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The Misperception of Norms:
The Psychology of Bias and the Economics of Equilibrium

by

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Abstract:

Our perceptions of what other people do often affect what we do. In these situations, perceptual biases can affect what everyone does. By combing the psychology of bias and the economics of equilibrium, we construct a model to predict how individual biases affect aggregate behavior. Psychologists have found at least two systematic biases in the perception of social and legal norms. Empirical studies often find a general tendency to over-estimate how much other people violate social norms – a bias toward moral pessimism. We show that persistence of this bias causes more people to violate the norm than if the bias were corrected. In addition, this bias increases the probability that behavior will settle into a "bad" equilibrium with many wrongdoers, instead of settling into a "good" one with few wrongdoers.   Empirical studies also find that a person often over-estimates how many other people act the same as he does – a bias towards social projection. We show that persistence of this bias does not change the number of people who violate the norm. Pessimism thus undermines conformity to social norms, whereas social projection leaves aggregate conformity unchanged. We apply these predictions, and some others, to empirical studies in psychology. We conclude that researchers who found false pessimism with respect to protection of trade secrets, tax compliance, alcohol abuse, and water conservation are right to predict that this bias will cause more people to do wrong, whereas researchers who found social projection bias with respect to water conservation, smoking, and drugs were wrong to predict that this bias will cause more people to do wrong.

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The Misperception of Norms:
The Psychology of Bias and the Economics of Equilibrium[2]

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I. Introduction

Our perceptions of what other people do often affect what we do. In these situations, biases in perceptions can affect what everyone does. By combing the psychology of bias and the economics of equilibrium, we construct a model to predict how individual biases affect aggregate behavior. Psychologists have found at least two systematic biases in the perception of social and legal norms. Empirical studies often find a general tendency to over-estimate the violation of social norms by other people. Over-estimating how badly other people behave is a form of moral pessimism that psychologists call the "uniqueness bias."[3] We show that persistence of this bias causes more people to violate the norm than if the bias were corrected. In addition, this bias increases the probability that behavior will settle into a "bad" equilibrium with many wrongdoers, instead of settling into a "good" one with few wrongdoers. Our results suggest that researchers who found false pessimism with respect to protection of trade secrets, tax compliance, alcohol abuse, and water conservation are right to predict that this bias will cause more people to do wrong.

Empirical studies also find that a person often over-estimates how many other people act the same as he does, Over-estimating how other people behave like yourself is a form of social projection that psychologists call the "false-consensus bias" or

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[2] We would like to thank Dhammika Dharmapala for useful comments.

[3] *See* George R Goethals, & David M Messick.; Scott T Allison, *The Uniqueness Bias: Studies of Constructive Social Comparison.* In SOCIAL COMPARISON: CONTEMPORARY THEORY AND RESEARCH 149 (Jerry Suls & Thomas Ashby Wills Eds. 1991); it should be noted that there are number of perspectives, on the correct definition for those biases. Goethals and Klein seem to make a distinction between False Uniqueness and Uniqueness Bias, whereas Miller does not seem to make any distinction regarding how people underestimate the probability[3] that other people will engage in ethical and morally desirable behavior (or call it "the tendency for people to underestimate the commonness of their own desirable behaviors (false uniqueness, as defined by Goethals, 1986)," and overestimate the commonness of their own undesirable behaviors (uniqueness bias, as define by Goethals, 1986) (see Handbook, pg 36 for distinction – more accurate references). To test for this bias, ask people to estimate the mean of undesirable behavior and compare their estimates to the actual mean (for reviews, see Goethals, 1986; Goethals et al., 1991).

"pluralistic ignorance."[4] We show that persistence of this bias does *not* change the number of people who violate the norm. According to our model, researchers who found social projection with respect to water conservation, smoking, and drugs are wrong to predict that this bias will cause more people to do wrong.

Consider three examples to illustrate our conclusions.

Trade secrets: An employee in Silicon Valley resigns from her job and accepts a job in a competing firm. Her original employer threatens to sue if she discloses any trade secrets to her new employer.   She is unsure about the kinds of information that constitute trade secrets. She believes that behaving like most others will reduce the probability that someone will sue her and increase her ability to find jobs. So she decides to do what she thinks most of her co-workers would do if they were in her position. Moral pessimism and social projection bias her perceptions of her co-workers.

Tax compliance: The tax code allows firms to expense certain kinds of investments. A sole proprietor is uncertain whether or not a particular investment falls under this provision of the tax code. He wants to avoid legal problems, but he does not want to be the only 'sucker' who pays the tax. Instead of hiring a tax lawyer, he guesses how many of other firms would pay the tax in similar circumstances and he does what he believes most other people do. Moral pessimism and social projection bias his perceptions of other taxpayers.

Heavy drinking: A freshmen in college wonders whether or not to try heavy drinking of alcohol.   He figures that his social acceptance in the college depends on behaving like most other students. Moral pessimism and social projection bias his perceptions of other students. Against this consideration, he balances a college rule that forbids overdrinking.

A bias towards moral pessimism in these examples makes the actor over-estimate how frequently others reveal trade secrets, evade taxes, and drink heavily. Our model predicts that pessimism bias will cause more actors to reveal trade secrets, evade taxes, and drink heavily. With a bias towards social projection, an actor who is inclined to do these things over-estimate how many others do them, and an actor who is not inclined to do these things over-estimate how many others do *not* do them. Our model predicts that social projection bias will not change the number of people who engage in these activities.

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[4] Debora A Prentice, Dale T Miller *Pluralistic ignorance and the perpetuation of social norms by unwitting actors* Advances in Experimental Social Psychology, 1996

The predictions of our model follow whenever each actor sees an advantage from acting like others. This fact is easy to see in the economic model of deterrence. The probability that a particular wrongdoer will suffer a social or legal sanction often decreases as more people commit the sanctioned act. Safety lies in numbers for a variety of reasons, including the fact that more wrongdoers stretch the limited resources available for detecting and punishing them. Consequently, a bias towards under-estimating the probability of a sanction reduces its power to deter wrongdoing. When society settles into an equilibrium where pessimism bias persists, more people should break the law than if pessimism were eliminated. In addition, norms often have multiple equilibria. (Later we show the conditions for multiple equilibria.) In these circumstances, moral pessimism increases the probability that the system settles into a "bad" equilibrium with many wrongdoers, instead of a good one with few wrongdoers.

Turning to the second bias, empirical studies find that a person often over-estimates how many other people act the same as he does. According to these studies, individuals *project* their behavior onto others. In the preceding examples, the actor who is inclined to reveal trade secrets, evade taxes, or drink heavily overestimates how many other people do these things. In contrast, an actor who is inclined to refrain overestimates how many other people also refrain from these acts. Research about this bias tends to divide people into "good" and "bad" actors. Individuals who engage in "good" behavior overestimate the percentage of people in society who engage in good behavior, and individuals who engage in "bad" behavior overestimate the percentage of people in society who engage in the bad behavior.[5]

Instead of changing behavior, social projection bias strengthens the inclinations that people already have. The person who is inclined to do the bad act thinks that he has safety in numbers, which increases his resolve to do the bad act. The person who is inclined to do right thinks that wrongdoers lack the safety of numbers -- they suffer from the danger of prominence -- which increase his resolve not to do wrong. If projection bias persists in equilibrium, the aggregate number of actors who do right and wrong

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[5] A famous exception is Prentice and Miller's (1993) discussion of students' overestimation of the number of students who engage in over-drinking.

remains the same as if perception were unbiased. Instead of changing aggregate behavior, the projection bias increases its stability. For example, the bias causes fewer actors to change their behavior in response to an increase in the severity of the sanction. In economic terms, projection bias reduces the "elasticity of the supply of wrongdoing on the extensive margin." (Note, however, that projection bias can also cause wrongdoers to do wrong more often, which increases the aggregate number of wrongs without increasing the aggregate number of wrongdoers.[7])

What happens when a person inclines towards pessimism *and* projection? Do the two perceptual biases reinforce or undermine each other? The answer is different depending upon whether the actor is inclined to do wrong or right. For a person inclined towards wrongdoing, projection reduces his perceived risk of a sanction from wrongdoing, and so does pessimism. So, for a person inclined towards wrongdoing, one bias reinforces the other. The two biases strengthen the wrongdoer's resolve without changing his behavior. For a person inclined towards rightdoing, projection increased his perceived risk of a sanction from wrongdoing, whereas pessimism reduces his perceived risk of a sanction. So, for a person inclined towards rightdoing, one bias undermines the other.

Biased beliefs cause miscalculations that can impair a person's performance. To reduce the risk of miscalculation, a rational actor will sacrifice something of value - money, effort, and time – in order to obtain more information that corrects bias. As the cost of information approaches zero, bias tends to disappear among rational actors. Conversely, as the cost of information rises, bias increases among rational actors. While rational actors will pay for information, actors whose bias is emotional rather than cognitive may not pay for it and they may resist costless information.

We will apply these predictions and some others to empirical studies in psychology. Our results suggest that researchers who found false pessimism with respect to protection of trade secrets, tax compliance, alcohol abuse, and water conservation are

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[7] We focus on the number of people who do right or wrong, which economists call the "extensive margin." We could change the model to focus on how many wrongs are committed by each wrongdoer, which economists call the "intensive margin." Social projection changes the former and not the latter.

right to predict that this bias will cause more wrongdoing. In contrast, researcher who found projection bias with respect to water conservation, smoking, and drugs were wrong to predict that this bias will cause more people to do wrong.

II. Causes of Perceptual Bias

We will review several accounts of the possible causes of pessimism bias, and then turn to the possible causes of projection bias. The media provides one of the simplest explanations for overestimating wrongdoing.[8] Immoral events get more media coverage than moral ones in the media. Lichtenberg and MacLean demonstrate that much of what the media reports is bad news.[9] Miller and Prentice analyzed four different types of TV news programs (national network news, local news, independent news, and cable network news) for violence type, conflict, and suffering. [11] Over 100 programs were analyzed over a six-month period. The authors discovered an emphasis on news that is bad and violent.[12] The media also depicts immorality more than morality, including lying, adultery, robbery, and fraud. [13]

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[8]While psychology research on TV violence tends to focus on entertainment TV, the daily news is even more heavily watched and also contains extreme and realistic violent content *See* Miller & Prentice, *infra note*, at 808 for a discussion of the role of the media in the phenomenon of the "spiral of silence."

[9] *See* J. Lichtenberg and D. MacLean, *Is Good News No News?* 17 The Geneva Papers on Risk and Insurance, 362 (1992). Koren and Klein also show this in their comparison of news coverage of two scientific studies, one on bad news and one on good news. The studies compared by Koren and Klein both investigated the relationship between radiation exposure and cancer. The bad news study showed an increased risk of leukemia in white men working at the Oak Ridge National Laboratory. The good news study failed to show an increased risk of cancer in people residing near nuclear facilities. Koren and Klein found that subsequent newspaper coverage was far greater for the study showing increased risk. *See **G.** Koren and N. Klein, *Bias Against Negative Studies in Newspaper Reports of Medical Research*, 266 J. of Amer. Med. Assoc. 1824 (1991).

[11] *See* Roger Johnson, *Bad news revisited: The portrayal of violence, conflict, and suffering on television news.* 2(3) J. of Peace Psyc. 201 (1996).

[12] On parameters of time allocation and amount of featured news stories, more than half (53.4%) of the news displayed violence, conflict, and suffering. Bad news was also given greater emphasis in that it featured earlier in the programs. While local news broadcasted the most bad news, all four program types were found to emphasize bad news.

[13] Jones cites a USA Today report that 48% of workers confess to illegal or unethical behavior as evidence of this phenomenon. *See* D. Jones, *48% of Workers Admit to Unethical or Illegal Acts*, (April) *USA Today*, 4 (1997).

In psychology, "salience" refers to the ease of recalling events that are vivid and recent. Psychologists have found that people tend to overestimate the probability of salient events and underestimate the probability of non-salient events.[14] The media gives salience to wrongdoing, which in turn amplifies popular misperceptions of wrongdoing.

The news media gives disproportionate attention to bad news presumably because human beings pay more attention to bad news.[19] According to the theory of *automatic vigilance.*, individuals who respond to undesirable social stimuli gain an evolutionary advantage. [20] As a result, undesirable stimuli attract more attention than desirable social stimuli,[21] especially when the source is undesirable behavior by others.[22]

Many psychological studies support the conclusion that people attribute too much undesirable behavior by others to fixed traits of character in the actors, and too little behavior to the social situation[23]. Buckley, Harvey, and Beu[24] suggest that this

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[14] Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology* **5**, 207-232

[19] *See* Paul Slauvic, *Perceived Risk, Trust, and Democracy*. 13(6) Risk Anal. 6 (1993).

[20] *See* Felicia Pratto and Oliver P. John. *Automatic Vigilence: The Attention-Grabbing Power of Negative Social Information*, 61(3) J. of Pers. & Soc. Psyc. 380 (1991).

[21] "There is a fundamental asymmetry in people's evaluations of gains and losses, of joy and pain, and of positive and negative events. A considerable body of research, in fields as diverse as decision making, impression formation, and emotional communication, has shown that people exhibit loss aversion (Kahneman & Tversky, 1984): They assign relatively more value, importance, and weight to events that have negative, rather than positive, implications for them. In decision making, potential costs are more influential than potential gains (e.g., Kahneman & Tversky, 1979). In impression formation, negative information is weighted more heavily than positive information (e.g., Anderson, 1974; Fiske, 1980; Hamilton & Zanna, 1972). In nonverbal communication, perceivers are more responsive to negatively toned messages than to positive ones (Frodi, Lamb, Leavitt, & Donovan, 1978). Q

[22] *See* John J. Skowronski and Donal E. Carlston, *Negativity and Extremity Biases in Impression Formation: A Review of Explanations,* 105 Psychological Bulletin 131 (1989). This concept is related to impression formation – the fact that unfavorable characteristics are weighted more heavily than favorable ones in initial formation of an assessment toward an object (John J. Skowronski and Donal E. Carlston, *Negativity and Extremity Biases in Impression Formation: A Review of Explanations,* 105 Psychological Bulletin 131 (1989)). Results showed that likableness ratings of a person associated with an unfavorable attribute were significantly more discrepant from a neutral impression than were ratings of a person associate with a desirable attribute. Additionally, subjects were more confident in their likableness ratings of the negative stimulus persons. It is certainly plausible to equate unethical traits/information with negative traits/information when it comes to impression formation.

[23] Gilbert, D. T., & Malone, P. S. (1995). The correspondence bias. *Psychological Bulletin*, 117, 21-38
[24] *See* Halbesleben, J.R., Buckley, M.R., & Sauer, N.D. *The Role of Pluralistic Ignorance in Perceptions of Unethical Behavior: An Investigation of Attorneys' and Students' Perceptions of Ethical Behavior*, 14(1) ETHICS AND BEHAVIOR, Pages 17 (2004).*See supra* note 19.

"fundamental attribution error" plays a role in overestimating the amount of wrongdoing by others[25]. According to the authors, most people are ethical with occasional lapses. Thoroughly unscrupulous people are an exceptional minority. The fundamental attribution error could cause a person who witnessed wrongdoing to conclude that the actor usually does wrong, whereas the correct conclusion in most cases is that the actor occasionally lapses.[26]

Moral pessimism could also result from a tendency to believe that the behavior of others is instrumentally driven. The overestimation of unethical behavior could follow from a common belief that one's self interest is the most important factor in explaining the behavior of individuals in the society[27].

Another possible source of moral pessimism is more emotional than cognitive. A wrongdoer may protect his self-esteem by exaggerating how frequently others commit the same wrong.[28] Relevant concepts invoked by psychologists include social validation, self- enhancing biases, and constructive social comparison.[29]

Now we turn from moral pessimism to social projection. An individual who projects his own behavior onto society overestimates how many others behave like he does.[31] This bias is closely related to what the psychology literature calls the false consensus effect (FCE), which refers to a situation where people mistakenly think that others agree with them.   According to the FCE, people tend to overestimate the social support of their own views and underestimate the social support for people who hold

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[25] The fundamental attribution error is the basis of the pluralistic ignorance phenomenon, implying that people might fail to account for others true motivations for engaging in various behaviors.
[26] For an economic model that develops the effect of attribution biases, see Dharmapala, Dhammika and Richard McAdam, "Words that Kill? An Economic Model of the Influence of Speech on Behavior (with Particular Reference to Hate Speech)" *Journal of Legal Studies*, Vol. 34, 2005, pp. 93-136.

[27] Dale Miller, The Norm of Self-Interest, 54 American Psychologist 1053 -60 (1999)
[28] See Wenzel on taxation, infra note 49
[29] Avoiding or inventing social reality when one suspects that the social practice might prevent him from following his own self-interest. Jerry Suls, *In search of the false-uniqueness phenomenon: Fear and estimates of social consensus*, 52 J PERSONALITY & SOC. PSYCH. 211 (1987). See also Ladd Wheeler, *Motivation as a determinant of upward comparison*, 2 J. EXPERIMENTAL SOCIAL PSYCH. 27 (1966)

[31]For social projection, s*ee generally*: Newman, L.S., Duff, K.J., & Baumeister, R.F. A New Look at Defensive Projection: Thought Suppression, Accessibility, and Biased Person Perception. Journal of Personality and Social Psychology, 1997, Vol. 72, No. 5 980-1001

opposing views.[32] Evidence from four studies in the original research by Ross demonstrates that social observers tend to form a false consensus with respect to the relative commonness of their own behavior. These results were obtained in questionnaires that presented subjects with hypothetical situations and also in actual conflicts that presented subjects with choices.

Several psychological mechanisms could cause social projection. One such mechanism is cognitive: A person may attend to positions with which he agrees and dismiss positions with which he disagrees. [33] Selective attention allows his preferred position to dominate his consciousness. The sorting of people reinforces selective attention. People tend to associate with others who share their general beliefs, attitudes, and values. The association could be voluntary as when people select their friends, or involuntary as when people are involuntarily segregated. If likes associate with likes, then recalling instances of behavior like your own will be easier than recalling behavior unlike your own.[34]

Instead of cognition, emotion could cause social projection. Perhaps people need for people to see their own acts, beliefs, and feelings as morally appropriate.[36] Finding

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[32] *See* Lee Ross, David Greene, Pamela House, the *False Consensus Effect: An Egocentric Bias in Social Perception and Attribution Processes*. 13 (3): JOURNAL OF EXPERIMENTAL SOCIAL PSYCHOLOGY. 279 (1977). But see also Anne-Marie De la Haye, *A Methodological Note About The Measurement Of The False Consensus Effect* 30 EUROPEAN JOURNAL OF SOCIAL PSYCHOLOGY, 569 (2000) (demonstrating the mistakes that Ross et al made in their measurements). In addition, Dawes, et al, (Robyn M Dawes, Matthew Mulford, *The False Consensus Effect And Overconfidence: Flaws In Judgment Or Flaws In How We Study Judgment?* 65 (3): ORGANIZATIONAL BEHAVIOR & HUMAN DECISION PROCESSES. 201(1996)) also question the existence of the false consensus effect, basically showing the opposite, i.e. that the more people thought others were like them, the more accurate they were in their estimations of their behavior. See G. Marks, *Thinking One's Abilities Are Unique and One's Opinions Are Common*, 10 PERSONALITY AND SOCIAL PSYCHOLOGY BULLETIN, 203. (1984) for a reconciliation of the uniqueness and the false consensus effect. It is important to note that some have argued that the false consensus is not at all a bias, but could rather be explained according to the bayesian analysis. *See* Dawes, R.M. & Mulford, M. The False Consensus Effect and Overconfidence: Flaws in Judgment or Flaws in How We Study Judgment? ORGANIZATIONAL BEHAVIOR AND HUMAN DECISION PROCESSES. Vol. 65, No. 3, March, pp. 201–211 (1996)

[33] *See infra* note
[34] *See* infra note . *See* E. Berscheid and E. H. Walster, *Interpersonal attraction,* Reading, MA: Addison-Wesley. (1978). *Also see* L. Ross, D. Greene, & P. House, *The "false consensus effect": An egocentric bias in social perception and attribution processes*, 13 J. Exp. Soc. Psyc. 279 (1977).

[36] Sherman, S. J., Presson, C. C., & Chassin, L. (1984). Mechanisms underlying the false consensus effect: The special role of threats to the self. *Personality and Social Psychology Bulletin*, *10*, 127–138.

similarity between oneself and others may validate the appropriateness of behavior, sustain self-esteem, restore cognitive balance, enhance perceived social support, or reduce anticipated social tensions.[37] Later we discuss the possibility that emotional bias resists correction by fresh information that ameliorates cognitive bias.

III. The Model

We will construct an economic model of conformity to a social norm, solve for the equilibrium, introduce perceptual bias into the model, and see how the equilibrium changes.   We follow the economic tradition of distinguishing between benefits and costs. A person who breaks a norm often enjoys various benefits, such as the financial gain from disclosing trade secrets, the reduction in taxes from evading them, the pleasure of listening to music after downloading it illegally, victory from winning a contest by cheating, time saved by not complying with law, etc. Assume that each actor's benefit from breaking the norm can be measured. The metric may be utility, pleasure, income, time, prestige, power, comfort, etc. In Figure 1, the vertical axis measures the amount a person benefits from breaking the norm. Each person i has a type θ_i, reflecting the benefits he obtains from breaking the norm. The horizontal axis depicts the cumulative proportion of people who enjoy a benefit of a given amount. According to the curve in Figure 1, a small number of people enjoy a high benefit, and a large number of people enjoy at least a small price.

We connect the benefit from breaking a social norm to standard economic concepts. A person's benefit in economics is described as his "willingness to pay" (WTP). The curve in Figure 1 thus depicts willingness to pay for wrongdoing in a population of people.   The number of people who are willing to pay a certain amount also measures demand. The curve in Figure 1thus depicts the "demand" for wrongdoing. The demand curve slopes down because more people are willing to pay the price of wrongdoing as it decreases.

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[37] *See generally* G. Marks & N. Miller, *Ten Years of Research on the False-Consensus Effect: An Empirical and Theoretical Review*. 102(1) Psyc. Bull. 72 (1987).
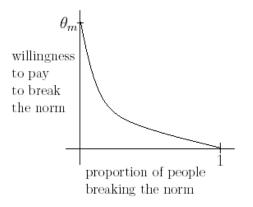
Figure 1: Distribution of the willingness to pay to break the norm.

Now we turn from the individual's benefits to his costs. Breaking a social norm often provokes social sanctions that can take various forms.[38] First, people who break the norm could lose the social approval of their peers (Macadams, 1997). Second, they could face social resentment (Cooter, 1996). Third, they might have trouble finding business partners (Bernstein, 1996). Fourth, if the social norm is also a law, the wrongdoer might suffer civil liability or criminal punishment. Fifth, they might suffer in some of all of these ways because they acquire a bad reputation (Posner, 2000).

The vertical axis in Figure 2 indicates the individual actor's cost of breaking the social norm, and the horizontal axis indicates the proportion of wrongdoers who break the norm. As depicted in Figure 2, the individual actor's cost of breaking the norm decreases as the proportion of wrongdoers increases. Various reasons could explain why breaking a norm costs less when many others do it. A simple reason that is central to the enforcement of norms concerns the expected sanction. The expected sanction equals its probability multiplied by its severity.   As discussed above, the probability that a particular wrongdoer will suffer a social or legal sanction often decreases as more people commit the sanctioned act. For example, when people see many others smoking in

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[38] A number of factors moderate the relationship between violating a norm and social sanctioning (such as legitimacy of the law, morality etc, for a general discussion of people's motivation to sanction violators see Armin Falk, Ernst Fehr and Urs Fischbacher, Driving Forces Behind Informal Sanctions in: 7 (6) Econometrica, 2017-2030 (2005)

airports, they feel more confident that they will not be confronted if they smoke. Because safety lies in numbers, the cost curve slopes down in Figure 2. The curve in Figure 2 also describes the "supply of sanctions for wrongdoing" as a function of the proportion of wrongdoers.
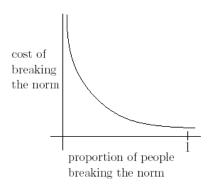

Figure 2: Cost of breaking the norm as a function of the proportion of people who break the norm.

Having characterized the demand and supply for wrongdoing, we can analyze the equilibrium towards which social interaction tends. We assume that the severity of the sanction suffered by wrongdoers can be measured by the same metric as the gain from wrongdoing, so the curves in Figure 1 and Figure 2 can be combined in the same graph. Consider a population of rational people with heterogeneous willingness to pay to break the norm, where person i's WTP is denoted by θ_i. Each person decides whether or not to break the norm by comparing the cost of the sanction and her WTP, θ_i. We assume that the cost curve slopes down as in Figure 2. For example, suppose that the actor's cost of violating the norm is inversely proportional to the fraction of people who break it. When a fraction $x \in [0,1]$ of the agents violate the norm, the sanction cost is $1/x$. Therefore, the net benefit u_i of a person who breaks the norm is the difference between the benefit θ_i that he gains from his misbehavior and the cost $1/x$ imposed on him, expressed by

$$u_i = \theta_i - 1/x.$$

In contrast, an individual who complies with the norm obtains a utility of 0 (since he does not gain any benefits and does not incur any costs). Thus, the decision of a rational person with type θ_i is:

> Violate, if $\theta_i > 1/x$
> Comply, otherwise.

Even within this minimal framework, we can derive some interesting implications. In this baseline scenario, the percentage x of violators in equilibrium is determined as the intersection of the WTP distribution and the cost curve.   In order to determine the equilibrium points, we need to make some assumptions on the WTP distribution in the population. For simplicity, we assume that an actor's type is a random variable, distributed uniformly between *0* and some maximal value θ_m.   By this assumption, the cumulative proportion of actors who are willing to pay a given price forms a straight line that slopes down, as depicted by the WTP curve in Figure 3.
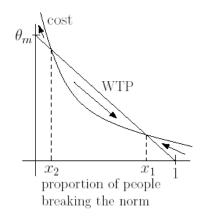

Figure 3: The intersection points of the two curves represent two equilibria. The higher equilibrium, x_1, is stable, and the lower point, x_2, is unstable. The point $x = 0$ is an additional stable equilibrium.

Figure 3 depicts three equilibria. The two interior equilibria occur at the two intersections of the WTP curve and the cost curve, denoted x_1 and x_2. Thus at x_1 the cost of breaking the norm is too high for any of the $1-x_1$ actors to break it, and the cost of breaking the norm is not high enough for any of the x_1 actors to stop breaking it. So the expected sanction at x_1 exactly sustains the proportion of wrongdoers and right-doers. The same is true for x_2. The third equilibrium is at *x=0*, where no one breaks the norm.

When no one is breaking the norm, the expected sanction from breaking it is too high for anyone to change his behavior.

Consider the natural best-response dynamics of such a community. Starting at some initial x, users arrive at individual decisions, their aggregate decisions define a new x, which leads to a new aggregate decision, and so on. When the community is out of equilibrium, the direction in which the community moves depends on the relative heights of the WTP curve and the cost curve. If the cost curve lies above the WTP curve, violation cost is higher than current wrongdoers are willing to pay, so the fraction of violators decreases. This happens in Figure 3 for $x<x_2$ or $x>x_1$. In contrast, if the cost lies below the WTP curve, current wrongdoers are willing to pay more than the cost of wrongdoing, so the fraction of violators increases. This happens in Figure 3 for $x_1<x<x_2$.

According to these best-response dynamics, $x=x_1$ and $x=0$ are "stable" equilibria: If the population starts at a point close enough to these points, the population will converge to these points. Conversely, x_2 is an "unstable" equilibrium: If the population starts at a point around x_2, it will cause the population to converge to one of the stable equilibria. If the initial x lies above x_2, the process converges to x_1, and if the initial x lies below x_2, it will cause the population to converge to x=0.

The population is unlikely to persist at the unstable equilibrium x_2, so we will not focus on it. In addition, since few social norms enjoy compliance at the 100%, or nearly we will not focus on x=0 either. Therefore, we restrict attention to the stable interior equilibrium, x_1, and refer to it as the most likely equilibrium in the population. In addition, we will refer to the second point, x_2, as the *tipping point* above which the population will converge to the equilibrium x_1.[39]

The properties of the equilibria described above depend on the shape of the cost curve and the distribution curve, especially whether the cost curve intersects the WTP curve from above or below. For example, if the cost and WTP curves intersect in the opposite direction of Figure 3, as in Figure 4, the stable equilibria are the interior one,

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[39] An implication of the existence of multiple equilibria is that policy making requires global knowledge of the cost function and the distribution of the willingness to pay. This is due to the fact that a minor movement may initiate a jump in the aggregate behavior. This is in contrast to standard economics, where there exists a unique equilibrium, and thus policy making requires only a local knowledge of the demand and supply curves,

x=x₂, and the corner one, *x=1*, in which everyone violates the norm. In Figure 4, either most actors obey the norm or else no one obeys it.
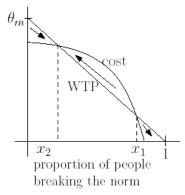

Figure 4: The intersection points of the two curves represent two equilibria. The higher equilibrium, x_1, is unstable, and the lower point, x_2, is stable. The point $x = 1$ is an additional stable equilibrium.

In standard economic analysis of markets, the demand curve slopes down as in Figure 1. In standard economic analysis, however, the supply curve does *not* slope down as in Figure 2. The fact that both curves slope down creates the possibility of multiple equilibria as depicted in Figures 3 and 4. The supply curve slopes down for social norms when an increase in the number of wrongdoers decreases the cost that each one of them expects to bear. We believe that this is the common situation. Consequently, we believe that multiple equilibria are more common for social norms than in markets for commodities.   Given multiple equilibria, small changes in the social environment can produce abrupt jumps up or down in levels of compliance with norms. For example, in Figure 4, a small change from x_1 will cause the system to jump to x_2.

While we believe that a down-sloping cost curve is more common for social norms, cases also occur where the cost curve slopes up. Instead of gaining an advantage from acting like others, sometimes one gains an advantage from acting differently from others. Instead of safety in numbers, there is sometimes danger in numbers. For example, as wrongdoing increases, society may shift so many resources into punishing wrongdoers that the probability increases that a wrongdoer will suffer a sanction. Consider, for example, the case of drunk driving. It is a more pervasive problem in the U.S. than Israel, so police in the U.S. buys have state-of-the-art detection equipment that Israel

foregoes. Better equipment may make the likelihood of detection apparently higher in the U.S. than in Israel.

The fixpoint dynamics in this case where the cost curve slopes up are depicted in figure 5. If $x<x_1$, then the cost is lower than the WTP, so the number of violators increases. If, however, $x_1<x$, then the cost exceeds the WTP, so the number of violators decreases. According to these dynamics, $x=x_1$ is the unique equilibrium, and it is a stable one. When the cost curve slopes up and the demand curve slope down, the existence of a single stable equilibrium point implies that changes in the levels of compliance with the norm will be smooth and gradual as the social environment changes.
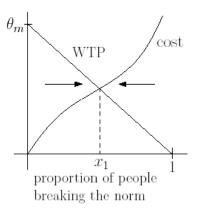

Figure 5: The intersection point of the two curves is the unique equilibrium.

Pessimism Bias

Now we use our model to analyze the two biases that we already described. The pessimism bias suggests that the individual's perception about the fraction of people who break the norm is biased upwards. When individuals overestimate the percentage of people who break the norm, the cost curve shifts down, which Figure 6 depicts as the shift from the "real cost" curve to the "biased cost" curve. A downward shift in the cost curve causes a higher fraction of people to break the norm in equilibrium, as indicated by the shift in the stable interior equilibrium from x_1 to x_1^P. Thus moral pessimism causes a larger proportion of people to violate the norm.
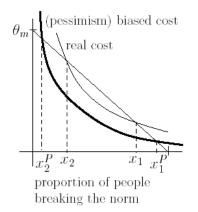
Figure 6: This figure demonstrates the effect of the pessimism bias. Under the pessimism bias, the cost curve shifts downwards, and consequently, the equilibrium x_1^P becomes higher. Additionally, the population will converge to x_1^P as long as the initial x lies above x_2^P.

Now consider the dynamics of convergence to the equilibrium. Specifically, consider the circumstances under which society converges to the corner equilibrium where no one breaks the norm. With pessimism bias, we need a higher fraction of people who initially comply with the norm in order to arrive at the equilibrium where no one breaks it. If the initial x lies below x_2^p and there is pessimism bias, the community will converge to the equilibrium $x=0$ where no one breaks the norm. For initial values of x in between x_2 and x_2^p, unbiased perception causes the community to settle where no one breaks the social norm, whereas biased perception causes the community to settle at x_1^p where most people break the norm.

In summary, pessimism bias has two effects on the equilibria:

- The equilibrium where no one violates the norm is less likely.
- The likely equilibrium is one where more people violate the norm.

Finally, consider the possibility that actors can reduce their own bias.

Consider the possibility that actors can obtain information to reduce or eliminate bias. Pessimism bias causes some actors to break the norm who objectively stood to gain more from conforming to it. A rational actor recognizes that bias can lead to costly mistakes, so he will pay to reduce his own bias. We will formulate how much a rational actor would pay to reduce his possible bias.

An actor's net benefit from conforming to a norm is normalized to equal zero. An actor's benefit from breaking the norm is θ_i, and the actual cost of breaking it is $1/x$, so his *actual net payoff* from breaking the norm is $\theta_i - 1/x$. Let x_i' denote person i's

perception of the fraction of wrongdoers. The actor's *perceived net payoff* from wrongdoing is θ_i-1/x_i'. Because of the pessimism bias, the perceived fraction of wrongdoers is higher than the actual fraction, $x_i'>x$, so the perceived net payoff from wrongdoing is higher than the actual net payoff. Thus pessimism bias causes some actors to break the norm who stand to lose from doing so.[40] Information that caused such an actor to switch from wrongdoing to rightdoing would save him $1/x - \theta_i$. Suppose that an actor knows that his perception might be biased. Let *q* denote the actor's subjective probability that receiving the information will cause him to switch from wrongdoing to rightdoing. He will be willing to pay for the information only if its cost, denoted *a*, is less than his expected savings from switching behavior,[41] that is, if:

$q(1/x - \theta_i) \geq a.$

Let $\overline{a}$ denote the most that anyone would pay for information.[42] If the information cost is higher than $\overline{a}$, then no one buys information and the equilibrium x_i^P based on biased perception will persist. As the price of information falls below $\overline{a}$, more and more actors buy and correct their bias. As the price of information falls to 0 for a population of rational actors, everyone will buy it, their bias will disappear, and society will approach the equilibrium x_1 based on accurate perception.   Figure 7 depicts the situation for a population of rational actors. If the cost of information is in the range between 0 and $\overline{a}$, the equilibrium will lie somewhere between x_1 and x_1^P.

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[40] By definition, the marginal actor's benefit from breaking the norm equals his perceived cost: $\theta_i=1/x_i'$. Consequently, pessimism bias causes the marginal actor to break the norm even though his actual net gain from doing so is negative.

[41] For example, assume that pessimism causes the perceived cost of norm-breaking to equal 1/2x, whereas the true cost is *1/x*. For the marginal actor, his WTP equals his perceived cost of breaking the norm: $_{i.}$ = 1/(2x).   The actual net payoff of the marginal actor from breaking the norm is *1/(2x)-1/x = -1/(2x) < 0*. If he did not break the norm, his actual net payoff would be 0. So he would gain from spending up to *-1/(2x)* to obtain information about the true cost of breaking the norm.

[42] Under reasonable assumptions, the marginal wrongdoer will ay the most for information. The marginal wrongdoer has the lowest value benefit θ_i among wrongdoers. Consequently, if q is non-decreasing in θ_i , which is reasonable, the marginal wrongdoer will pay more for than anyone else for information that might prevent him from making a costly mistake.
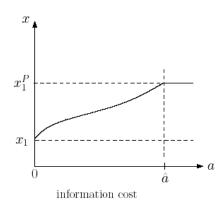
Figure 7: This figure demonstrates the effect of the information cost on the interior stable equilibrium. If the information cost is 0, then all the agents are informed about the true distribution, and therefore the original equilibrium x_1 is the only equilibrium. If, however, information cost is high, agents will not buy it, and the worse equilibrium x_1^P will persist.

Projection Bias

Now we turn from pessimism to projection. To establish a benchmark, consider the full information, unbiased population that converges to an equilibrium in which a fraction x breaks the norm. If full information causes an actor to break the norm, we say that he is inclined to be a wrongdoer. For such a wrongdoer, the benefit θ_i equals or exceeds his actual cost $1/x$ of breaking the norm: $\theta_i \geq 1/x$. Now introduce projection bias and see this value's change. Let x'_i denote person i's perception of the fraction of wrongdoers. By assumption person i is a wrongdoer, so projection bias causes i to over-estimate how many other people act the same as he does and break the norm. Thus we have

$$\theta i \geq 1/x \geq 1/x'_i$$

Bias thus increases the wrongdoer's perceived net benefit from violating the norm, so the wrongdoer does not change his behavior, although bias gives him a stronger reason to do what he does.

If, on the other hand, full information causes an actor to obey the norm, we say that he is inclined to be a rightdoer. For such a rightdoer, his benefit θ_i is less than his

actual cost $1/x$ of breaking the norm: $\theta_i < 1/x$. We introduce projection bias, which causes i to under-estimate how many other people act the same as he does: $x'_i < x$. We have

$$\theta_i < 1/x < 1/x'_i \, .$$

Bias thus increases the rightdoer's perceived net benefit from obeying the norm, so the rightdoer does not change his behavior, although bias gives him a stronger reason to do what he does.[44]

Combining Pessimism and Projection

What happens when each actor is inclined to both biases? The answer is different depending on whether the actor would do wrong if he knew its actual cost. For such wrongdoers, both pessimism bias and projection bias increase the perceived gain from wrongdoing, so they reinforce each other and wrongdoers persist. For rightdoers, pessimism bias increased the perceived net gain from wrongdoing, and projection bias decreases it, so they undermine each other. Depending on the larger effect, they may persist in rightdoing or switch to wrongdoing. Thus when both biases combine, wrongdoers do not change their behavior and some rightdoers may switch to wrongdoing, so the aggregate level of wrongdoing may increase and will not decrease. Any increase in the aggregate number of people who do wrong is due to moral pessimism bias, not to projection bias.

IV. Model Applied to Empirical Literature

We will apply our model to some leading psychological studies of individual bias in order to predict their effects on aggregate behavior. Our applications will clarify sound reasoning and criticize faulty reasoning in these studies.

Trade Secrets

One of this article's authors gave questionnaires to engineers in Silicon Valley concerning trade secrets. The questionnaires asked each person whether or not he would violate trade secrets law, and then asked the frequency with which he thought that other people violated trade secrets laws. 44.8% of the participants in the study said that they

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[44] We do not discuss projection bias in a person who is equipoised between rightdoing and wrongdoing. Presumably such a person arbitrarily chooses whether to do right or wrong, and projection bias makes him assume that others make the same choice, thus increasing his commitment to a choice that was originally arbitrary.

were more likely than not to violate trade secrets law, but they estimated on average that 57% of the employees in their company would violate trade secrets law. When asked about the proportion of employees in Silicon Valley in general who would violate the trade secrets law, the average answer was 68%.

Pessimism bias would produce such a gap in results.[45] Our model predicts that moral pessimism bias would lower the perceived cost of disclosing trade secrets. In terms of Figure 5, the perceived cost curve lies below the actual cost curve. Consequently, moral pessimism bias causes more disclosure of trade secrets. Equivalently, fewer people would disclose trade secrets laws if they knew the true level of illegal disclosure. In these circumstances, accurate reporting of the frequency of norm violations should cause fewer of them. The effect of accurate reporting is presumably stronger when cognitive processes cause bias, and the effect is presumably weaker when motivational processes cause bias.

The survey also found that the longer a worker spends in Silicon Valley, the more he feels justified in disclosing trade secret. Perhaps people change their beliefs to align with their misperception of the facts -- they accept the morality of the actual as they misperceive it. [46]

The gap between self-reported and perceived disclosures of trade secrets differed systematically across types of people. Those who reported that they were more likely to disclose secrets estimated that a relatively high percentage of other people disclose secrets, and those who reported that they were less likely to disclose secrets estimated that a relatively low percentage of other people disclose secrets. Social projection would produce these results. Our model predicts that social projection would *not* cause more people to disclose trade secrets. Consequently, providing information to correct the bias will not change the number of people who disclose trade secrets. Social projection, however, might cause those people who disclose trade secrets to do so more often. In

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[45] Interestingly, when the question has focused on the most severe type of trade-secret violation – intentional downloading of confidential know-how, only 20% said that they would download trade secrets and use it in a different company, but the participants believed that 43% of their peers would do so, and that 62% of the employees in Silicon Valley would do so.

[46] For a discussion of the concept of 'conventional morality and the relationship between perceived norms and morality, see for example, JA Wood, JG Longenecker, JA McKinney, CW Moore , Ethical attitudes of students and business professionals: A study of moral reasoning, 7(4)Journal of Business Ethics 249, 1988

addition, social projection increases the resolve of people who disclose trade secrets; so increasing the severity of the punishment will be less effective in deterring them.

Tax Evasion[47]

Psychologists have investigated the connection between the willingness of people to pay taxes and their perception of tax evasion by other. [48] A study of Australian taxpayers found a discrepancy between what the individual does and what he thinks others are doing. [49] Moral pessimism bias would produce the observed discrepancy.[50] According to our model, moral pessimism will cause fewer taxpayers to comply with the law.

A longitudinal study of Australian citizens that used a cross-lagged panel analysis found that taxpayers' personal views of the morality of tax compliance affect their perception of the levels of tax compliance by others.. Those with high personal standards of tax compliance perceived relatively more compliance by others, and those with low personal standards perceived relatively less tax compliance by others. These results are consistent with social projection bias. According to our model, social projection bias will not affect the number of taxpayers who comply with the law, but it may cause tax avoiders and evaders to comply less, and it should make all taxpayers more reluctant to change their behavior.

This study show how people respond to information exposing their biases. Researchers were able to monitor people's actual tax files. Some sub-groups were given information about the gap between their own behavior and the behavior of others. Receiving information on the behavior of others caused more tax compliance in some forms, such as the amount of deduction claimed. This fact is consistent with our

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[47] *See* Michael Wenzel, *Motivation or Rationalization? Causal Relations BetweenEthics, Norms and Tax Compliance*. Journal of Economic Psychology. 2005

[48] For a discussion of the concept of conditional cooperation see Tyran and Feld (Jean Robert Tyran and L.P. Feld, *Why People Obey the Law: Experimental Evidence from the Provision of Public Goods,* Cesifo Working Paper No.651(2) (2002). For an illustration of the importance of conditional cooperation in the context of tax compliance is John Scholz & Mark Lubell, T*rust and Taxpaying: Testing the heuristic Approach*, 42 AMERICAN JOURNAL OF POLITICAL SCIENCE 398 (1998).
[49] Michael Wenzel, Misperception of Social Norms about tax compliance: from theory to intervention, 26 journal of Economic Psychology (2005) 862-883
[50] Although in that study, the psychological cause they focused on was the pluralistic ignorance phenomenon.

prediction that disseminating accurate information will cause more rightdoing when actors suffer from moral pessimism bias.

Drinking, Drugs, Smoking

A series of studies show that college students perceive their peers as less critical of heavy drinking than they actually are. The actor's perceived cost of heavy drinking, consequently, is less than its actual cost. Since the perceived cost curve lies below the actual cost curve, as in Figure 5, our model predicts more heavy drinking than would occur if students perceived costs accurately.

One of the studies tracked how attitudes developed over the course of two months among college freshmen and discovered gender differences. Male students adjusted their personal attitudes over time to match more closely the perceived consensus.   After the adjustment, actual attitudes among males were closer to perceived attitudes. In terms of Figure 5, the actual cost curve shifted closer to the perceived cost curve. These facts suggest that providing information to correct misperception at the beginning of the semester would reduce heavy drinking more than if the information were provided at the end of the semester. With female students, attitudes remained stable, so the timing of the information should make less difference to their behavior.[51]

Given multiple equilibria as in Figure 3, the initial proportion of wrongdoers can affect the equilibrium. In Figure 3, an initial proportion of wrongdoers below x_2 will cause their numbers to fall approximately to zero, whereas an initial proportion of wrongdoers above x_2 will cause their numbers to rise to x_1. Perhaps more male students drink heavily when they arrive as freshmen, which causes the system to settle at a high level of drinking among males. Conversely, perhaps fewer female students drink heavily when they arrive as freshman, which causes the system to settle at a low level of drinking among females.   These hypotheses require testing.

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[51] Subjects' ratings of personal comfort with Princeton drinking norms as well as estimates of their perceptions of the average students' comfort level were taken at two separate points separated by a 2 months. The results indicated that men behaved in accordance with social influence theorist expectations in that they changed their own attitudes in the direction of the social norm. Indeed, personal average comfort among men in September was 5.84 with perceived average student at 7.48. In December, men's personal comfort with drinking norm jumped to 7.08, with perceptions of average student comfort level remaining relatively stable at 7.58. Women, on the other hand, showed no change in personal attitudes over time, save for a slight inflation of perceived average student comfort from 7.16 to 7.74.

Now we turn to studies on drug use. In a classical study, a sample of adolescents was divided into three groups: nonusers, cannabis-users, and cannabis and amphetamine users. [52] The perceptions of members of the three groups differed significantly from each other.[53] Compared to nonusers, drug-users gave relatively high estimates of the number of users. These results are consistent with social projection. Researcher proposed two psychological causes of projection. First, the number of arguments that we hear for or against something affects our attitudes towards it and we hear more arguments from people inside our group than from outsiders. Accurate information should help to correct this cognitive bias. Second, the members of each group were motivated to see their own behavior in others. Accurate information is probably not enough to correct this emotional bias.

The authors concluded that projection bias would cause over-use of drugs, which contradicts our model. Our model does predict that projection bias will entrench existing behavior among the three groups of people and make it harder to change.

Turning to smoking, researchers surveyed 916 junior high school students in Grade 7 and two years later in Grade 9.[54] 7th graders who smoked thought that relatively more people smoke, and 7th graders who did not smoke thought that relatively fewer people smoked.[55] Specifically, adolescents who were most involved with smoking believed that half or more than half of all adults or peers smoked, while those least involved believed that fewer than half of adults or peers smoked. Projection bias could explain this data.

Students in 9th grade were more likely to smoke than in 7th grade. The study showed *which* 7th grade non-smokers were likely to become 9th grade smokers. Specifically, non-smokers in the 7th grade who thought that others smoke were relatively

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[52] *See* Sandy Wolfson, *Students' Estimates of the Prevalence of Drug Use: Evidence for a False Consensus Effect,* 14(3) Psyc. Add. Beh. 295 (2000).

[53] nonusers: M = 37.23%, cannabis users: M = 44.38%, and amphetamine users: M = 54.22%.

[54] *See* G.J. Botvin, E.M. Botvin, E Baker, L. Dusenbury, & C.J. Goldberg, *The false consensus effect: predicting adolescents' tobacco use from normative expectations*, 70(1) Psyc. Rep. 171 (1992).

[55] The use of longitudinal and cross sectional design allows the authors to speak of causality, although they use correlation-based analysis. .

likely to smoke became smokers in the 9th grade. Thus the non-smokers who failed to project their behavior onto were likely to become smokers. In contrast, 7th graders who thought that others do not smoke were relatively unlikely to smoke themselves in the 9th grade. Thus non-smokers who projected their behavior onto others were unlikely to become smokers. These facts are consistent with our conclusion that projection bias stabilizes behavior.

From these facts, the authors of the study concluded that projection bias caused the increase in smoking. If our model is correct, their conclusion is mistaken. According to our model, projection bias does not change the number of wrongdoers, but it increases the stability of behavior. We predict that providing accurate information about actual smoking to 7th grader non-smokers would reduce their resistance to smoking, and providing accurate information to 7th grade smokers would reduce their resistance to quitting.

Altruistic Behavior and Water Conservation

A tropical storm caused a water shortage in east coast of the United States in 1999. Princeton University imposed a ban on showering for the first 3 days of the water crisis.[56] Princeton psychologists surveyed students for self-reported and perceived showering.[57] During the ban, students estimated that others took more showers than implied by self-reports -- 47% versus 33% on day 2, and 56% versus 47% on day 3. Moral pessimism bias would have produced this gap, and according to our model, this bias should have increased the amount of showering. If the ban persisted until equilibrium was reached, it might have been at a point like x_1 in Figure 3 where almost everyone violates the norm. Our model predicts that accurate information would have slowed the rate of increase in showering and reduced the amount of wrongdoing in the final equilibrium.

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[56] *See* Benoit Monin & Michael I. Norton, *Perception of Fluid Consensus Bias, False Consensus, False Polarization and pluralistic ignorance in a Water Conservation Crisis*, 29(5) Pers. & Soc. Psyc. Bull. 559 (2003).

[57] For the relationship between self-reported behavior and actual behavior, s*ee* N. Epley & D. Dunning, *Feeling "Holier Than Thou": Are Self-Serving Assessments Produced by Errors in Self – or Social Prediction?* 79 J. Per. & Soc. Psyc. 861 (2000).

As soon as the ban was lifted, other students were seen as taking fewer showers than implied by self-reports -- 70% versus 77% on day 4, 72% versus 84% on day 5. This fact is consistent with the theory that moral pessimism only applies to morally relevant behavior. Not showering ceased to be altruistic (or, perhaps showering became altruistic) after the ban was lifted.

In another study on altruism, subjects were asked whether or not they would perform hypothetical acts to help others, such as aiding an aging couple stranded in a storm with a flat tire, and whether or not they thought that other people would perform those acts.[58] The study found a gap suggesting moral pessimism. Pessimism was greatest for people who reported that they would not help others, which suggests social projection. Similarly, in the context of blood donations, Goethals found that 60% of a student sample said they would be willing to donate blood but estimated that only 39% of heir peers would do so.[59] In contexts like these, people have difficulty getting information about actual behavior, so bias is likely too have long-term effects. These studies would be more valuable if they predicted the effect of bias on actual behavior and tested their predictions.

V. Conclusion

When psychologists find perceptual bias in individuals, they often lack the analytical tools to predict the effects on aggregate behavior. Conversely, economists have the analytical tools to predict aggregate behavior, but not the experimental tradition for discovering perceptual bias in individuals. We combine the psychology of bias and the economics of equilibrium to predict how psychological biases affect aggregate behavior. Policy makers care about the consequences of individual bias for aggregate behavior. Combining individual bias and aggregate behavior should increase the usefulness of social science to policy makers.

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[58] *See* G. R. Goethals, *Fabricating and ignoring social reality: Self-serving estimates of consensus.* In Relative deprivation and social comparison: The Ontario symposium (Vol. 4, pp. l35-l57). Hillsdale, NJ: Erlbaum. (l986).

[59] id,

We focus specifically on two fundamental biases relevant to law and norms -- moral pessimism bias that causes individuals to overestimate wrongdoing by others, and social projection bias that causes individuals to overestimate how many other people act like they do. "Safety in numbers" causes the cost function to slope down, which can cause multiple equilibria. Moral pessimism bias reduces the probability the society will settle into a good equilibrium instead of a bad one. In addition, pessimism makes the relatively good equilibrium worse in the sense that fewer people comply with the norm. In contrast, social projection bias strengthens each person's belief in what he is doing, which increases the equilibrium's stability without changing aggregate behavior. We hope that our analysis will help psychologists to reason more precisely when making aggregate predictions and drawing policy conclusions from studies of individual biases. We also hope that our analysis will make economists take psychological bias more seriously and to recognize that social norms result in multiple equilibria.