

## *Engaging Rational Discrimination*

Oscar H. Gandy, Jr.  
Professor Emeritus  
Annenberg School for Communication  
University of Pennsylvania  
May 31, 2008

### **Introduction**

Although I am not a philosopher, I am going to attempt to place my thinking about emergent social structures within the framework that has been established for a conference on ethics, technology and identity. At the heart of the conference agenda is a concern about the role that information technology should be allowed to play in our lives.

On the one hand, I believe that much of what we are concerned about is the role that high-tech sentinels will play at the various nodes and access points we will encounter as we navigate an increasingly integrated network infrastructure.<sup>1</sup>

We understand the role of a sentinel at an outpost asking “who goes there; friend or foe?” We understand the sentinel makes use of a technology: it asks for a code, and it asks documentation. The sentinel is in control.

We now envision a time when the sentinel is a kind of an ambient intelligence (AmI),<sup>2</sup> and it doesn't take much for us to understand that the sentinel doesn't need to query us directly, but will access our identity systems automatically.<sup>3</sup>

It is already obvious that the bulk of this surveillance infrastructure will not be contained within us, or carried entirely on our person, despite the kinds of technological developments that Ray Kurzweil places on a not too distant horizon.<sup>4</sup> The sentinel will query a networked system of distributed intelligence that will evaluate our identities not only in terms of who we are biologically, and historically, but also in terms of the state of

the environment and its readiness to engage with the likes of us.<sup>5</sup> The sentinel will make use of Bayesian systems processing continuous streams of transaction-generated information to routinely update and adjust the system's assessments of risk.<sup>6</sup> Of course, these estimates will be of interest to a continually changing network of interested parties, and autonomous agents that will have claimed a right to be informed about who goes where.

While our own interests and desires will certainly play some role in determining just how our encounters with these sentinels will unfold, none of us should really assume that we, rather than the network will actually be in control.<sup>7</sup>

Of course, my comments in this paper may not stray as far as some who have actually begun to suggest that we have pretty much lost all control over the determination of just who, or what we will actually come to be.<sup>8</sup> Instead, I will attempt to draw your attention to more mundane considerations about what it means to develop and implement relatively autonomous systems that discriminate between people in ways that affect their life chances. Discrimination is at the heart of the concepts I plan to explore.<sup>9</sup>

## **Discrimination**

I think of discrimination is the final link in a chain of events that begins with identification, proceeds through classification, and gathers momentum at the point of evaluation. Increasingly this evaluation is forward-looking, based on predictions about what some target of interest is likely to do at some point in the future.

The routine, but increasing investment of resources in identification, classification and evaluation is meant to produce actionable intelligence or guidance about choices that have to be made. The choice between X and Y, where Y is everything other than X, is to be understood as discrimination. The choice of X generally implies discrimination against Y. Of course, in a simple case where X and Y are two applicants for a mortgage, the decision to grant the mortgage to X might be based on the flip of a coin, and Y then, would be the victim of bad luck, rather than discrimination.

Although the subprime mortgage crisis in the United States seems to indicate that the dominant technology was often no more sophisticated than that of a coin flip,<sup>10</sup> a financial decision in favor of X would more often be made on the basis of a rather complex underwriting program. Our concerns about increasingly reliance on automated underwriting, despite suggestions that the use of this technology avoids the distortions that racial, and other group-centered biases might have played in the past, are based on a belief that the influence of other variables within the models still work to produce a disparate effect that many of us see as unfair.<sup>11</sup>

Because routine decision making systems become normalized quite rapidly, especially when they operate outside our fields of vision, it becomes especially important for us to remember that the ubiquitous networks of AmI, like other technological innovations, should be subject to routine, if not continuous assessment and regulatory control.<sup>12</sup>

Far too often, the regulatory control of technology is motivated by concerns about threats to competitive advantage. Far less often, assessment and control is motivated by a desire to minimize or mitigate the societal harms that flow from its use. Most public technology assessments are retrospective, often initiated in response to a crisis, rather than beginning as an integral component of research and development. Still, public discussion and debate often accompanies the rise and fall of every technology's star.<sup>13</sup>

Regulatory interventions rarely succeed in banning the introduction of an emergent technology. However, it is quite common for legislatures to introduce controls over the scope of its application, including the identification of uses and users that should be disallowed. Initially, at least, regulations may establish limits on the kinds of materials and resources that can be used. And, on occasion, regulatory initiatives may impose impact assessment and reporting requirements that enhance the possibility that unanticipated and unintended consequences will be identified and addressed before a critical point of no return has been reached.<sup>14</sup>

Automated discrimination by AmI systems is precisely the kind of rapidly developing technology that has to be brought under the control of a global regulatory regime.<sup>15</sup> But that regime needs an appropriate identity.

Considerable time and effort has been spent in trying to control information-intensive activities under the banner of privacy or data protection.<sup>16</sup> I include myself among those who have come to realize that neither privacy, nor surveillance frameworks are adequate to the task of managing a system whose purpose is discrimination.<sup>17</sup> At the heart of the problem is the difficulty we face in controlling the use of information about people. Existing privacy and data management regimes are severely handicapped by a set of seemingly intractable problems related to the establishment and defense of property interests in information.<sup>18</sup> From my perspective, negotiating ownership claims is little more than an annoying distraction in ongoing debates about the establishment of regulatory limits on the use of “personal” information by private and public organizations.<sup>19</sup>

## **Discrimination and the use of information**

There are a number of logical and ethical reasons for limiting the use of information that are not based on ownership, but on considerations of appropriateness or legitimacy.

The first, and least controversial reason is that the data or information is simply wrong. In the case of information about an individual, a clerical or transcription error may mean that a unique identifier has been associated with the wrong individual. Similar errors would mean that attributes ascribed to, or associated with a particular individual are incorrect or false. Many of these errors will be random, but criminal intent as well as structural constraints are certain to be reflected in the data that get recorded and distributed for later use.<sup>20</sup>

A more difficult assessment involves an evaluation of the completeness or correctness of the models or routines that generate the recommendations. Assuming the accuracy of the data used, poor system performance generally reflects a poor choice of variables, or

indicators, or a misunderstanding of the underlying mechanisms that condition a behavioral response. Often, the variables used in a model are only weakly related to the outcomes of interest.

A somewhat different, but closely related concern arises in the case of models or decision support systems in which the relationship between predictors and outcome variables may be strong, but reliance on these systems for high risk decisions is considered unwise because one or more of the variables are understood to be merely correlated, rather than causal.

For quite different reasons, some of those who oppose the use of a particular program or system may argue that some variables or types of data should not be used because of philosophical or ethical concerns regarding fairness, or moral relevance, despite the fact that these variables work quite well as predictors.

Some of the most troublesome candidates for regulatory exclusion or control are variables that have a strong historically generated structural linkage with other measures that we have already agreed to ban. Here I refer primarily to the measures of socioeconomic status and attainment that are closely associated with indicators of race, ethnicity and gender. But I also include indicators of genetic predisposition that may also be associated with racial or ethnic group membership.<sup>21</sup>

Before we explore some of these reasons in a bit more detail, we need to come to terms with some fundamental distinction between two kinds of deciders: human beings and computer software, or machines.

## **Design flaws and human errors**

A great many believers in the promise of artificial intelligence (AI), or whatever we will eventually call it, are confident that we will reach a stage in the development of autonomous systems when they will engage in routine self-correction, thereby eliminating concerns about computational errors attributable to exogenous threats like

radiation, network failures, or malicious attacks.<sup>22</sup> A smaller number of AI enthusiasts believe that adaptive learning and autonomous alternations of code will reduce the frequency and impact of errors that are generated endogenously by the models, subroutines, and agents that govern the processing of information.

Although we will ultimately have to determine the basis on which we should distinguish between choices made by machines, or autonomous agents; choices made by humans with the assistance of machines; and choices made entirely by human beings, we should start with first things first. What does it mean to be rational, and to make a rational choice on the basis of a meaningful and relevant distinction?

Defining a concept by means of its opposition is rarely satisfactory, but it is a place to begin. Irrational decision-making is commonly associated with emotional or habitual, responses, informed by broad generalizations, rather than by careful weighing of the relevant facts. Rational decision-making generally refers to the process, rather than the outcome or results of any decision, although we understand that a carefully considered decision arrived at following a process of extensive search, reflection, and analysis, can still produce unsatisfactory results. A realization that there are constraints on the ability of humans to access and incorporate all relevant information has led to the suggestion that the process is not necessarily irrational, but merely constrained or “bounded.”<sup>23</sup> Most often, the concept of bounded rationality is focused on the limits of human information processing, rather than on limitations on access, or strategic misdirection. But, as Giddens reminds us, some of the more important constraints on human agency are those blind spots we have regarding the motivations and goals of other interested parties who may be involved in some aspect of our decision-making.<sup>24</sup>

There is a tendency to think about rationality in terms of a continuum; one that moves from an idealized intelligence—a difference engine that engages in rapid computation, without errors in calculation, and more critically, without any systematic bias introduced by irrational emotional distractions. On the other end of the continuum we find the

sometimes slow, sometimes fast, error prone, easily distracted, and routinely distorted information processing by humans.

## ***Emotionalism***

While there is still much to be said about the limited capacity of human beings to process large amounts of information, or to solve complex analyses without the aid of machines, a seemingly insurmountable problem is associated with the role that human emotions seem to play in the choices that we make. There are, of course, a great many scholars who firmly believe that emotional responses play an important, and functionally necessary role in our decisions. They suggest that our emotional sensors are the products of long-term evolutionary development, and almost by definition, they have served us well. Indeed, some developers of AI systems are actively pursuing the integration of emotional components into their machines.<sup>25</sup> Of course, it is not exactly clear whether those efforts are driven by a desire to be more rational, or to be more human.

On the other hand, a substantial literature, and a well-documented history of civil rights and anti-discrimination legislation has been developed in an effort to correct the bias and distortion that prejudice, disregard, animus, and own-group favoritism by humans often introduce into the calculus of social choice. Because these threats to rationality are so tightly woven into our individual assessment routines, attempts to minimize their influence are only marginally successful. These routines are largely automatic, and are often brought into play in ways that shape decisions before, or instead of more careful reflection. Neuroscientists have sought to understand this process at the molecular level through techniques based on nuclear imaging of the brain. Cognitive psychologists have developed less technology-intensive approaches toward the activation of biased processing that relies on comparisons of response rates.

One measure, the Implicit Association Test (IAT) has been used extensively to reveal the role that association between category membership and evaluative assessments plays in our unconscious reactions to people. Differences in response rates to a paired sorting task are interpreted as a reliable index of an implicit preference for the members of one group

over those of another.<sup>26</sup> A number of studies that make use of the IAT challenge simple-minded theories about racial prejudice and the way it shapes our decisions. Own-group preferences explain some, but not all of the racial biases at work. While bias against African Americans certainly reflects a racial influence in that more whites than blacks reveal an anti-black bias, upwards of fifty percent of African Americans also reveal anti-black bias when measured by the IAT.<sup>27</sup>

Although the distinction is not well defined, there is a tendency to treat preference-based discrimination as irrational, while granting belief-based discrimination the benefit of the doubt. The fact that preferences can be based to some degree on identifiable beliefs or cognitions, while an aversive response is emotional and automatic is the primary basis for maintaining a distinction between the two. However, it is also clear that stereotypical beliefs about the characteristics of disfavored groups may be used to reinforce, or justify a hostile intuitively negative response.<sup>28</sup>

Other cognitive psychologists have focused on the ways in which moral reasoning is shaped by structural conditions that we might associate with institutional and organizational cultures.<sup>29</sup> An especially critical insight is the fact that “only a small percentage of what we think of as judgments about situations with potential moral implications is the product of reasoned analysis. Instead, most judgments reflect immediate intuitive reactions, which individuals then justify post hoc by recourse to what they regard as socially acceptable reasons.”<sup>30</sup>

Because unconscious group biases, and intuitive reactions have such a powerful influence on the routine decisions made by individuals at critical points of interaction with persons at risk, many have applauded the introduction of automated, or computer-assisted decision-making routines. While such systems may reduce the impact of biased individuals, they are certain to normalize the far more massive impacts of system-level biases, and blind spots with regard to structural impediments that magnify the impact that disparities in starting position will have on subsequent opportunities.

## ***Causality and related epistemological concerns***

In my own work, I have tried to call attention to cases where the quality and character of the data used by policy makers has been influenced by the success of policy entrepreneurs in providing direct and indirect information subsidies.<sup>31</sup> Yet, there are a number of different explanations for the fact that incomplete, or inaccurate data come to be used so often in making important public policy decisions.<sup>32</sup> Reliance on biased, or inaccurate data seems especially likely when the data are probabilistic, or estimates of uncertain futures. This means, somewhat ironically, that as more and more public and private decisions are made in the context of uncertainty and risk, the probability that these decisions will be made in error will only increase.<sup>33</sup>

Although the community of scholars who argue against the use of non-causal variables in explanatory or predictive models is relatively small, I believe their arguments are worthy of our attention.<sup>34</sup> The claim that categorical variables are non-causal is not as widely accepted as we might assume, despite its logical weight. It shouldn't require an elaborate argument to convince most people that a woman's race cannot be the cause of her behavior. Sometimes data can be brought to bear. Some people can be convinced by argument and statistical evidence suggesting that the apparent relationship between two variables is actually caused by a third variable that had been excluded from the model. Because the magnitude of the correlation moves toward zero upon the introduction of this additional variable, some observers are willing to conclude that the relationship was spurious, rather than causal.

On the other hand, we recognize that categorical variables like race and gender can be causal when a woman's gender or her race acts as the stimulus that primes or activates a stereotype that influences the behavioral choices of an individual she encounters. In this case, however, the introduction of additional variables into a model testing this hypothesis at the aggregate level may be motivated by a desire to demonstrate that neither racism, nor sexism were factors governing the choices being made.<sup>35</sup>

Addressing more fundamental concerns about reliance on highly correlated, but non-causal variables requires engagement with epistemological debates that surround the nature of causality, and the criteria necessary for making a causal claim. The primary consideration is to be found at the heart of the revered status of the experimental model. For many, the controlled experiment with random assignment to treatment conditions is the standard against which causal claims must be assessed. Unfortunately, at least for the causal claim, it is simply not possible for a person's race, or gender, or even her age to be manipulated by the researcher. The absence of manipulability thereby denies such categories the possibility of achieving the status of cause.<sup>36</sup>

Other arguments regarding the causal status of variables can be seen in the context of challenges to the leakage or spread of indicators, or criteria beyond the domains in which they were initially developed. A prime example is the rapid diffusion of credit scores as an index of trustworthiness.<sup>37</sup> The Fair Credit Reporting Act<sup>38</sup> is quite generous in its identification of the permissible uses of a credit report. Not only does this list include insurance underwriting, licensing, and employment, but it also includes a virtual chasm of possibility within the residual category of "legitimate business need." Opposition to many of these uses has emerged for a variety of reasons over time. Public opposition to the use of credit scores for risk rating by insurance companies has been focused primarily on the absence of a demonstrated causal link between financial irresponsibility and the filing of claims for accidental loss. The fact that they are both indicators of a person's financial risk status explains their statistical correlation, but insurers have been pressured to find a more compelling explanatory model.<sup>39</sup> The fact that the leading causal hypotheses favored by the industry rely on the identification of a personality type (sensation seekers) that may have roots in genetic predispositions, would suggest that this particular battle is far from over.<sup>40</sup>

Ian Ayres and his colleagues identify three kinds of discriminators:<sup>41</sup> those who are irrational, and make decisions entirely based on the race of the other; the rational discriminator who includes race as one among many sources of information that may help to shape a decision; and the hyper-rational discriminator, a rapid calculator, perhaps

an “intelligent Bayesian”<sup>42</sup> who continually adjusts her expected value estimates on the basis of new information. While Bayesian probability theory makes an important contribution to the design of decision systems, serious problems arise at the point in which prior probabilities are specified.<sup>43</sup> All of the factors that represent challenges to the accuracy or correctness of facts also operate with regard to the selection of prior probabilities.

There are also a host of problems associated with the quality of the information used in updating probability estimates. These problems are especially troublesome when they take the form of summary statistics. Summary statistics are statements about attributes of a population or an aggregate. While the statistics are only supposed to refer to an aspect of the population as a whole, it is common for people to treat such measures as an indication of something held in common by every individual within the population. Data that are supposed to provide information about a group becomes a representation of each member of the group.<sup>44</sup> Summary statistics are stereotypes by a different name, and we have good reasons for questioning their use.

The use of stereotypes has been characterized as an adaptive response to cognitive demands that arise each day as people negotiate rapidly changing environments and interactions with strangers. Stereotypes can be thought of as labor-saving devices that enable the realization of cognitive efficiencies.<sup>45</sup> In the context of decisions that involve the assessment of risk, stereotypes may also be short hand indicators of the relative, or criterion level of risk a stranger represents. It is in this context that the role of stereotypes becomes especially problematic. Some argue that in the absence of individuating information about the intentions of the young black male coming your way, it is perfectly rational, and in no way racist for you to grip your purse more securely, or even to consider crossing the street. Arguably, the young man’s race provides access to “base-rate” information about criminal victimization that many believe you would be foolish to ignore.<sup>46</sup>

## ***Ethical Concerns***

Complications regarding the use of variables with indeterminate causal weight take on a different character when the variables are themselves the products of an analytical routine. Ethical concerns arise because group, or category data is ordinarily understood to be a representation, or a statement about members of that group.<sup>47</sup> These same representations are often implicated in the reproduction and reinforcement of inequality between groups in society. These statistical measures become even more powerful as they become linked with culturally weighted labels.

Labeling is a routine activity for analysts who use multivariate statistical techniques, such as factor analysis, to discover unmeasured relations between variables. In order to facilitate sense making and communications about the factors that emerge from their efforts, analysts develop distinctive and meaningful labels for each one. These names are often idiosyncratic to the researchers, their organizations, and the goals of their investigations. On occasion, however, those factors become constructs that become part of the marketing discourse used in promoting the commercial application of the evaluative distinctions enabled by the classification. The impact spreads further if the labels slip into common usage.

A classic example can be seen in the names that have been assigned to the geodemographic clusters developed by the Claritas Corporation for its PRIZM Cluster products. These trademarked names help to reinforce the corporate construction of community identities among marketers of consumer goods and policy initiatives. The name “Black Enterprise” may not have been any more problematic as a label for the middle class African Americans living in the suburbs than “Money & Brains” was for the young intellectual elites who lived in key cities around the US. I suspect, however, that the people living in communities characterized as “Shotguns and Pickups,” “Norma Rae-ville,” “Tobacco Roads,” or “Hard Scrabble,” were probably not as pleased.<sup>48</sup> In addition to expanding the number of clusters they have identified, Claritas and its competitors have modified the names assigned to these communities so that the markers of race and class were not as disparaging and disrespectful as those used initially.<sup>49</sup>

Of course, ethical concerns about the use of categorical data are not limited to the questionable use of group names that have emerged from the lab, or the back office.<sup>50</sup> A related concern, also with a basis in moral reasoning, is that category or class membership does not reflect an aware, affirmative choice by that individual. In some discussions, critics seek to set these variables aside because they are said not to be “morally relevant,” either because they are immutable, or because they are outside the limits of effective individual control. In the United States, five categories or classes (race, ethnicity, religion, sex, and national origin) have been banned for use in a number of decisional domains.<sup>51</sup>

From time to time, successful mobilization of public opinion by activist organizations has added additional categories, such as sexual orientation to the list of banned, or suspect classes. The public debates surrounding the passage of these bills have tended to cover the same familiar ground. Most recently we have seen legislation passed in the United States that would ban the use of genetic information in decisions about employment and insurance. This bill was passed, and then signed<sup>52</sup> after decades of both scholarly reflection and somewhat more rancorous debate.<sup>53</sup> Legislators reported having been influenced by constituents’ suggestions that people shouldn’t be penalized “because they happened to be born at a higher risk for a given disease.”<sup>54</sup> This is a concern about fairness.

Considerations of fairness are commonplace, and people show a willingness to reward behaviors seen as fair, and to punish those that appear unfair. The importance of “reciprocal fairness” to social behavior has been demonstrated repeatedly in carefully constructed “games” where self-interested economic rationality is seen to be limited by actions designed to punish unfairness by others even at a relatively high personal cost.<sup>55</sup> Researchers in the emerging field of “neuroeconomics” suggest that this response may not be an expression of moral rectitude, but a desire to avoid being perceived as unfair. Thus, a concern with maintaining the value of one’s own reputation can be interpreted as

fundamentally self-interested.<sup>56</sup> A rather different mechanism is likely to be involved when the target of the unfair offer or behavior is another individual.

Unfortunately, at least with regard to its usefulness as a criterion against which to evaluate the use of information for decision-making, not all definitions of fairness are based on the same moral, ethical, or even evolutionary foundation. The insurance industry, for example, has done quite well in establishing its own self-serving definition of fairness as a regulatory and judicial norm.<sup>57</sup> Its evaluative standard sets as ideal a match between the total value of premiums paid, and the expected value of the legitimate claims made by an individual. However, because it is not possible for the insurer to actually know what an individual's future claims will actually be, it is said to be "actuarially fair" for them to set prices for individuals on the basis of the claim histories of the persons within the risk class, or population an individual is determined to belong. Actuarial fairness has little to do with considerations of justice or the moral relevance of the categories that are actually used in the establishment of rates.<sup>58</sup>

Ethical concerns about fairness in the use of group membership as a basis for discrimination are not raised to the same degree across all categories. The use of race as a basis for discrimination is less tolerable in part because in this case, categorical membership is immutable, and does not reflect affirmative choice by the individual. Of course, age is mutable to a limited degree; we can all hopefully age, even if we can't adjust the rate. We cannot, however, choose to actually become younger. Educational attainment, on the other hand is mutable, and reflects choice and perhaps investment on the part of the individual. Beyond mutability, choice and control, the reasons for opposing most forms of categorical discrimination are complex, and not very well understood.<sup>59</sup>

Legal scholar Jack Balkin suggests that the best reason for deciding that the use of an immutable trait is unjust is because of the ways in which its use establishes, or reinforces a status hierarchy "that helps dominate and oppress people."<sup>60</sup> In his view, other traits that are not immutable, and do reflect autonomous choice, can still be seen as "morally

irrelevant” and therefore inappropriate for use as a selection criterion. He offers religion as a prime example.

There is growing body of evidence demonstrating that human beings vary in the extent to which their decisions are influenced by forms of “moral sensitivity” to the correctness of their actions.<sup>61</sup> Although moral sentiments are associated with cultural norms and values, it is obvious that within all complex societies, there will be a great many points at which differences between people’s views about some action will reflect an underlying disjuncture in ideology, value system, or world-view.

We will not be surprised to see that supporters and opponents of discriminatory techniques line up along ideological lines because of the ways in which these techniques affect concerns at the heart of an ideological divide. Milton Rokeach,<sup>62</sup> among others,<sup>63</sup> has demonstrated that those who hold either liberal or conservative political views can be reliably identified on the basis of their relative ranking of two terminal values: freedom and equality. Liberals consistently place a higher value on equality, while conservatives tend to favor freedom. To the extent that discrimination produces, reproduces, or exacerbates inequality within society, liberals are more likely to oppose it, and to support public policies that restrict the use of discriminatory techniques.

Other social theorists who have studied the nature of the ideological divide associate conservatives with opposition to change or a preference for stability, without regard to its impact on their freedom to choose.<sup>64</sup> Although there are other analytical models that emphasize the role of different value complexes,<sup>65</sup> the impact of any discriminatory technology on social inequality will be an inescapable aspect of its evaluation within the public sphere.

### ***Economic Concerns***

Cost is also a factor that plays a role in justifying the use of some information within decision systems. The cost of acquiring, or making use of information helps to determine its cost-effectiveness, or efficiency. Economic or efficiency guidelines suggest that we

should use information as long as the costs of acquiring and using the information are less than the costs that would be faced in its absence. Unfortunately, as we will explore, there are important distinctions to be drawn between private costs, or the costs to the decider, and the social costs, or costs to society as a whole. Problems regarding the distribution of both private and social costs arise because the ease with which we can acquire categorical information, such as gender, and membership in certain racial and ethnic groups means that this information is likely to be over-used.<sup>66</sup>

However, economists are quick to suggest that to the extent that group membership provides reliable information about the group, and by extension about any individual group member, routine use of such information may be economically efficient.<sup>67</sup> There is an explicit assumption that placing constraints on the efficient use of information is irrational.

On the basis of this claim, arguments that proceed from an economic perspective suggest that decision support systems that make use of race, or gender, or other categories or classes into which people may be assigned, are legitimate, because they are efficient. The use of these categories is characterized as “statistical discrimination” and its use is fully justified on the basis of the “information” or signal that group membership provides. Defenders of statistical discrimination are not deterred by the absence of any demonstrable causal linkage between these attributes and outcomes, or criterion measures; all that matters is that the association is strong enough to stand as a reliable indicator or predictor.

Group-based discrimination in pursuit of profit is readily justified on the basis of economic efficiency. A variety of techniques that target members of readily identifiable groups are designed to exploit existing knowledge about what makes some members of that group especially vulnerable to a specific marketing ploy. There are other ways in which knowledge of the constraints that affect members of disadvantaged groups can be used to the advantage of those with opportunities on offer. Courts have historically been willing to accept the use of market criteria that have a disparate impact on members of

historically burdened groups as long as these methods can be shown to meet a legitimate business purpose. The enhancement of a firm's bottom line is one such purpose.<sup>68</sup>

As we have noted, critical distinctions are often drawn between forms of discrimination that are motivated by racial animus or prejudice, and forms that are motivated by what we think of as rational efforts to maximize pleasure and minimize pain. Those who engage in the presumptively irrational forms of discrimination can be said to have a "taste for discrimination."<sup>69</sup> There is a substantial economic literature that argues that this irrational taste will be punished by the market, and ultimately extinguished. Far less attention has been paid to consideration of an equally imaginable "taste for fairness" by which individuals would forgo advantages that they might otherwise realize because of the discriminatory tastes of those they deal with.<sup>70</sup> The fact that received economic theory assumes that people are governed more by consideration of personal gain than by moral or ethical concerns no doubt explains the relative lack of attention that a taste for fairness, or justice has received.

Although Rokeach's lists of terminal values did not include efficiency, economists and those who rely upon economic rationales have focused on the extent to which efficiency and equality are incompatible objectives or values.<sup>71</sup> Beginning with the articulation of the idea that tradeoffs between equity and efficiency were inescapable if the benefits of economic growth were to be achieved,<sup>72</sup> many economists have tried to subordinate concerns about equality in debates over a broad range of public policy matters. Attempts to formalize the analysis of these tradeoffs through benefit/cost analysis largely failed to include measures of equity that liberal policy advocates could recognize as adequate to the task.

The fact that as values, neither equity, nor efficiency could be "traded-off" or exchanged, one against the other because they are fundamentally incommensurable has not kept proponents of market-place solutions to justify them on the basis of poorly specified indicators of efficiency.<sup>73</sup> On the other hand, numerous critics have provided arguments and examples intended to demonstrate that increasing equality need not result in declines

in either efficiency, or economic productivity.<sup>74</sup> Indeed, they have argued that inequality in general, and racial inequality in particular has been a substantial constraint on economic growth and development.<sup>75</sup> When the measure of equality is focused on individual's capabilities, as suggested by Nobel laureate Amartya Sen,<sup>76</sup> is easy to see how reducing inequality by enhancing the capabilities of the poorest and most disadvantaged members of the society, would contribute to the overall productivity of the economy. This expectation also forms the basis for Rawl's suggestion that the only inequality that should be tolerated is an inequality in distribution that favors those with the most limited resources.<sup>77</sup>

Despite the steady flow of position papers that emphasize the importance of economic efficiency as an basis for policy evaluation, the general public still appears to regard considerations of equality in particular, and fairness more generally as considerations that matter for many of their decisions.<sup>78</sup> There is also substantial evidence that considerations of equality and fairness also influence aggregate decisions, including those made by markets and by political institutions.<sup>79</sup>

Because of the evidence that there remains a substantial preference for more, rather than less equality within society, it makes sense to call public attention to the ways in which emergent technology and social practices that depend upon them are likely to worsen inequality.

## **The consequences of group-based discrimination**

Because of the ways in which the impact of racial discrimination in one domain cumulates or spreads its effect across others, there is value in identifying those that have the greatest impact. Among the primary candidates for analysis, researchers have tended to focus on employment and housing, credit or financing and consumer markets.<sup>80</sup>

Theorists who have explored the ways in which rational, or statistical discrimination tends to reproduce societal disparities have emphasized the role that learning over time plays in the reinforcement particular sets of choices. In the context of employment markets, employers make decisions about categories of workers, based on their estimates

of worker productivity. Workers also make decisions about investing in the improvement of their skills on the basis of their own estimates of their future employment opportunities. While both sets of behaviors are based on individualized learning, when they operate at the level of large systems, similar patterns tend to generate massive system-level effects. We understand these outcomes as the result of self-fulfilling prophecies.<sup>81</sup>

The impact of group-based discrimination is best understood in terms of cumulative disadvantage.

We can think about cumulative disadvantage in terms of the distribution of life chances, or opportunities to enjoy the rewards of one's efforts.<sup>82</sup> The life chances of some people, African Americans in particular, have been minimized by a complex of factors, that bear much in common with the burden of stigmatization.<sup>83</sup> Following the outlines of a concept introduced by Erving Goffman, contemporary investigations of the concept have applied the term to places as well as groups of people that share the burden of "spoiled identity."<sup>84</sup> The stigma of racial identity stands as a classic example in that the visual "mark" of skin color is routinely linked with a cluster of stereotypical characteristics that help to justify the disregard with which those who are so marked will be treated.

The cumulative impact of stigmatization that is amplified through the utilization of race, and race-linked measures within panoptic discrimination systems<sup>85</sup> is most clearly seen in comparative measures of inequality.<sup>86</sup> It is particularly noteworthy that among the rich countries of the world, the United States has the highest level of income inequality. Equally notable is the fact that the disparities between the haves and the have-nots have grown at a rate far in excess of OECD averages over the last 25 years.<sup>87</sup> Income inequality is a contribution to cumulative disadvantages that persist across generations. This intergenerational burden is quite substantial among African Americans.<sup>88</sup>

Examinations of inequality as a social problem describe the ways in which income inequality comes to be reflected in other critical disparities across groups, and across

generations. Income is linked to quality of life including health, and in terms of other measures of satisfaction. Relative status is also linked to levels of political involvement, which reinforces the tendency of the political system to respond to the demands of affluent citizens who tend to be more politically engaged.

The absence of neighbors and friends with the kinds of knowledge, contacts, or confidence that social theorists talk about in terms of “social capital” also works to reinforce the impact of concentrated poverty within hyper-segregated communities.<sup>89</sup> In part, it is the geographic isolation of African Americans that reproduces and extends the cumulative disadvantages that have a basis in burdens of poverty.<sup>90</sup> Geographic isolation reinforces the impact of deficits in social capital that are common within African American communities. Not only are black members of these communities less likely to trust their neighbors, or to have much contact with them, they are also less likely to be involved in community projects or in the political process more generally.<sup>91</sup>

Among the many aspects of an individual’s identity, the communities in which they live have begun to emerge as a vitally important indicator of current position and risk status. While it is not known how much of the disadvantage that African Americans face in the housing market can be attributed to predation and other abuses within the market for consumer credit,<sup>92</sup> clearly, the impact of statistical discrimination in the housing market is not limited to decisions made by lenders. All sorts of investment decisions help to determine the status and character of our nation’s communities. Although racial identifications can not be used in decisions about the sale, rental, or financing of housing, the legal system has not been as quick to preclude the use of race in the characterization of neighborhoods, or in the prediction of their likely future.

The development of spatial analysis techniques that transform geographic coordinates into points of comparison for units ranging in scale from individual homes, blocks and neighborhoods, to ZIP codes and Census tracts, has played a central role in the socioeconomic development of these units. Geographic information systems (GIS) combine the ability of mapping technologies with the resources of advanced datamining

systems to enable the visual representation of forward-looking scenarios about population growth, economic development, or about the decay and deterioration of community resources. Many community and neighborhood level studies have identified and geo-coded institutional resources, like churches, libraries and schools, as well as threats and challenges such as vacant and vandalized houses, bars, and liquor stores. Data available for the characterization of neighborhoods and regions also include crime reports, automobile accidents, fires, and persons with criminal records, as well as information about building permits, and home improvement loans.

The racial composition of neighborhoods continues to be a very powerful predictor of the socioeconomic trajectory of those communities. Continuing residential segregation by race has a variety of causes, but racial discrimination remains its primary cause. What is not clear, of course, is the extent to which this discrimination is primarily rational or statistical, rather than being based on more emotional sources of distain. The fact that African Americans are subject to hyper-segregation at rates that far exceed those of other minority group members lends some support to the belief that aversive racism is still a major component of this process.<sup>93</sup>

It is difficult, of course, to distinguish between revealed preferences for living and raising a family among people like yourself, and a desire to avoid contact with a specific group of “others.” Researchers who have asked people to indicate their “comfort with and willingness to enter neighborhoods” with varying degrees of black residential presence have determined the tipping points at which discomfort arises. White respondents were far more likely to express discomfort with entry into neighborhoods with a minimal black presence, while black respondents actually preferred moving to integrated neighborhoods.<sup>94</sup>

Another critical component of the cumulative disadvantage that burdens African Americans is the association between race and crime. As we have suggested with regard to the impact that biased or inaccurate data have on the recommendations made by both human and computer-based guidance systems, self-confirming hypotheses operate to

validate and reinforce initial impressions. Such is the case with regard to crime statistics and the arrest and imprisonment of African Americans for drug-related crimes.

Racial profiling is the name applied to a discriminatory technology that justifies a higher than average number of traffic stops of black drivers because of a belief that those drivers are more likely to be carrying contraband drugs.<sup>95</sup> If African Americans are actually no more likely to be carrying contraband than other drivers, then a higher stop rate will still produce a greater number of good hits, convictions, and sentences. The crime statistics that result will serve as proof of the correctness of the model, and may even be used to justify increasing the rate of such stops.

There is also great deal to be said about the ways in which the use of this particular technology generates a host of unintended, cumulatively disastrous consequences. Growing disrespect for the law, the police, and the court is just one small thread that threatens to unravel the social fabric of our nation.

If we add the development of DNA fingerprinting to the resources used in the control of crime, we can expect to see a further accumulation of harms for African Americans. The use of genetic material as index of identification has all but become the norm in the criminal justice field.<sup>96</sup> Policy makers in the UK are already discussing whether it makes more sense, from a social justice perspective, to collect and process samples of DNA from every resident, and every visitor, rather than limit the collections to individuals who have been convicted, arrested, or merely detained as a person of interest.<sup>97</sup> Because of racial profiling, the world's largest DNA database contains samples of genetic material from 40% of the Black men in the UK. Although the growth in these databases in the US has not been quite as fast, the disproportionate representation of African Americans in the eligible pool obviously reflects the impact of race based policing.<sup>98</sup>

If we then consider the ways in which DNA profiles identify family members as well as the original source of the material, the numbers of African Americans who will be placed

at risk of an unsolicited, and potentially life-threatening interactions with police are bound to grow as the use of these databases expands.

Of course, it is not only racial profiling that should invite caution about the expanding the use of DNA databases. We should also keep in mind the fact that not all criminals activities leave genetic material behind. The people who commit crimes against property, especially white-collar crimes committed at a distance, perhaps with the aid of a computer, rarely leave any DNA at the scene of the crime. This means, of course, that DNA fingerprinting will be far more effective in identifying a relatively small share of the criminal population. But it will, nevertheless, increase the number of African Americans brought into contact with the police.

There is a special irony in the fact that even within the civil justice system, we find significant barriers to access to resources that might otherwise help to reduce the level of inequality in society.<sup>99</sup> People burdened by poverty have a sense of powerlessness, and because of this, they tend to believe that there is little chance that they will succeed in pursuing legal claims against more powerful others. As a result, the poor are far less likely to pursue legal action even when they believe that their claims are just. Often, their own experiences, or that of their friends and neighbors reinforces the sense that they will encounter barriers every step of the way toward what will ultimately turn out to be a negative decision by some officer of the court. Because personal injury lawyers also estimate their chances of covering their costs with a favorable settlement, they are far more likely to decide against taking the case of the victims most in need of their help.<sup>100</sup>

The fact that public policies establish punishments and rewards for behaviors that reflect ideological biases more than they reflect objective indicators of societal value also means that these policies contribute to cumulative disadvantages for members of some groups. The examples are numerous. Consider, for example, the consequences that flow from treating particular kinds of drug offenses as being more dangerous, or problematic than others. If those offenses happen to be associated with particular groups, such as African Americans, then, over time, the burdens on African Americans will cumulate, and spread

throughout their communities. There are not only harsher sentences for possession of crystal, or crack, than powdered cocaine, but, there are also likely to be more severe collateral constraints that help to ensure that those convicts will face greater barriers to re-entry into society.<sup>101</sup>

Other examples in other domains could be easily added to those we have covered so far. The process will operate in essentially the same way, with the same results, whenever the purpose, or the primary function of the system is discrimination on the basis of group or category membership.

## **Automated Discrimination**

For this reason, the continued development and implementation of decision support systems that rely on autonomic profiling should not be expected to produce better results, simply because they lack the particular forms of bias that we have associated with decisions made by human beings.<sup>102</sup>

It must be recognized that certain kind of biases are inherent in the selection of the goals or objective functions that automated systems will be designed to support. We must also consider that fact that as system objectives more routinely come to be framed in terms of the identification, minimization, or management of risks, rather than the achievement of objectively measured goals or achievements, the consequences of systematic error will be more difficult to observe and to control. When the goals of risk management are in the service of profit maximization and the maintenance of structures and relations of power, the introduction of system threatening biases is all but guaranteed.

A common feature of our discussions of the performance of computers, or computer-based systems, has been the extent to which these systems generate errors. Certainly, our evaluation of these systems has to take error rates into account. However, not all kinds of errors are the same. Depending upon the nature of the goals of the system controllers, our orientation toward Type I and Type II errors will be quite different.<sup>103</sup> In the case of security systems, where the sentinel is determining whether the request or the transaction

is a legitimate request, or is an attack, the greatest concern is not to miss or ignore any attacks—to minimize passive failures. However, because the overwhelming numbers of interactions with systems are legitimate, a goal of minimizing passive failures will necessarily mean that there will be a high number of active failures--the denial of access, or the assignment of burdens on clients, customers, or citizens actually making legitimate requests.<sup>104</sup> The determination of the error rates that are acceptable will not be left to the machine. It will be an economic or political choice, and it is a choice that should be subject to routine review and assessment in the interest of the public at large.

Our regulatory assessment and response to the performance and impact of these systems must consider the distribution of errors that we must not assume to be random. It will be a challenge to ensure that those who are assigned the responsibility for technology assessment are fundamentally committed to the reduction, rather than the exacerbation of inequality within and between nations and regions of the world.

And finally, our assessment will have to be especially sensitive to the relative scales at which different discriminators operate. It will not make sense to ignore the decisions made by autonomous intelligent sentinels even though the error rates might be quite remarkably low. The fact that the number of decisions made by such sentinels in one hour may be several orders of magnitude greater than those made by all the human deciders in the world in a previous calendar year would suggest that cumulative, as well as catastrophic harms could emerge routinely as a matter of scale.

As I suggested earlier on, a privacy or data protection regime will not be adequate to the task of reducing the cumulatively disparate impact of autonomous discriminators. Privacy and data protection regimes focus primarily on the correctness of the “personally-identified information” stored within a database. It simply will not be economically or even technically feasible for data subjects to assess and then challenge the correctness of data used by sentinels, agents, or environments. Most of the time, persons who have been victimized by an active system failure will not know precisely if, when, or how they have been misidentified. If they somehow suspect, or become aware of an erroneous

assessment, they will not know where to begin to gain access to the data, or the algorithms that were used to adjust their profile or status. Even with access, and with the aid of an advocate, they will likely discover that the offending result has been generated by factually correct data used within an operationally validated system that performs as well, or better than its competitors. Framing a demand for an adjustment of such systems might be possible on a case-by-case basis, but in general, success is so unlikely that the most rational response is to ignore it. At the end of the day, it will be the nature of the organizational purpose, or goals that will determine whether the use of any particular variable or measure can be successfully challenged.<sup>105</sup>

Only a well-organized and highly motivated social movement is likely to succeed in challenging the elevation of a set of institutional goals and objectives beyond the reach of individuals and small groups. No such movements appear to be massing at the horizon. That doesn't mean there is no basis for hope. Perhaps a merger between egalitarian movements for civil rights and environmental movements for sustainability<sup>106</sup> may generate sufficient energy and intellectual resources to carry the struggle against ambient discrimination forward.

---

<sup>1</sup> Committee on Networked Systems of Embedded Computers. *Embedded, Everywhere: A research agenda for networked systems of embedded computers*. Washington, DC: National Research Council, National Academy Press, 2001.

<sup>2</sup> Gordon Patrick. "The locus opus: playing with privacy in a world of ambient intelligence." Manuscript online at <http://ssrn.com/abstract=1091116>, 2007.

<sup>3</sup> Mireille Hildebrandt and Martin Meints (eds), "D7.7: RFID, Profiling, and AmI" *Future of Identity in the Information Society* (FDIS Consortium), 2006.

<sup>4</sup> Ray Kurzweil. *The singularity is near: when humans transcend biology*. New York: Viking, 2005.

<sup>5</sup> Alberto Lafuente-Rojo, Julio Abascal-Gonzalez and Yan Cai.. "Ambient intelligence: Chronicle of an announced technological revolution." *UPGRADE* 8, 2007, pp. 8-12.

<sup>6</sup> Peter Haddawy. "An overview of some recent developments in Bayesian problem solving techniques." *The AI Magazine* 20, 1999, pp. 11-19.

<sup>7</sup> Philip Brey. "Freedom and privacy in ambient intelligence." *Ethics and information technology* 7, 2005, pp. 157-166.

<sup>8</sup> Antoinette Rouvroy. "Privacy, data protection, and the unprecedented challenges of ambient intelligence." *Studies in Ethics, Law, and Technology* 2, 2008, pp. 1-51.

- 
- <sup>9</sup> Oscar Gandy. "It's discrimination stupid," pp. 35-47 in *Resisting the Virtual Life: The Culture and Politics of Information*, edited by J. Brook and I. Boal. San Francisco, CA: City Lights Books, 1995.
- <sup>10</sup> ACORN Fair Housing. "Foreclosure exposure: A study of racial and income disparities in home mortgage lending in 172 American cities." Chicago, IL: ACORN Housing Corporation, 2007.
- <sup>11</sup> Seth Chandler. "Visualizing adverse selection: an economic approach to the law of insurance underwriting." *Connecticut Insurance Law Journal* 8, 2002, pp. 435-503.
- <sup>12</sup> Oscar H. Gandy, Jr. "Quixotics Unite! Engaging the pragmatists on rational discrimination," pp. 318-336 in *Theorizing Surveillance: The Panopticon and Beyond*, edited by D. Lyon. Portland: Willan Publishing, 2006.
- <sup>13</sup> Frank Baumgartner and Bryan Jones. *Agendas and instability in American politics*. Chicago: University of Chicago Press, 1993.
- <sup>14</sup> Edward Tenner. *Why things bite back: technology and the revenge of unintended consequences*. New York: Vintage Books, 1996.
- <sup>15</sup> Mireille Hildebrandt, Serge Gutwirth and Paul De Hert. "Implications of profiling practices on democracy and the rule of law." Deliverable D7.4, FIDIS Consortium, September 5, 2005.
- <sup>16</sup> James Waldo, Herbert Lin and Lynette Millett (eds.). *Engaging privacy and information technology in a digital age*. Washington, DC: National Academies Press, 2007.
- <sup>17</sup> Oscar H. Gandy, Jr. "Data mining, surveillance, and discrimination in the post-9/11 environment," pp. 363-384 in *The New Politics of Surveillance and Visibility*, edited by K. Haggerty and R. Ericson. Toronto: University of Toronto Press, 2006.
- <sup>18</sup> William M. Landes and Richard A. Posner. *The political economy of intellectual property law*. Washington DC: The AEI Press, 2004.
- <sup>19</sup> Mireille Hildebrandt. "Profiling: from data to knowledge." *Datenschutz und Datensicherheit* 30, 2006, pp. 548-552.
- <sup>20</sup> Bruce Schneier. *Beyond Fear: thinking sensibly about security in an uncertain world*. New York: Copernicus Books, 2003. See also, David S Wall. *Cybercrime: The transformation of crime in the Information Age*. Cambridge, UK: Polity, 2007.
- <sup>21</sup> Pilar Ossorio and Troy Duster. "Race and genetics: Controversies in biomedical, behavioral, and forensic sciences." *American Psychologist* 60, 2005, pp. 115-128.
- <sup>22</sup> Andrew Whitby, Audun Josang and Jadwiga Indulska. "Filtering out unfair ratings in Bayesian reputation systems," *Proceedings of the Autonomous Agents and Multi Agent Systems Conference*. New York, July 2004.
- <sup>23</sup> John Elster. "When rationality fails," pp. 19-51 in *The Limits of Rationality*, edited by K. S. Cook and M. Levi. Chicago: University of Chicago Press, 1990.
- <sup>24</sup> Anthony Giddens. *The Constitution of Society*. Cambridge, UK: Polity Press, 1984, pp. 5-14.
- <sup>25</sup> Roman Belavkin. "The role of emotion in problem solving," pp. 49-57 in *Proceedings of the AISB '01 Symposium on Emotion, Cognition and Affective Computing*, edited by C. Johnson. York, England: Heslington, 2001. See also, Delores Canamero. "Modeling motivations and emotions as a basis for intelligent behavior." *Agents '97, ACM, 1997*, and

---

Aaron Sloman. "Beyond shallow models of emotion." *Cognitive Processing* 2, 2001, pp. 177-198.

<sup>26</sup> Brian Nosek, Anthony Greenwald and Mahzarin Banaji. "The Implicit Association Test at age 7: a methodological and conceptual review," pp. 265-292 in *Social Psychology and the Unconscious: the automaticity of higher mental processes*, edited by J. A. Bargh, Psychology Press, 2006.

<sup>27</sup> Jerry Kang and Mahzarin Banaji. "Fair Measures: a behavioral realist revision of "affirmative action."" *California Law Review* 94, 2006, pp. 1063-1118.

<sup>28</sup> Lincoln Quillian. "New Approaches to Understanding Racial Prejudice and Discrimination." *Annual Review of Sociology* 32, 2006, pp. 299-328.

<sup>29</sup> Milton C. Regan, Jr. "Moral intuitions and organizational culture." *Saint Louis University Law Journal* 51, 2007, pp. 941-988.

<sup>30</sup> *Ibid.* p. 950.

<sup>31</sup> Oscar H. Gandy, Jr. *Beyond Agenda Setting: Information Subsidies and Public Policy*. Norwood, NJ: Ablex, 1982. See also, Oscar H. Gandy, Jr. "Public opinion surveys and the formation of privacy policy." *Journal of Social Issues* 59, 2003, pp. 283-299.

<sup>32</sup> Jonathan Koomey, et al. "Sorry wrong number: the use and misuse of numerical facts in analysis and media reporting of energy issues." *Annual Review of Energy and the Environment* 27, 2002, pp.119-158. See also, Joel Best. *Damned Lies and Statistics: untangling numbers from the media, politicians, and activists*. Berkeley: University of California Press, 2001.

<sup>33</sup> Paul Kleindorfer, Howard Kunreuther and Paul Shoemaker. *Decision sciences: an integrative perspective*. New York: Cambridge University Press, 1993, pp. 86-104.

<sup>34</sup> Paul W Holland. "Causation and race," pp. 93-109 in *White Logic, White Methods*, edited by T. Zuberi and E. Bonita-Silva. Lanham, MD: Rowman & Littlefield, 2008.

<sup>35</sup> John A. List. "The nature and extent of discrimination in the marketplace: evidence from the field." *Quarterly Journal of Economics*, 2004, pp. 49-89.

<sup>36</sup> Tukufu Zuberi. *Thicker Than Blood: How Racial Statistics Lie*. Minneapolis, MN: University of Minnesota Press, 2001, pp. 126-130. See also, David A. Freedman. "From association to causation via regression," pp. 113-162 in *Causality in crisis? Statistical methods and the search for causal knowledge in the social sciences*, edited by V. McKim and S. Turner. Notre Dame, Indiana: University of Notre Dame Press, 1997.

<sup>37</sup> Edward Altman and Anthony Saunders. "Credit risk measurement: developments over the last 20 years." *Journal of Banking and Finance* 21, 1998, pp. 1721-1742. See also, Loretta Mester. "What's the point of credit scoring?" *Business Review*, October/November, 1997, pp. 3-16.

<sup>38</sup> Pub. L. No. 90-321, 1970.

<sup>39</sup> Birny Birnbaum. "Insurers' use of credit scoring for homeowners insurance in Ohio." Ohio Civil Rights Commission, January 2003.

<sup>40</sup> Patrick L Brockett. and Linda L. Golden. "Biological and psychobehavioral correlates of credit scores and automobile insurance losses: toward an explication of why credit scoring works." *The Journal of Risk and Insurance* 74, 2007, pp. 23-63.

<sup>41</sup> Ian Ayres, Frederick Vars and Nasser Zakariya. "To insure prejudice: racial disparities in taxicab tipping." *Yale Law Journal* 114, 2005, p. 1640.

- 
- <sup>42</sup> Jody Armour. *Negrophobia and Reasonable Racism*. New York: New York University Press, 1997, pp. 35-67.
- <sup>43</sup> Daniela Florescu, Daphne Koller and Alon Levy. "Using probabilistic information in data integration." *Proceedings of the 23rd VLDB Conference*. Athens, Greece, 1997, pp. 216-225.
- <sup>44</sup> Annamaria Carusi. "Data as representation: beyond anonymity in e-research ethics." *International Journal of Internet Research Ethics* 1, 2008, pp. 37-65.
- <sup>45</sup> Schneider, David J. *The Psychology of Stereotyping*. New York: The Guilford Press, 2004, pp. 197-206
- <sup>46</sup> Saera Kahn, and Alan Lambert. "Perceptions of rational discrimination: When do people attempt to justify race-based prejudice?" *Basic and Applied Social Psychology* 23, 2001, pp. 43-53.
- <sup>47</sup> Annamaria Carusi. "Data as representation: beyond anonymity in e-research ethics." *International Journal of Internet Research Ethics*, 2008, pp. 37-65.
- <sup>48</sup> Michael J Weiss. *The Clustering of America*. New York: Harper & Row, 1988.
- <sup>49</sup> Michael J Weiss. *The Clustered World: How we live, what we buy, and what it all means about who we are*. Boston: Little, Brown & Co, 2000.
- <sup>50</sup> Geoffrey C Bowker. and Susan Leigh Star. *Sorting Things Out: classification and its consequences*. Cambridge, MA: The MIT Press, 1999.
- <sup>51</sup> Leah Wortham. "Insurance classification: too important to be left to the actuaries." *Journal of Law Reform* 19, 1986, pp. 349-423.
- <sup>52</sup> The Genetic Nondiscrimination Act, Public Law No: 110-233, May 21, 2008.
- <sup>53</sup> Ine Van Hoyweghen, Klasien Horstman and Rita Schepers. "'Genetics is not the issue': insurers on genetics and life insurance." *New Genetics and Society* 24, 2005, pp. 79-98.
- <sup>54</sup> Amy Harmon. "Congress passes bill to bar bias based on genes" in *New York Times Online*, May 2, 2008, <http://www.nytimes.com/2008/05/02/health/policy/02gene.html>.
- <sup>55</sup> Daria Knoch, Alvaro Pascual-Leone, Kaspar Meyer, Valerie Treyer, and Ernst Fehr. "Diminishing reciprocal fairness by disrupting the right prefrontal cortex." *Science* 314, 2006, pp. 829-32.
- <sup>56</sup> Alan Sanfey, James Rilling, Jessica Aronson, Leigh Nystrom, and Jonathan Cohen. "The neural basis of economic decision-making in the Ultimatum Game." *Science* 300, 2003, pp. 1755-58.
- <sup>57</sup> Yves Thiery and Caroline Van Shoubroeck. "Fairness and equality in insurance classification." *The Geneva Papers* 31, 2006, pp. 190-211. See also, Theodore Marmor and Jerry Mashaw. "Understanding social insurance: Fairness, affordability, and the 'modernization' of Social Security and Medicare." *Health Affairs* 25, 2006, pp. 114-134.
- <sup>58</sup> Trudo Lemmens and Yves Thiery. "Insurance and human rights: What can Europe learn from Canadian Anti-discrimination law?" in *Discrimination in Insurance*, edited by H. Cousy and C. V. Schoubroeck. Maklu: Academia-Bruylant, 2007.
- <sup>59</sup> J. Atsu Amegashie. "Socially-tolerable discrimination." MPRA paper no. 8543, Munich Personal RePEc Archive, 2008. <http://mpa.ub.uni-meunchen.de/8543>.
- <sup>60</sup> Jack M. Balkin. "The constitution of status." *Yale Law Journal* 106, 1997, p. 2366.
- <sup>61</sup> Jorge Moll, Ricardo Oliveira-Souza and Roland Zahn. "The neural basis of moral cognition: sentiments, concepts, and values." *Annals of the New York Academy of Sciences* 1124, 2008, pp. 161-180.

- 
- <sup>62</sup> Milton Rokeach. *The Nature of Human Values*. New York: Free Press, 1973.
- <sup>63</sup> George Lakoff. *Moral Politics: How Liberals and Conservatives Think*. Chicago: University of Chicago Press, 2002. See also, Marc Stewart Wilson. "Values and political ideology: Rokeach's Two-Value Model in a proportional representation environment." *New Zealand Journal of Psychology* 23, 2004.
- <sup>64</sup> John Jost, Brian Nosek, and Samuel Gosling. "Ideology: Its resurgence in social, personality, and political psychology." *Perspectives on Psychological Science* 3, no. 2, 2008, pp. 126-36.
- <sup>65</sup> Marc Stewart Wilson. "A social-value analysis of Postmaterialism." *The Journal of Social Psychology* 145, no. 2, 2005, pp. 209-24.
- <sup>66</sup> Frederick F Schauer. *Profiles, Probabilities and Stereotypes*. Cambridge: Harvard University Press, 2003.
- <sup>67</sup> Peter Norman. "Statistical discrimination and efficiency." *The Review of Economic Studies* 70, 2003, pp. 615-27.
- <sup>68</sup> Ian Ayres. "Market power and inequality: a competitive conduct standard for assessing when disparate impacts are unjustified." *California Law Review* 95, 2007, pp. 669-719.
- <sup>69</sup> Gary Becker. *The Economics of Discrimination*, 2<sup>nd</sup> edition. University of Chicago Press, 1971.
- <sup>70</sup> Mary Anne Case. "Developing a taste for not being discriminated against." *Stanford Law Review* 55, 2002-2003, pp. 2273-2291.
- <sup>71</sup> Daniel Hausman, and Michael McPherson. *Economic Analysis and Moral Philosophy*. New York: Cambridge University Press, 1996.
- <sup>72</sup> Arthur Okun. *Equality and Efficiency: The Big Tradeoff*. Washington, DC: The Brookings Institution, 1975.
- <sup>73</sup> Julian Le Grand. "Equity Versus Efficiency: The Elusive Trade-Off." *Ethics* 100, 1990, pp. 554-68.
- <sup>74</sup> Stephen Klasen. "The efficiency of equity." Discussion paper no. 145, Ibero-America Institute for Economic Research. Goettingen, Germany, 2006.
- <sup>75</sup> Steven A Ramirez. "Bearing the costs of racial inequality: Brown and the myth of the equality/efficiency trade-off." *Washburn Law Journal* 44, 2004, pp. 87-104.
- <sup>76</sup> Amartya Sen. *Inequality Reexamined*. Cambridge, MA: Harvard University Press, 1992.
- <sup>77</sup> John Rawls. *A Theory of Justice*. Cambridge, MA: Harvard University Press, 1971.
- <sup>78</sup> Jukka Pirttila, and Roope Uusitalo. "Leaky bucket in the real world: Estimating inequality aversion using survey data." Paper presented to the Conference on Public Sector Economics. Munich, Germany, 2007.
- <sup>79</sup> Colin Camerer, and Ernst Fehr. "When does "Economic Man" dominate social behavior?" *Science* 311, 2006, pp. 47-52.
- <sup>80</sup> Devah Pager, and Hana Shepherd. "The sociology of discrimination: Racial discrimination in employment, housing, credit, and consumer markets." *Annual Review of Sociology* 34, 2008 (preprint), pp. 9.1-9.29.
- <sup>81</sup> Lawrence E. Blume. "The dynamics of statistical discrimination." *The Economic Journal* 116, 2006 pp. 480-498.
- <sup>82</sup> Ralf Dahrendorf. *Life chances: approaches to social and political theory*. Chicago: University of Chicago Press, 1979.

---

<sup>83</sup> Bruce Link and Jo C. Phelan. "Conceptualizing stigma." *Annual Review of Sociology* 27, 2001, pp. 363-385.

<sup>84</sup> Glen C Loury. *The Anatomy of Racial Inequality*. Cambridge, MA: Harvard University Press, 2002.

<sup>85</sup> Oscar Gandy. *The Panoptic Sort: A Political Economy of Personal Information*. Boulder, Co.: Westview Press, 1993.

<sup>86</sup> Thomas DiPrete and Gregory Eirich. "Cumulative advantage as a mechanism for inequality: A review of theoretical and empirical developments." *Annual Review of Sociology* 32, 2006, pp. 271-97.

<sup>87</sup> Kathryn Neckerman and Florencia Torche. "Inequality: causes and consequences." *Annual Review of Sociology* 33, 2007, pp. 335-357.

<sup>88</sup> *Ibid.* p. 339.

<sup>89</sup> Saguaro Seminar on Civic Engagement in America. "Better together." Cambridge, MA: John F. Kennedy School of Government, Harvard University, December, 2000.

<sup>90</sup> Robert Sampson, Jeffrey Morenoff and Thomas Gannon-Rowley. "Assessing 'neighborhood effects': social processes and new directions in research." *Annual Review of Sociology* 28, 2002, pp. 443-478.

<sup>91</sup> Saguaro Seminar on Civic Engagement in America.. "Social capital community benchmark survey, executive summary." Cambridge, MA: John F. Kennedy School of Government, Harvard University, 2000, pp. 6-7.

<sup>92</sup> Harry Medina. "Consumer protection: Federal and state agencies face challenges in combating predatory lending." Washington, DC: United States General Accounting Agency, 2004. See also, Kathleen Engel and Patricia McCoy. "A tale of three markets: The law and economics of predatory lending." *Texas Law Review* 80, 2002, pp. 1255-1367.

<sup>93</sup> Camille Zubrinsky Charles. "The dynamics of racial residential segregation." *Annual Review of Sociology* 29, 2003, pp. 167-207.

<sup>94</sup> *Ibid.* pp. 183-184.

<sup>95</sup> Oscar Gandy and Lemi Baruh. "Racial profiling: They said it was against the law!" *University of Ottawa Law & Technology Journal* 3, 2006, pp. 297-327.

<sup>96</sup> Troy Duster.. "Selective arrests, an ever-expanding DNA forensic database, and the specter of an early Twenty-First-Century equivalent of phrenology," in *The Technology of Justice: DNA and the Criminal Justice System*, edited by D. Lazer. Cambridge: MIT Press, 2004.

<sup>97</sup> "All UK 'must be on DNA database'." BBC. [http://news.bbc.co.uk/go/pr/tr/-/2/hi/uk\\_news/6979138.stm](http://news.bbc.co.uk/go/pr/tr/-/2/hi/uk_news/6979138.stm). News. 2007.

<sup>98</sup> Tabia Simoncelli. "Forensic database expansion: Dangerous Excursions: The case against expanding forensic DNA databases to innocent persons." *Journal of Law, Medicine & Ethics* 34, 2006, p. 390. See also, D. H. Kaye. "The impact of behavioral genetics on the criminal law: Behavioral genetics research and criminal DNA databases." *Law and Contemporary Problems* 69, 2006, p. 259.

<sup>99</sup> Rebecca Sandefur. "Access to civil justice and race, class and gender inequality." *Annual Review of Sociology* 34, no. 16, 2008, pp. 1-20.

<sup>100</sup> *Ibid.* p. 10.

---

<sup>101</sup> Gabriel J Chin. "Race, the War on Drugs, and the collateral consequences of criminal conviction." *The Journal of Gender, Race & Justice* 6, 2002, pp. 253-275.

<sup>102</sup> Mireille Hildebrandt. "Profiling: from data to knowledge." *Datenschutz und Datensicherheit* 30, 2006, pp. 548-552.

<sup>103</sup> Type I errors refers to a conclusion claiming distinction, or difference, when there is no difference; Type II errors refer to a conclusion of no difference, when a difference, or distinction actually exists. An active failure is a Type I error; claiming a threat when there is none.

<sup>104</sup> Bruce Schneier. *Beyond fear: thinking sensibly about security in an uncertain world*. New York: Copernicus Books, 2003, pp. 54-58.

<sup>105</sup> Yves Thiery and Caroline Van Shoubroeck. "Fairness and equality in insurance classification." *The Geneva Papers* 31, 2006, pp. 190-211.

<sup>106</sup> Peter Barnes. *Capitalism 3.0: A guide to reclaiming the commons*. San Francisco: Berrett-Koehler, 2006.