service quality. To see this, consider again Equation (3). If the elasticity of consumer volume also depended on facial symmetry, increasing $\mathcal{S}'$ to $\mathcal{S}''$ would cause both sides of the equation - both elasticities - to shift. If the sides move in opposite directions, it is unclear whether $t^*(\mathcal{S}'') > t^*(\mathcal{S}')$ or $t^*(\mathcal{S}'') < t^*(\mathcal{S}')$. The answer will depend on how sensitive the elasticities are to facial symmetry. In other words, having observed $t^*(\mathcal{S}'') > t^*(\mathcal{S}')$ ($t^*(\mathcal{S}'') < t^*(\mathcal{S}')$), does not allow us to conclude that service quality and facial symmetry are complements (substitutes). Doing so would require more information about the elasticities themselves.

2 Measures for Evaluating the Trade off

2.1 The Context

The context is a large-scale restaurant, one that serves approximately 3000 customers per week on average. The scale of production is important because it changes the job of the worker. Specifically, the scale expands the set of tasks to include a task which is unaffected by facial features. Workers deliver service quality in a way that trades off more customers served for more earnings per customer. In contrast, workers in restaurants with low customer volumes deliver service quality in a way that simply maximizes earnings per customer. Since facial features do not affect customer volume directly, whereas service quality affects both earnings and customer volume, we can separate the indirect effect of symmetry on earnings (through service quality) from the direct effect on earnings. In our empirical framework we show this information allows to determine whether facial symmetry is a substitute or complement for service quality in worker earnings.

In addition to the scale of production, the market setting has other valuable features for investigating the role of consumer preferences for specialization in the workplace. One in particular is that matches between workers and consumers are exogenous to the traits of either party. The firm uses well-defined and well-enforced rules to match workers with consumers. When there are no line-ups for seating, the firm uses the pre-determined start time of the worker to assign consumers to workers. The worker with the earliest start time gets the first consumer, the worker with the next earliest start time gets the second, and so on. When there are line-ups for seating, the firm assigns first consumer in line to the first

available seat, the second to the next available seat, and so on. These rules prevent workers from choosing who they serve, consumers from choosing who serves them, and managers (and hosts) from using the traits they expect the consumer to favor to match consumers with workers. This institutional feature allows us to separate the direct role of physical appearance on worker production from its role in the sorting decisions of the various parties involved.

An important implication of these features of the setting is that workers likely face the same consumer on average. Since rules at the firm ensure matches are exogenous, and the scale ensures the workers interact with many consumers, differences in consumer preferences at the individual level are 'averaged' out at the daily level. That is, under the assumptions that the preference of one consumer is unrelated to preferences of others and that workers draw consumers from the same distribution,[15] the law of large numbers implies differences in the consumers workers face average out over the course of a shift. Having workers face a representative consumer is important for a couple reasons. First, it increases the chances that our inferences speak to disparate treatment of workers in the market as a whole.[16] Second, not having information on the individual traits of consumers becomes even less important for the conclusions that we draw.

2.2 The Data

The production data comes from a large franchise of a major North American Corporation. The data includes information on sales, tip rates, number of customers served, as well as more detailed information on sales (sales of appetizers, drinks, the main course, and desserts). Importantly, these outcomes all have natural counterparts in the model. The sample runs from October of 2008 until May of 2009 and includes October 2009.[17][18] In all, the sample

[15] In this way, another nice feature of the setting is that patrons of the restaurant come from a relatively homogeneous population. The franchise is located in a large suburb of Toronto which consists mostly of married people (nearly two-thirds) of homogenous origins (more than two-thirds). **Source:** Statistics Canada - 2006 Census of Population.

[16] Several economists object to inferences about unequal treatment at the market level based on data generated from person-to-person interactions (such as data found in audit studies). An argument for why this is the case is found in [Cain, 1986]. [Cain, 1986] argues that treatment in person-to-person interactions can differ from that at the market level because agents can sort out of situations where the potential for unequal treatment exists.

[17] All of these months lie in the busy season for the restaurant. The summer months and slow days were excluded because customer volumes are generally very low during these periods. In these periods workers basically perform one task - maximizing sales per customer.

[18] The sample stops in October 2009 because the field experiment that we consider later in the paper was conducted at the restaurant from November 2009 onwards.

Table 1: Summary Statistics for Worker Performance and Earnings.

Variable	Observations	Mean	Standard Deviation
Sales (in dollars)	758	1205.43	345.76
Alcohol	758	158.67	66.97
Salads & Appetizers	758	93.02	38.81
Main Course	758	735.89	216.05
Desserts	758	42.84	24.52
Tip Rate (as a percentage of before tax bill)	755	14.67	3.02
Hours of Work	682	6.35	1.07
Sales per Customer	758	44.03	5.44
Alcohol	758	5.91	2.38
Salads & Appetizers	758	3.44	1.30
Main Course	758	26.73	2.42
Desserts	758	1.59	0.88
Number of Customers	758	27.66	8.19
Hourly Productivity and Wages			
Sales per Hour		184.85	
Tip Earnings per Hour		27.12	
Hourly Wage (before March 31 2009)		7.60	
Hourly Wage (after March 31 2009)		8.25	

has 35 workers approximately 750 worker-day observations. Descriptive statistics are found in Table 1.

We photographed workers in October 2009. The photographs were taken one half hour before the start of an already scheduled shift in order to ensure that workers were in uniform when the picture was taken.[19] Interviews were mostly conducted at the same location to ensure that the photos were uniform in background lighting and background colors. To obtain measures of facial symmetry from the photographs, we use software that measures 8 geometric proportions at different points on the face. The software calculates the absolute difference between each of these proportions and the ideal. The sum of these differences is then used to calculate the person's percentile in the population.[20] In Figure **??** we present

[19]Workers wear uniforms and these uniforms must meet a certain standard. Managers do regular uniform checks to ensure that these standards (cleaned and pressed shirts, pants, and ties) are met. Note that workers are allowed to wear different ties.

[20]The proportions are: 1. Distance between eyes/Nose width; 2. Head height/Face height; 3. Face

Insert pictures here

the photographs for two workers, one at the lower end of the distribution, the other at the top. According to the algorithm, the worker in the first photograph is in 42.5^{th} percentile and the worker in the second is in the 99.9^{th} percentile.

Table 2 summarizes the distribution of facial symmetry in our context (as well as other information that we collected). The sample shows the facial symmetry of workers in our sample is well above the median in the population at large. Only 16.18 percent of the population have better looks than the average worker in our sample. As a result, because our estimates apply to the upper tail of the symmetry distribution, our estimates provide a lower bound on the effect of facial symmetry on consumer and worker behavior.

At the time the photographs were taken, we conducted interviews in order to obtain measures of social and communication skills, confidence, and other demographic and employment information. We collected five measures of social and communication skills, three of which are self reported, and two of which are reported by others. Summary statistics are found in rows 3 to 7 of Table 2. On average workers reported that they had 2.71 coworkers who they consider friends, they socialized 16.20 times with their coworkers outside work in the previous month, and that they do not have a preference for working with friends.[21] In addition, on average 3.81 other workers reported the worker was a friend, while 5.04 reported the worker was someone they'd like to sit with at a social gathering.

We use the tip rate workers expect to receive and the sales they expect to make to proxy for the confidence of workers. The proxies are presented in rows 2 and 3 of Table 2. Row 2 gives the tip rate the worker expects to receive, while row 3 gives the sales (per customer) the worker expects to make.[22][23] A comparison of the expectations in Table 2 with the measurements in Table 1 suggests workers forecast sales and tips fairly accurately.[24]

height/(Face height - Chin height); 4. (Face height - Chin height)/Mouth width; 5. Face width in the mouth area/Nose length; 6. Head height/Face width in the eye area; 7. Face width in the eye area/(Face height - Chin height); 8. Face height/Forehead height. The ideal is given by the golden section or divine proportion, which equals 1.61803398875. More information about the software can be found at `http://www.facebeautyrank.com/index.html`.

[21] For this last question, we asked workers to indicate their preference for working with friends on a scale from one to five (where one is strongly disagree and five is strongly agree).

[22] The process for constructing expectations follows from [Manski, 2004].

[23] The reported value for expected sales is an average of the sales per customer the worker expects to receive on a party of two and on a party of four.

[24] Tables 2 and 1 suggest a slight imprecision in the forecasts of tip rates. The imprecision arises because the calculation of tip rates is based on bills where the payment method was a credit or debit card (more than 75 percent of bills are paid this way). In discussions with employees, we were told that the payment method is informative about the tip rate received. The tip rates are highest for bills settled by credit card,

Table 2: The Attributes of Workers.

Category	Variable Name	Description	Observations	Mean	Standard Deviation
Facial Symmetry	Facial Symmetry Percentile		34	83.82	20.79
Confidence	Expected tip rate		35	14.41	1.56
	Expected sales per customer		35	44.50	5.95
Social and Communication	Friends at work	Number of coworkers who are friends	34	4.62	2.71
	Socializes with coworkers	Times socialized with coworkers outside work last month	34	11.18	16.20
	Likes working with friends	Prefers working with friends	34	3.85	1.13
	Others consider a friend	Number of coworkers reporting worker was a friend	33	5.06	3.81
	Fun to sit with	Number of coworkers reporting worker was someone they wanted to sit with at social gatherings	33	7.15	5.04
Demographic and Employment	Male		34	0.62	0.49
	Days in sample		34	28.08	12.07
	Industry experience (months)		34	70.68	61.93
	Older than 30		34	0.18	0.39
	Full time		34	0.08	0.29

3 Estimating the Trade off

3.1 Baseline Econometric Specification

The base specification for our empirical analysis is:

$$y_{id} = \beta_{\mathcal{S}}\mathcal{S}_i + \mathbf{Z}_i\boldsymbol{\gamma} + \mathbf{X}_{id}\boldsymbol{\beta} + \gamma_d + \epsilon_{id}. \tag{4}$$

y_{id} measures outcomes for worker i on date d, such as sales, sales per customer, the number of customers, and tip rates. $\mathcal{S}_i$ is measures the facial symmetry of the worker. $\mathbf{Z}_i$ includes other important attributes of the worker such as their confidence, social and communication skills, gender, and employment characteristics.[25] $\mathbf{X}_{id}$ includes the start time of the worker, table fixed effects, and whether the worker often works on day of the week d. The fixed effects for the calendar date, γ_d, control for aggregate shocks to outcomes, such as daily changes in team composition or in the consumers that visit the firm. The random variable ϵ_{id} measures daily shocks to performance that are specific to the individual. We assume that $E[\epsilon_{id}|\mathcal{S}_i, \mathbf{Z}_i, \mathbf{X}_{id}, \gamma_d] = 0$.

3.2 The Trade Offs Workers Make

We show that workers whose facial symmetry is above-average deliver lower quality service to consumers. The estimates in Columns 5 through 8 of Table 3 show the average worker serves 0.025-0.037 more customers ($p < 0.01$) when the symmetry of the worker's face improves by a percentage point. The estimate in Column 8 - where controls for social and communication skills, confidence, and demographic and employment information are all controlled for - implies a worker whose facial symmetry is one decile above the average serves 0.74 more customers than a worker one decile below the average. It also implies above-average workers spend less time with customers. Columns 1 through 4 show, despite being statistically insignificant at the 10 percent level, workers with above-average symmetry sell \$0.22 less to customers. That is, workers with above average symmetry provide lower quality service

next highest for bill settled by cash, and lowest for bills settled by debit. In turn, the inclusion of cash tips would likely lower the measured tip rate in Table 1.

[25] We also considered specifications that included a binary indicator of high Body Mass Index (BMI). The measure is imperfect in that it is not based on measured physical characteristics of the workers, but on the authors' perceptions of their characteristics. The estimates are very similar to those found in the paper when this variable is included. Details are available upon request.

Table 3: **The Trade Offs Workers Make.** Standard Errors (in parentheses) are robust to arbitrary forms of heteroskedasticity and within-worker correlation. *** indicates $p < .01$, ** indicates $.01 < p < .05$, and * indicates $p < .1$. All regressions control for calendar date fixed effects, table fixed effects, gender, tenure and squared tenure, industry experience, whether the worker is over 30, employment status (full or part time), whether the worker often works that day of the week, and the start time for the worker.

	Dependent Variable							
	Sales per Customer				Number of Customers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Facial Symmetry Percentile	-0.007	-0.010	-0.002	-0.011	0.025***	0.037***	0.033***	0.037***
	(0.009)	(0.009)	(0.011)	(0.008)	(0.013)	(0.007)	(0.008)	(0.005)
Fun to Sit With		-0.08	-0.16	-0.16		0.03	0.03	0.13
		(0.15)	(0.17)	(0.12)		(0.13)	(0.12)	(0.14)
Others consider a Friend		0.16	0.34	0.31		-0.03	-0.06	-0.13
		(0.20)	(0.25)	(0.17)		(0.14)	(0.14)	(0.13)
Friends at Work			-0.01	-0.25			-0.05	-0.05
			(0.01)	(0.10)			(0.06)	(0.06)
Socializes with Coworkers			-0.01	-0.02			0.01	0.01
			(0.01)	(0.01)			(0.01)	(0.01)
Likes Working with Friends			-0.27	-0.09			0.09	0.03
			(0.21)	(0.15)			(0.17)	(0.11)
Expected Tip Rate				-0.51***				0.29***
				(0.15)				(0.10)
Expected Sales per Customer								-0.05
								(0.03)
Observations	758	734	734	734	758	734	734	734

to their customers and do not earn less. The estimates in Columns 1 through 4 suggest improvements in the delivery of meals, table maintenance, or effort directed at sales fail to compensate for the reduction in time spent with customers (or for the positive effect symmetry might have on sales) and, as a result, the estimates imply a reduction in the overall service quality customers receive. The findings also imply that facial symmetry and service quality are substitutes in sales per customer and, ultimately, that facial symmetry substitutes for service quality in consumer demand.

3.3 Is Symmetry a Source of Information to Consumers?

We test the hypothesis that facial symmetry conveys information (regarding product knowledge and trustworthiness, *e.g.*) to consumers, and thus that it explains why symmetry and service quality are substitutable in generating consumer demand. Our test assumes that facial symmetry conveys information to consumers. Under this assumption the role of

symmetry should diminish over the course of the interaction. As consumers receive more information about the actions of workers, symmetry is less useful as a signal of unobserved productivity.[26] Specifically, to test that symmetry is informative for unobserved productivity, we exploit the fact that workers generally sell items in a particular order. Drinks are sold first, appetizers second, main courses are third, and desserts last.[27] As information should matter more early on if it matters, facial symmetry should, for example, have a smaller effect on sales of drinks that on sales of desserts.

Table 4 provides evidence against the hypothesis that facial symmetry informs consumers about the unobserved productivity of workers. Columns 1 and 2 show that facial symmetry has a negative effect on sales per customer at the start of the interaction, while columns 3 and 4 show it has a positive effect on sales per customer at the end. Columns 5 through 8 also provides evidence against the informational value of symmetry, as the estimates reveal that symmetry only has statistically significant positive effects on overall sales of items sold at later stages of the interaction.

3.4 Consumers Prefer Symmetry

In the last subsection, by ruling out the hypothesis that symmetry informs consumers, we provided indirect evidence that consumer preferences drive the effects of symmetry on consumer demands. In this subsection we provide direct evidence that the effects are driven by consumer preferences for facial symmetry. Our strategy for doing so rests on the fact that consumers tip after the service is completed. At this point, because the service is complete, consumers have no need to use physical traits to infer the unobserved productivity of workers. As such, a dependence of tip rates on facial symmetry would imply that consumers have preferences for this physical trait.[28]

[26] The idea that outward traits matter less as agents accumulate information is consistent with the findings of several experimental papers. The evidence in [Todorov et al., 2005] suggests that appearance matters less for inferences about politician competence when voters obtain more information about the politician. In the public goods game of [Andreoni and Petrie, 2008], the premium for good looks diminishes when individual contributions are revealed.

[27] Managers at the firm monitor workers to ensure the order is followed.

[28] In many other settings, outward traits are informative for the unobserved productivity of the agent because the actions of the agent (that are relevant for the interaction) happen after trades are made. In the context of mortgage lending, for example, lenders agree to loans before the quality of the applicant is revealed. In this case physical traits might be useful to the lender for drawing inferences about future behaviors affecting the probability of default.

Table 4: **The Informational Value of Symmetry to Consumers?** Standard Errors (in parentheses) are robust to arbitrary forms of heteroskedasticity and within-worker correlation. *** indicates $p < .01$, ** indicates $.01 < p < .05$, and * indicates $p < .1$. All regressions control for calendar date fixed effects, table fixed effects, gender, tenure and squared tenure, industry experience, whether the worker is over 30, employment status (full or part time), whether the worker often works that day of the week, and the start time for the worker.

	Dependent Variable							
	Sales per Customer				Sales			
	Beverages	Salads & Appetizers	Main Course	Desserts	Beverages	Salads & Appetizers	Main Course	Desserts
Facial Symmetry Percentile	-0.004**	-0.002	0.006	0.006***	0.08	0.03	1.14***	0.19***
	(0.002)	(0.002)	(0.005)	(0.001)	(0.06)	(0.05)	(0.33)	(0.04)
Fun to Sit With	-0.06	-0.01	-0.03	-0.07***	-1.36	0.41	1.31	-2.24***
	(0.05)	(0.04)	(0.08)	(0.02)	(1.84)	(1.42)	(4.85)	(0.85)
Others consider a Friend	0.05	0.03	0.11	0.09***	0.50	-0.28	0.38	2.46**
	(0.06)	(0.05)	(0.10)	(0.03)	(2.05)	(1.62)	(5.04)	(1.06)
Friends at Work	-0.07**	-0.042*	-0.10**	0.002	-0.64	-0.53	-1.03	0.28
	(0.03)	(0.025)	(0.04)	(0.012)	(0.71)	(0.55)	(2.22)	(0.27)
Socializes with Coworkers	-0.007	-0.006**	-0.015**	-0.003	0.01	-0.10	-0.24	-0.002
	(0.004)	(0.003)	(0.006)	(0.002)	(0.13)	(0.09)	(0.46)	(0.058)
Likes Working with Friends	0.11**	0.04	-0.18*	-0.09***	2.90***	1.97***	-3.67	-1.82***
	(0.05)	(0.04)	(0.10)	(0.02)	(1.09)	(0.80)	(6.49)	(0.68)
Expected Tip Rate	-0.09*	-0.11**	-0.15*	-0.05***	-0.45	-2.50***	1.90	-0.97*
	(0.05)	(0.04)	(0.08)	(0.02)	(0.93)	(0.65)	(4.97)	(0.52)
Expected Sales per Customer					0.61	0.15	-1.37	0.34*
					(0.45)	(0.32)	(1.36)	(0.20)
Observations	734	734	734	734	734	734	734	734

Table 5: **Consumers Prefer Symmetry.** Standard Errors (in parentheses) are robust to arbitrary forms of heteroskedasticity and within-worker correlation. *** indicates $p < .01$, ** indicates $.01 < p < .05$, and * indicates $p < .1$. Random Effects regressions control for calendar date fixed effects, table fixed effects, gender, tenure and squared tenure, industry experience, whether the worker is over 30, employment status (full or part time), whether the worker often works that day of the week, the start time for the worker, and personality traits. Fixed Effects regressions control for calendar date fixed effects, table fixed effects, tenure and squared tenure, whether the worker often works that day of the week, and the start time for the worker.

	Tip Rate					
	(1)	(2)	(3)	(4)	(5)	(6)
Facial Symmetry Percentile		0.008*		0.008*		0.011**
		(0.004)		(0.004)		(0.004)
Sales per Customer	0.05**	0.05**				
	(0.02)	(0.02)				
Alcohol					0.11**	0.11**
					(0.05)	(0.05)
Salads & Appetizers					0.22**	0.24***
					(0.09)	(0.09)
Main Course					-0.04	-0.06
					(0.05)	(0.04)
Desserts					-0.33**	-0.26*
					(0.15)	(0.15)
Expected Sales per Customer		0.01		0.01		0.01
		(0.02)		(0.03)		(0.02)
Number of Customers			-0.02	-0.02		
			(0.02)	(0.02)		
Worker Fixed Effects	Y	N	Y	N	Y	N
Observations	754	730	754	730	754	730

To explore the role of facial symmetry in tip rates we estimate the following specification:

$$\tau_{id} = \beta_{\mathcal{S}}\mathcal{S}_i + \gamma t_{id} + \delta E_i[s] + \mathbf{X}_{id}\boldsymbol{\beta} + \epsilon_{id}. \tag{5}$$

where τ_{id} is the tip rate, t_{id} is service quality, and $E_i[s]$ is the sales per customer worker i expects. In our regressions we use sales per customer and the number of customers served as proxies for the service quality of the worker.[29] Random Effects estimates of Equation (5) are found in Columns 2,4, and 6 of Table 5.[30]

We find evidence that consumers have preferences over the facial symmetry of workers, as workers with symmetric faces receive better tip rates. Columns 2,4, and 6 of Table 5 reveal 0.008 ($p < 0.1$) - 0.011 ($p < 0.05$) percentage point increase in tip rates when facial symmetry improves by one percentile. The estimates imply a worker whose facial symmetry is one decile above the average earns 1.1-1.5 percentage points more in tip rates than a worker who is one decile below the average.[31]

3.5 It's not just Favorable Treatment by the Employer

In theory, favorable treatment by the employer can result in better section assignments.[32] Before the start of each shift (before workers arrive), managers assign sections of 2-4 tables (10-16 seats) to each worker. Tables differ in the type of seating available to consumers. Some tables have booth seating, others have benches, and others still have wooden chairs. Sections mainly differ in the number of booth seats, bench seats, and chairs. Since consumers typically have preferences over seating, managers can influence the productivity and earnings through the seats they assign to workers.[33]

[29] Using sales as a proxy for service quality leads to underestimates of the effect of facial symmetry on tips. To see this, let the tip regression be given by $\tau = \beta_{\mathcal{S}}\mathcal{S} + \gamma t + e$ where τ is tips and t is unobserved service quality. Sales is given by $s = \rho_0 + \rho_1 t + \rho_2 \mathcal{S} + u$. The coefficient on $\mathcal{S}$ when we proxy for t using s is $\beta_{\mathcal{S}} - \frac{\gamma\rho_2}{\rho_1}$. If service quality results in higher tips $\gamma > 0$ and higher sales $\rho_1 > 0$, and more symmetry means more sales $\rho_2 > 0$, then $\beta_{\mathcal{S}} - \frac{\gamma\rho_2}{\rho_1} < \beta_{\mathcal{S}}$. That is, we underestimate the effect of facial symmetry on tips.

[30] We present Fixed Effects estimates in Columns 1,3, and 5 to show that the coefficient estimates for service quality are robust to the choice of specification.

[31] One interpretation of this finding might be that facial symmetry correlates with product knowledge and consumers reward product knowledge with tips. Under such an interpretation the estimate measures rewards product knowledge rather than a taste for facial symmetry. This interpretation would be incorrect given our finding that consumers do not statistically discriminate and the assumption that consumers are rational.

[32] Favorable treatment in the assignment of workers to shifts is unlikely in our setting. In order to minimize employee turnover, the firm gives workers significant latitude over the days they work. For shifts where there is a shortage of willing workers, workers take turns working the undesirable shifts.

[33] Managers might, for example, assign workers they like to sections where consumers turn over relatively quickly.

Favourable treatment through better section assignments cannot explain our findings. The data allows us to condition on table fixed effects, and thus the section assignment of workers, in our regressions. Knowing this, we in any case evaluate the effects of symmetry on the seating assignments of workers in Table 6. The evidence implies symmetry has no effect on the number of booth or bench seats the employer assigns to the worker. It does, however, suggest the employer assigns fewer wooden chairs to workers with symmetric faces. The estimate in Column 3 suggests workers who are one decile above the average symmetry percentile are assigned 0.2 ($p < 0.1$) fewer wooden chairs than workers one decile below the average.

The estimate in Column 3 actually strengthens the main conclusions of the paper. The reason is that wooden chairs are usually viewed as undesirable places to sit. If consumers dislike these seats, and the employer tends to assign the seats to symmetric workers, then it becomes more costly for these workers to serve more consumers by lowering their service quality.[34] The seating assignment should increase the chances that symmetric workers receive lower tip rates from consumers.

We note that, in the end, the effects of symmetry on seating assignments are economically and statistically small. In this regard the employer appears to treat workers equally. In theory, this is unsurprising. Once workers are hired, the value to the manager of physical traits for inferring unobserved worker productivity diminishes with time. Physical traits are less useful after hiring because managers can learn about individual productivity through repeated interactions [Altonji and Pierret, 2001]. Furthermore, it is unlikely that the firm preferentially treats workers on the basis of facial symmetry, as doing so comes at the cost of lower profits for the firm and lower earnings for managers (whose bonuses depend on the profitability of the firm).

3.6 Causal Evidence that Symmetry and Service are Substitutes

In this section we test the conclusion that the trade offs made by workers imply substitutability between outward physical traits and service quality. We do so by drawing on a field experiment that exogenously rewards workers with bonuses (in addition to their tips and wages) for the number of customers they serve. Because the experiment rewards workers for serving more consumers it exogenously increases the opportunity cost of service quality.

[34] Note that the manager does not have the ability to seat a particular type of consumer in a particular type of seat. We are only considering busy periods, during which seating is necessarily "first come, first served."

Table 6: **Favorable Treatment by the Employer?** Standard Errors (in parentheses) are robust to arbitrary forms of heteroskedasticity and within-worker correlation. *** indicates $p < .01$, ** indicates $.01 < p < .05$, and * indicates $p < .1$. All regressions control for confidence, social and communication skills, calendar date fixed effects, gender, tenure and squared tenure, industry experience, whether the worker is over 30, employment status (full or part time), whether the worker often works that day of the week, and the start time for the worker.

	Dependent Variable		
	Number of seats, by category		
	Booth	Bench	Chair
Facial Symmetry Percentile	0.0001	0.004	-0.010*
	(0.0107)	(0.005)	(0.006)
Mean for Dependent Variable	8.12	1.75	3.01
Observations	734	734	734

When workers provide better service quality, they now forgo the bonus as well as earnings from serving more consumers. If symmetry substitutes for service quality in sales, then the responses to the endowment of symmetry should resemble the responses to the bonuses for consumer volume. This is the foundation for our empirical test. We show below that the responses are in fact similar, a finding that implies that trait indeed substitutes for service quality in sales.

3.6.1 Research Design

We briefly explain the field experiment here, focusing on design features which are most relevant for the present study. The original purpose of the field experiment was to study agency problems related to multitasking [Kapoor, 2010]. Since the purpose was incidental to the facial symmetry of workers, conclusions regarding the effects of symmetry are somewhat immune to confounding factors, such as placebo effects, experimenter demand effects, and hawthorne effects. A detailed explanation of the design can be found in [Kapoor, 2010].

The experiment exogenously changed worker incentives on busy days in November and January of the 2009-2010 season.[35] The experimental treatment pays workers bonuses for the number of customers they serve. We compare behavior during the treatment period to

[35] We concentrate our analysis on part of the high-demand season, which runs from September until the end of May, because every Friday and Saturday has excess demand for seating.

behavior at the start of the 2009-2010 season and during the 2008-2009 season, where pay was based on tips and hourly wages only.

In particular, workers were paid a bonus for serving more customers than an exogenously determined performance standard.[36] The size of the bonus was proportional to the distance between the standard and the number of customers the worker served. The proportion was chosen so that workers would earn between \$20 and \$30, or more than 10% of average daily earnings, for exceeding the performance standard by one standard deviation.[37] Worker were all given the same performance standard and bonus rate.

3.6.2 An Experimental Test of Substitutability

We revisit the model of Section 1 to illustrate why the performance incentive can be interpreted as an endowment that can be substituted for service quality. Worker earnings from the experiment can be written as:

$$E(t, \mathcal{S}) = (e(t, \mathcal{S}) + \alpha)n(t) \tag{6}$$

where $\alpha \geq 0$ captures the added incentive for consumer volume. Workers with $\alpha = 0$ belong to the control group for the field experiment. The larger is α, the larger the opportunity cost of providing service quality. As such, the experiment allows us to hold facial symmetry fixed and study how workers change their behavior in response to an exogenous endowment of α.

From Equation (6), it follows that a worker with symmetry $\mathcal{S}$ chooses a service quality $t^*(\mathcal{S}, \alpha)$ that satisfies:

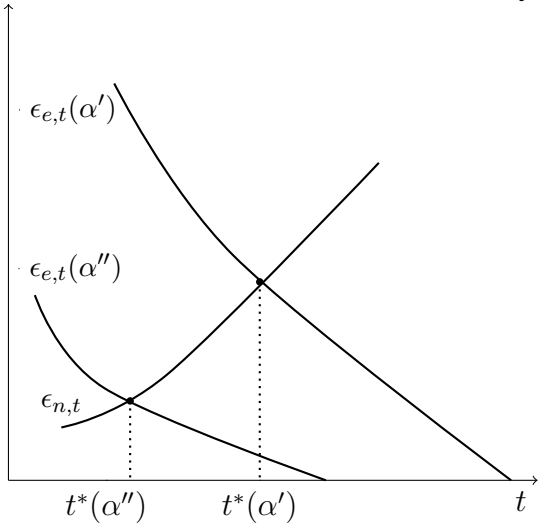
$$\frac{\partial e(t^*(\mathcal{S},\alpha),\mathcal{S})}{\partial t}\frac{t}{e(t^*(\mathcal{S},\alpha),\mathcal{S})+\alpha} = -\frac{\partial n(t^*(\mathcal{S},\alpha))}{\partial t}\frac{t}{n(t^*(\mathcal{S},\alpha))} \tag{7}$$

Noting the analogy to the optimality condition presented in Equation (3) in Section 1, we define $\epsilon_{e,t}(\alpha) \equiv \frac{\partial e(t^*(\mathcal{S},\alpha),\mathcal{S})}{\partial t}\frac{1}{e(t^*(\mathcal{S},\alpha),\mathcal{S})+\alpha}$ and $\epsilon_{n,t} \equiv -\frac{\partial n(t^*(\mathcal{S},\alpha))}{\partial t}\frac{t}{n(t^*(\mathcal{S},\alpha))}$. Using these expressions, we analyze the behavior of the worker when their endowment increases from α' to α''.

[36] The performance standard was calculated using the following steps: 1. compute long-run averages for the number of customers served, hours worked, and section size on high-demand days; 2. divide long-run customer turnover by long-run hours worked; 3. divide the number from the second step by long-run average section size. The steps yield a performance standard of .4 on Fridays and .41 on Saturdays.

[37] More specifically, workers were paid \$3 for each tenth of a point above the performance standard.

Figure 3: Bonuses Substitute for Service Quality



As Figure 3 illustrates, because bonuses substitute for service quality in sales, a worker with facial symmetry $\mathcal{S}$ delivers lower service quality they provide when the bonus is larger: $t^*(\mathcal{S}+\alpha'') \leq t^*(\mathcal{S}+\alpha')$. The figure is analogous to figure 2 where we analyze the effect of increasing facial symmetry in the case where it substitutes for service quality. Thus, if the worker's response to an increase in α is the same as their response to an increase in symmetry $\mathcal{S}$, then we can interpret this as causal evidence of substitutability between symmetry and service quality in earnings.

3.6.3 Empirical Specification and Experimental Results

We estimate the following specification:

$$y_{id} = \beta_T T_d + \mathbf{Z}_i \mathbf{\Gamma} + \mathbf{X}_{id} \boldsymbol{\beta} + \epsilon_{id}. \tag{8}$$

T_d is an indicator for calendar dates in October and November of 2009, dates where workers were offered the performance bonus on calendar date d. $\mathbf{Z}_i$ controls for gender, industry experience, whether the worker is over 30, employment status (full or part time), and personality traits. $\mathbf{X}_{id}$ controls for calendar date effects, such as the day of the week, calendar week, an indicator for the 2009-2010 season, customer arrivals and its square, table fixed effects, own and peer tenure, whether the worker often works that day of the week, and the

Table 7: **If Symmetry Substitutes for Service Quality.** Robust Standard Errors are in parentheses with *** for $p < .01$, ** for $.01 < p < .05$, and * for $p < .1$. Regressions control for day of the week, calendar week fixed effects, an indicator for 2009-2010, customer arrivals and its square, table fixed effects, gender, own and peer tenure, industry experience, whether the worker is over 30, employment status (full or part time), whether the worker often works that day of the week, the start time for the worker, and personality traits.

	Dependent Variable							
	Sales per Customer				Number of Customers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Performance Bonus	-1.21	-1.42	-1.60*	-1.47*	2.16***	2.09***	2.07***	1.99***
	(0.87)	(0.89)	(0.87)	(0.85)	(0.66)	(0.68)	(0.67)	(0.68)
Facial Symmetry Percentile	-0.009**	-0.013**	-0.013*	-0.013**	0.053***	0.070***	0.080***	0.083***
	(0.004)	(0.006)	(0.007)	(0.006)	(0.011)	(0.010)	(0.010)	(0.010)
Fun to Sit With		-0.09	-0.09	-0.12		0.06	0.09	0.16
		(0.09)	(0.12)	(0.12)		(0.15)	(0.16)	(0.17)
Others consider a Friend		0.15	0.23	0.23		-0.21	-0.18	-0.23
		(0.12)	(0.19)	(0.18)		(0.16)	(0.19)	(0.18)
Friends at Work			-0.20***	-0.20***			-0.17*	-0.19**
			(0.06)	(0.06)			(0.10)	(0.10)
Socializes with Coworkers			0.0005	-0.002			-0.03	-0.031**
			(0.0080)	(0.008)			(0.02)	(0.015)
Likes Working with Friends			-0.08	-0.04			-0.17*	-0.24
			(0.15)	(0.14)			(0.10)	(0.21)
Expected Tip Rate				-0.19**				0.13
				(0.09)				(0.19)
Expected Sales per Customer								-0.08*
								(0.05)
Observations	897	862	862	862	897	862	862	862

start time for the worker. We assume that $E[\epsilon_{id}|T_d, \mathbf{Z}_i, \mathbf{X}_{id}] = 0$. Estimates of β_T are found in the last row of Table 7.

The evidence indeed shows the responses to bonuses resembles the responses to improvements in facial symmetry. It allows us to conclude that symmetry substitutes for service quality in generating sales. The estimates in Row 1, Columns (4) and (8), imply workers serve 1.99 more consumers ($p < 0.01$), and sell \$1.47 less to each ($p < 0.1$), in response to the bonuses. On the other hand, the estimates in Row 2 show a worker whose facial symmetry is one decile above the average serves 1.66 more customers, while selling \$0.26 less to each, than a worker one decile below the average.[38]

[38]We note here that estimates of the treatment effect are robust to fixed effects regressions. More details are found in [Kapoor, 2010].

3.7 The Welfare of Workers

We examine differences in productivity and earnings that follow from consumer preferences for the facial symmetry of workers. Table 8 presents random effect estimates (of our base specification) of the influence symmetry has on sales, tip rates, and hours of work.[39] The estimate in Column 1 captures the effect of facial symmetry on sales, as well as the effects of social and communication skills, confidence, and demographic and employment information. The raw estimate shows that a percentage point improvement in facial symmetry increases by \$0.94. The estimate implies the sales of workers whose facial symmetry is one decile above the average have \$18.80 more in daily sales than workers one decile below the average. Column 4 considers the effect of facial symmetry when we remove the effects of social and communication skills, confidence, and demographic and employment information. The estimate implies above-average workers sell \$28.40 ($p < 0.01$) more per day than their below-average counterparts. The 2.4 percent difference in daily sales and the 1.1 percent difference in tip rates imply workers with above-average facial symmetry earn 3.5 percent more per shift.[40]

The estimates in Columns 9-12 for hours of work show above-average workers work fewer hours and, therefore, earn (and produce) more per hour of work. The estimate in Column 12 implies, in particular, that above-average work 1 percent ($p < 0.05$) fewer hours than their below-average coworkers. From a welfare standpoint, the estimates for sales, tip rates, and hours of work imply workers with less symmetric faces are unambiguously worse off.

4 Conclusion

Most empirical studies analyzing worker responses to discrimination focus on extensive margins, such as the education or occupations workers pursue. In this paper, we analyze the

[39] Spending more time with customers is the primary means by which workers can increase hours of work. Work hours are largely under the control of managers. Managers assign start times before the start of the work week. They also decide when workers stop receiving new customer assignments. Assignments normally stop when the line-up for seating disappears. Workers stop receiving assignments in the same order that they started the shift and are free to leave when none of their existing customers remain. Workers are paid until the last customer leaves.

[40] Our estimates are somewhat smaller than those found in the literature examining the hourly wage premium for good looks. [Hamermesh and Biddle, 1994] find that the difference between the premium for above-average looks and the penalty for below-average looks is about 12 percent. [Mobius and Rosenblat, 2006] find that a one standard deviation increase in beauty results in a 12-13 percent increase in wages. [Arunachalam and Shah, 2010] find that wage premium is smaller after they control for the worker's communication ability and personality.

Table 8: **The Welfare of Workers.** Standard Errors (in parentheses) are robust to arbitrary forms of heteroskedasticity and within-worker correlation. *** indicates $p < .01$, ** indicates $.01 < p < .05$, and * indicates $p < .1$. All regressions control for calendar date fixed effects, table fixed effects, gender, tenure and squared tenure, industry experience, whether the worker is over 30, employment status (full or part time), whether the worker often works that day of the week, and the start time for the worker.

	Dependent Variable											
	Sales				Tip Rate				Hours of Work			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Beauty Percentile	0.94	1.37***	1.40***	1.42***	0.008**	0.008*	0.008**	0.008*	-0.002	-0.002	-0.002	-0.003**
	(0.60)	(0.42)	(0.55)	(0.57)	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.002)	(0.002)	(0.001)
Fun to sit with		-2.09	-2.82	-2.03		0.06	0.13	0.12		-0.04	0.03	-0.05
		(7.70)	(8.38)	(9.53)		(0.08)	(0.08)	(0.09)		(0.04)	(0.04)	(0.03)
Others consider a friend		3.84	5.29	4.35		-0.09	-0.16	-0.15		0.05	0.04	0.05
		(8.37)	(9.06)	(9.93)		(0.10)	(0.11)	(0.12)		(0.06)	(0.06)	(0.05)
Friends at work			-2.26	-2.54			0.006	0.01			0.04*	0.05***
			(4.01)	(4.01)			(0.037)	(0.04)			(0.02)	(0.02)
Socializes with coworkers			0.05	-0.09			-0.014**	-0.013**			-0.0002	0.002
			(0.70)	(0.80)			(0.006)	(0.006)			(0.0023)	(0.002)
Likes working with Friends			-1.48	-1.74			0.11	0.11			-0.0006	0.02
			(9.79)	(9.48)			(0.09)	(0.09)			(0.0400)	(0.03)
Expected Tip Rate				-2.39								0.04
				(7.77)								(0.02)
Expected Sales per Customer				-1.12				0.01				0.02***
				(2.33)				(0.03)				(0.01)
Implied Effect from a one standard deviation increase in beauty	$5.13											
Observations	758	734	734	734	754	730	730	730	682	661	661	661

on-the-job response of workers, focusing in particular on worker responses to discrimination by consumers. Specifically, using extraordinarily unique data from a large-scale restaurant, we investigate worker responses to consumer discrimination based on the symmetry of their faces, the implications for the trade offs workers make, and whether the trade offs arise because of a preference by consumers for the trait in question.

We find consumers discriminate because they have a preference for the trait and, in response to the preference, workers who possess the trait deliver lower service quality. Instead they specialize in serving more consumers. The findings imply that when outward yet immutable physical traits - such as symmetry of the facial attributes of workers - substitute for service quality in consumer preferences, preferred workers specialize in tasks having no services component because consumers punish them less for poor performance. Because it shapes the comparative advantage of workers, discrimination by consumers is an important source for earnings inequality in the workplace. In turn, the evidence implies labor market discrimination can persist even after workers have sorted into jobs and occupations.

The trade off that we analyze strongly resembles trade offs commonly found in the services sector, the largest and fastest growing economic sector in the industrialized world. For jobs in this sector, workers often balance the demands of consumers with other activities the employer cares about. For example, in many jobs where customer service is important, customer service representatives are responsible both for soliciting orders from customers and for ensuring the orders are completed on time. Since the returns from soliciting and completing orders likely depend on the worker's outward traits, so too will the trade offs workers make. In these regards, our conclusions apply more generally to the role of a consumer preference for outward traits in other service-sector jobs.

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