Declining Moral Standards and The Role of Law

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November 7, 2014

Abstract

This paper examines how moral rules form in the process of social learning in order to analyze the relationship between legal rules and moral rules. Members of society learn morality from the observed behavior of other members. Their incentive to act morally is influenced by their expectation of other members' moral behavior. The moral standards of a society are built on the outcomes of such interactions over time. I show that moral standards can quickly deteriorate even if the majority of the members have a strong moral sense individually. When insufficient moral sanctions for wrongful actions are observed, the members form a belief that the society’s moral standards are lower than what they had expected. Such a belief encourages more wrongful actions and results in less incentive for the members to act morally. As the moral standards decline, moral rules may not be able to regulate behavior. Legal sanctions can prevent such a decline as they offer an objective and time-invariant level of expectation for the enforcement of rules. Hence, morality is less likely to degenerate in the presence of legal rules. I discuss how strong morality can enhance the effectiveness of law enforcement, in turn.

JEL Classification Numbers: K00, D82
Keywords: dynamics of moral rules, law, Bayesian inference, social learning.

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1 Introduction

Morality is learned from social interactions. Shavell (2002) writes

\[ \text{the establishment of moral rules [...] comes about in part through a complex process of socialization, learning, and inculcation. When a child is raised by his or her parents, plays with peers, attends school, and the like, the child absorbs many lessons and turns out to feel guilty about certain behaviors and virtuous about others. Along with these lessons the child learns to reproach bad behavior and compliment the good. (p. 231)} \]

Unlike law, moral rules are intrinsically implicit and subjective because each person’s moral values, which constitute society’s rules, are individual and private information. For example, our guilt about stealing is what we feel individually, though we learn it from education or experiences with other people. How bad it feels differs by person, and only we know how bad we feel about stealing. More importantly, we do not know exactly how other people feel about stealing. Thus, we do not know exactly how seriously people in general would like to punish stealing if we were to steal something. Our expectation of the social enforcement of moral rules is based on our belief of the social standards, i.e., the collective values of other people’s morality. We infer other people’s moral standards from their actions. We expect that we will be punished severely if other people have strong principle against stealing. If they don’t, we will not need to worry about social punishment. We update our belief based on what we observe of others’ behavior. Such experiences reshape our belief about the social standard. This, in turn, determines our behavior toward stealing and a thief whom we might encounter in the future.

Because each person’s moral value is private information and members of society learns morality from each other, moral rules differ between different groups of people. For example, in some countries, dog fighting is considered to be immoral and to violate animal rights, whereas this is not so in other countries.\(^1\) For the same reasons, moral rules evolve and adapt over time in the process of inter-generational interactions. There is abundant evidence of time-varying morality. Adultery, pornography, and

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\(^1\)Currently, dog fighting is unlawful in the US, and often is a felony in many states. However, it is a legal and popular sport in Japan and Pakistan.
prostitution have been considered not only immoral, but also illegal for a long time. However, people are more tolerant today of adultery, and are even more lenient toward pornography and prostitution.

This paper shows that because of the nature of flexible adaptation and evolution, moral rules may easily become powerless to regulate behavior. I first prove that, indeed, a society's moral standards can easily decline, as is believed by many. This model highlights that what facilitates the decline is imperfect "social learning" when the members of a society can infer the social standard only on the basis of the "observed" actions of others. The observed actions may not be perfectly correlated with the members’ true moral values, and thus, they can misrepresent the underlying moral standards of the society. Such misrepresentation will accelerate if there are a few more slight misrepresentations and inadequate moral sanctions.

Consider shoplifting, for example. According to the National Association for Shoplifting Prevention, "more than $13 billion worth of goods are stolen from retailers each year," and "the vast majority of shoplifters are "non-professionals" who steal, not out of criminal intent, [...] but as a response to social and personal pressures in their life." Although stealing is illegal and immoral, the shoplifters are caught only "once in every 48 times they steal. They are turned over to the police 50 percent of the time."2 Thus, as there is no enforcement of rules, more and more shoplifting occurs. The teens learn from each other that shoplifting is okay, as long as they don’t get caught. This example shows how easily the moral sense of a person about a wrongful action can become hazy due to social influence when the majority of people around the shoplifters condone the act.

I show that the existence of a legal sanction prevents such degeneration of morality brought about by the social learning process. A legal sanction sets an "objective," lower bound for the expected punishment. As a result, the impact of social learning becomes less important in shaping the expected moral standards for members of society. In turn, this slows the decline of moral standards, which leads to fewer offensive behaviors and, thus, fewer chances of further misrepresentation. Therefore, if the moral standards can decline quickly, as in the case of shoplifting, having legal sanctions greatly helps to regulate behavior.

While there are numerous studies of social norms and morality,3 economic analyses

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2 www.shopliftingprevention.org
3 For examples of economic analyses of morality, see Frank (1987), Hirshleifer (1987), Berheim

This paper revisits the discussion of the difference between morality and law in regulating conduct in Shavell (2002), by incorporating the impact of social learning on the dynamic formation of morality. Shavell (2002) compares the two in the social costs of enforcement and the effectiveness in controlling behavior. He argues that, if the expected private gain from undesirable action and the expected harm due to the conduct are large, it is optimal to have law supplement morality and, if morality does not function well, law alone is optimal.

In contrast, I focus on the dynamic aspects of moral rules in explaining their relationship with laws. In particular, I emphasize that the costs of moral enforcement are not fixed. Individual costs of taking moral actions are inter-dependent and change over time as people’s willingness for moral actions changes.

Shavell (2002) describes several reasons why moral rules and legal rules can complement each other. The results in this paper show that the complementarity of legal rules and moral rules is much greater when we consider how external incentives of moral rules are dynamically influenced by the existence of legal rules. Moreover, since legal sanctions play an important role in keeping the moral standards from degenerating, an attempt to separate what should belong to the realm of morality and what to law can be potentially harmful by provoking moral degeneration that leads to absence of order entirely. The results of the paper suggest that, in many cases where the outcome from the demise of moral rules is dire, we may need laws, even if the laws are not actually enforced often, to keep our moral sense from being swayed and dispelled without any clear coordinates.

This paper explicitly models how individuals’ moral incentives are influenced by the public support or blame that they expect to receive for their actions, apart from their own conscience. With strong public moral support, an individual’s cost of taking an immoral action is higher and that of taking action against someone else’s immoral action (e.g. blaming him) is lower. Individuals infer public moral standards based on their observations of their neighbors’ actions, from which they estimate their cost of acting morally. They adjust their behavior according to the expected cost. This process of Bayesian updates in one’s belief of public morality is built on the framework

of information cascades in Bikhchandani et al (1992).\textsuperscript{4}

In this framework, people are uncertain of the true distribution of morality of society’s members. This implies that there is no reason to believe that current moral rules are either absolutely right or wrong. This framework sheds light on the question of what "should be" legal/moral rules to regulate people’s behavior, especially when it is unclear at the present time how much social costs the rules impose on people and how the rules would alter people’s behavior in the dynamics of social interactions and the way a society organizes itself. I argue that the rules, especially laws, are our commitment to a certain way of regulating the behavior of the members of a society, in the spirit of the argument by Honoré (1993) in the case of "moral conflicts." For this reason, morality and law can never be solely derived from the majority opinion as was evident in the case of slavery which was legal for a substantial period before it was completely banned. We discuss the implication of the recent repeal of adultery statutes in Colorado in this context.

The remainder of this paper is organized as follows. Section 2 presents our basic framework of morality formation, external incentives, Bayesian inference and update of public morality, and declining moral standards. In Section 3, I analyze the role of legal sanctions. In Section 4, I discuss the implication of declining morality when law enforcement depends on people’s willingness to become involved in the enforcement. Section 5 concludes.

\section{The Model of Moral Incentives and Rules}

Suppose at each period \( t \), nature randomly draw one individual \( I \) and \( N \) neighbors of \( I \) from the population.\textsuperscript{5} Nature presents \( I \) with an opportunity to take an offensive, immoral, action \( A \) (i.e. an action that imposes negative externalities on others).

\textsuperscript{4}There have been several applications of this framework of information cascades to the study of law. For example, Daughety and Reinganum (1999) model herding behavior by appeals courts in the process of Bayesian updates about a supreme court’s interpretation of the law.

\textsuperscript{5}The neighbors are the boundaries of the society that matters to \( I \). Each time when \( I \) decides whether or not to take \( A \), the selection of \( N \) occurs randomly and independently across the time in the society. The neighbors may be strangers or acquaintances to \( I \) in each period. The society can be narrowly defined as a school that \( I \) attends, or widely defined as a country in which \( I \) lives. In each period, \( I \) may or may not be the same person. If \( I \) passed the chance to commit a wrongdoing in the past, even if the chance arises again, the same choice may occur and thus, wrongdoing is never observed. However, if \( I \) takes the chance, depending on how the neighbors react, it may happen again if \( I \) receives the chance of a wrongdoing again or never be repeated again.
I's motivation to refrain from taking such an action depends on how strongly he feels about the offensiveness of the immoral action \( A \) ("internal incentive" following Shavell [2002]), and the expected punishment for the action by the society to which he belongs ("external incentive" following Shavell [2002]). If \( I \) takes the action \( A \), each of \( \mathcal{N} \) neighbors chooses either to publicly condemn the action (which is sometimes followed by an act of punishment) or to silently condone it. At \( t \), for choosing \( A \), \( I \) receives a benefit \( b \) at the cost of moral anguish \( m_{it} \), and legal sanctions, \( s \), with a probability of \( r \), if any. Let \( m_{it} \) be the personal moral cost of \( I \) chosen at \( t \). The moral cost \( \tilde{m}_{It} \) for \( I \) at \( t \) is the weighted sum of \( m_{it} \) and the external incentive \( M_t \). That is, \( \tilde{m}_{It} = (1 - w)m_{it} + wM_t, \ w > 0 \). The external incentive \( M_t \) is the level of public condemnation (and punishment) that \( I \) expects to receive from his neighbors upon choosing \( A \). \( I \) estimates \( M_t \) based on his past experiences and observations of how society has responded to another similar offensive event \( A' \) in the past. Specifically, at each period \( t \), \( I \) has a learned expectation of

\[
M_t = m \cdot E(N_t|\Omega_t),
\]

based on his observations of people’s past responses and all of available information \( \Omega_t \) until period \( t \), where \( m > 0 \), \( E(N_t|\Omega_t) = \sum \beta_{jt} \), and \( \beta_{jt} \) is the pure strategy variable of \( j \in \mathcal{N} \) at \( t \) such that \( \beta_{jt} = 1 \) if neighbor \( j \) condemns, whereas it is 0, otherwise. Roughly speaking, \( E(N_t|\Omega_t) \) is the expected number of neighbors who would condemn and punish \( A \) if \( I \) takes the action. For a given \( E(N_t|\Omega_t) \), \( I \) chooses \( A \) if and only if

\[
b - rs - [(1 - w)m_{it} + wM_t] \geq 0, \ \text{or} \nonumber
\]

\[
m_{it} \leq \frac{b - rs}{(1 - w)} - \frac{wm}{(1 - w)}E(N_t|\Omega_t). \quad (2)
\]

Other things being equal, \( I \) is more likely to choose \( A \) as the legal sanction \( s \) decreases. Similarly, if expected public moral standards \( M_t = E(N_t|\Omega_t) \) decline, \( I \) has less incentive to refrain from taking \( A \).

Often, the public’s willingness to "get involved" in others’ situation and to take action against offensive behavior deters crime more effectively than the law does. This is particularly true for crimes that are in progress because public moral enforcement \( M_t \) lowers the probability of successfully committing the crimes. In contrast, law can
be only in effect *ex post*. For example, in the case of the murder of Kitty Genovese (1964), the perpetrator had left her wounded, but alive, after the first attack upon hearing the neighbors’ response. However, he returned and completed the murder and rape after observing that no one was coming forward to help her. If there had been a timely and adequate response by the neighbors, the perpetrator would not have been able to complete his criminal acts. Hence, sufficient moral responses by the public are often the most effective means to prevent crimes (or the completion of criminal acts).

The key element of this model relies on the fact that the formation of the public moral standard $M_t$ is *social*. Each member learns the moral values from his or her parents, teaching, and observing other persons’ responses to offensive actions. This implies that each person’s moral incentive is dynamically adapting through learning.

We show that social learning often may be inefficient. This is because members of a society cannot observe other members’ moral values, but only observe their "actions," which may not perfectly reveal their moral values. Hence, there can be a slight misrepresentation of the neighbors’ underlying moral standards. In the learning process based on Bayesian inferences about the members’ moral values, if such a misrepresentation lowers expected public moral support and each member’s incentive for doing a moral action, there will be more observations of immoral actions. Such a decline in morality accelerates as more persons remain silent about the immoral actions of others, reluctant to act upon their moral values without sufficient public support. This can occur even if the majority of the members of the society are strongly moral.

### 2.1 External Incentives

What determines the external incentives, i.e., $E(N_t | \Omega_t) = \sum \beta_{jt}$? That is, what makes the neighbors or members of a society interested in enforcing moral standards by having a say about an action taken by another person, $I$? In this section, we consider the decision to condemn $I$’s action $A$ by the neighbor $j$ chosen at $t$, $\beta_{jt}$.

For $j$ chosen in period $t$, $jt$, given that there is no explicit rule that requires one to have a say regarding someone else’s action, the benefits from criticizing $A$ is only implicit. There is a personal reward that $jt$ receives from being truthful to what she believes in. The personal reward for keeping the moral value is greater if there is a
strong support from other members of her society. Thus, there are two elements of a neighbor’s incentive to personally "get involved" in enforcing moral rules. These are the neighbor’s own personal moral value $m_{jt}$ and her expectation of social support for her action.

Observing an offensive action by another person, condoning it causes neighbor $jt$ to suffer moral anguish $m_{jt}$. We assume that $m_{jt}$ is independent, private to $jt$, and unobservable by others. Now consider the cost of taking a public "action" against $A$. It costs $C_{jt} = c(1 - \sum_{t \neq j} \beta_{lt}/N)$ for $jt$ to publicly condemn $A$ and take a necessary action, where $\sum_{t \neq j} \beta_{lt}$ is the level of support from other neighbors $lt \neq jt$, i.e., the total numbers of $lt$ who concur.\(^6\) Thus, a person’s decision to take a public moral action costs $c$, which decreases if many other people concur. If $jt$ remains silent about the action, however, she does not incur $c$ but only suffers from a personal moral anguish, $m_{jt}$\(^7\).

Then, each neighbor $jt$ condemns the action $A$ if her own $m_{jt}$ is high or if she expects that many other people $lt$ will condemn $A$ (i.e., a high $\sum_{t \neq j} \beta_{lt}$). That is, $jt$ condemns $A$ if and only if

$$m_{jt} > c \left(1 - \frac{\sum_{t \neq j} \beta_{lt}}{N}\right)$$

$$\Leftrightarrow \sum_{t \neq j} \beta_{lt} > \bar{\beta}_{jt} = \frac{(c - m_{jt})N}{c}.$$ (3)

Similar to $jt$’s problem, whether another neighbor $l$ would be willing to condemn $A$ depends on his own $m_{lt}$ and the expected probability that $jt$ would condemn $A$ as well. If $jt$ decides to condemn $A$, then any $lt$ with $m_{lt} > m_{jt}$ would make the same choice of condemning $A$.

The problem is that neighbor $jt$ only observes her own moral cost $m_{jt}$ and not those of the others $m_{lt}$. More specifically, $jt$ does not know how many neighbors have an $m_{lt}$ that is higher than her own $m_{jt}$ and, thus, how many neighbors would take the same action if she condemns $A$. What this implies is that, for example, she may feel

\(^6\)In this framework, public support can be either guilt or virtue (see, Kaplow and Shavell [2007]).

\(^7\)In the model, we only consider two choices, condemnation or silence. Although $j$ may also choose to publicly "approve" the offensive action, such a choice is always dominated by silence, as it is, in the end, an offensive action. Thus, even if $j$ expects to receive great support for not condemning the action, the dominant strategy is to be silent rather than to actively support the action.
bad about cheating according to her own $m_{jt}$, but does not know if many others feel the same way. In addition, she does not know whether she feels bad because she has a higher moral standard than others, or because she is one of the many normal people. In the former case, she would not expect many persons to condemn cheating. In the latter case, however, she would expect that many other persons would condemn if she does.

Therefore, $jt$ needs to know the "relative standing" of her own $m_{jt}$ in the population distribution of morality. She does not know whether her $m_{jt}$ is in the lower tail or in the upper tail of the distribution. Thus, she is unsure of the fraction of her neighbors whose moral values are higher than her own. If she knows the "distribution" of others' $m_{lt}$, she can infer the fraction based on the information of her own $m_{jt}$ and the likelihood that she would receive support. Therefore, the uncertainty that each member of society faces in determining their moral action reduces to an uncertainty about the true distribution of the population moral values.

### 2.2 Uncertainty in Public Moral Standards

To model the members’ uncertainty about the true population distribution, suppose that the true population cumulative density distribution (cdf) of morality $\tilde{m}$ is either $F_1$ with a mean of $\mu_1$ or $F_2$ with a mean of $\mu_2$, where $\mu_2 > \mu_1$, without loss of generality, and $F_1$ and $F_2$ are continuous on $\tilde{m} \in [\underline{m}, \overline{m}], \underline{m} \geq 0$. Let $\phi(\tilde{m}) = \frac{f_2(\tilde{m})}{f_1(\tilde{m})}$ be the ratio between the two pdfs $f_2(\tilde{m})$ and $f_1(\tilde{m})$. We assume Monotone Likelihood Ratio Property for the ratio, i.e., $\phi(a_1) \geq \phi(a_2)$ for $a_1 \geq a_2$. Then, the MLRP implies that $F_2$ first order stochastically dominates $F_1$. Let $p > 0$ be the prior probability that the true distribution is $F_1$.

To see how the inferences of public moral standards are made, consider a case in which the true distribution is $F_1$ and this information is common knowledge. Suppose that there exists an $m_1$ such that at $m_1$, we can define an integer $N_1$ that satisfies $N_1/N = 1 - m_1/c = 1 - F_1(m_1)$ and, thus, $m_1 = cF_1(m_1)$. Similarly, we can define $m_2$.

**Assumption 1** $\overline{m} > c$.

Assumption 1 implies that $\overline{m} > cF_d(\overline{m})$, for $d = 1, 2$. Therefore, from (3), even if $\sum_{l \neq jt} \beta_{lt} = 0$, there will be some $jt$ whose personal moral value is too high to be silent about it. Let $m^*_d$ be the largest value of $m_d$, $d = 1, 2$.  

9
Lemma 1 If it is known that the true distribution of population \( m \) is \( F_d, \ d = 1, 2 \), then \( N'_d/N \) fraction of people condemn \( A \), where \( N'_d/N \) satisfies \( N'_d/N = 1 - m'_d/c \), and \( m'_d \) is the largest value that satisfies \( m_d = cF_d(m_d) \).

Proof. All proofs are provided in the Appendix.

Lemma 1 implies that, if the true distribution is \( F_1 \), all the neighbors \( lt \) with \( m_{lt} > m'_1 \) condemn \( A \) under the expectation that there would be moral support from \( N'_1 \) people, and the expectation is correct because for any \( m_{lt} > m'_1 \), \( 1 - F_d(m_{lt}) > N'_1/N = (c-m'_1)/c > (c-m_{lt})/c \). For any \( m_{lt} < m'_1 \), \( 1 - F_d(m_{lt}) < (c-m_{lt})/c \), and the neighbor \( lt \) does not want to take a moral action even if everyone else with a higher \( m_{kt} > m_{lt} \) does. Knowing that a person with a lower \( m_{kt} < m_{lt} \) would be even less willing, the neighbor \( lt \) does not. Hence, the rational expectation is that only \( N'_1 \) people condemn \( A \). Thus, if everyone knows that the true distribution is \( F_d, \ d = 1, 2 \), when nature randomly draws \( N \) neighbors from \( F_d \), people expect that \( N'_d/N \) fraction of the neighbors whose morality value is in the range above \( m'_d \) will condemn. Since \( F_2 \) first order stochastically dominates \( F_1 \), \( m'_1 > m'_2 \). Thus, for the same immoral action, a larger fraction of people are expected to take moral actions if the true population distribution is \( F_2 \).

Now consider the interactions among \( N \) neighbors. At period 0, each neighbor’s conjecture is as follows. While they observe their own moral value only, if the neighbors are ordered by their moral values as \{\( m_{10}, m_{20}, ..., m_{N0} \)\}, where \( m_{10} > m_{20} > ... > m_{N0} \), they believe that there should exist an \( m_{N0} = c(1-E(N_0)/N) \). A neighbor \( j0 \) expects that any neighbor \( k0 \) with \( m_{k0} \geq m_{N0} \) would condemn \( A \) under the expectation that \( E(N_0) = \sum \beta_{j0} \) people would condemn \( A \). With this belief, the neighbor \( j0 \) condemns \( A \) if her \( m_{j0} > m_{N0} \). Since the fraction of people who condemn \( E(N_0)/N \) must be the ones with a moral value \( m_{j0} > m_{N0} \), the correct expectation is that

\[
E(N_0)/N = p(1 - F_1(m_{N0})) + (1 - p)(1 - F_2(m_{N0})), \quad (4)
\]

\[
m_{N0} = c \{ pF_1(m_{N0}) + (1-p)F_2(m_{N0}) \}, \quad (5)
\]

\(^8\)Given that \( jt \) needs to know the underlying population distribution only to evaluate the relative location of her own, known \( m_{jt} \), and \( m_{jt} \) can be of any value in the domain, \( jt \) does not gain any information from the realization of her own \( m_{jt} \) about the relative location of her \( m_{jt} \).
and such a $m_{N_0}$ exists. Then, the condition for $j_0$ to condemn $A$ is

$$m_{j_0} > c \{p F_1(m_{N_0}) + (1 - p) F_2(m_{N_0})\} = \hat{m}_0(p). \quad (6)$$

**Lemma 2**

1. For any given $p \in (0, 1)$, $m_2^* < \hat{m}_0(p) < m_1^*$ and, thus, $N_1^* < E(N_0) < N_2^*$.

2. Let $\hat{m}_t$ be $\hat{m}_0$ defined at $\hat{p}_t$, that is,

$$\hat{m}_t = c \{\hat{p}_t F_1(m_{N_t}(\hat{p}_t)) + (1 - \hat{p}_t) F_2(m_{N_t}(\hat{p}_t))\}, \quad (7)$$

where $m_{N_t}$ is a fixed point that satisfies $m_{N_t} = \hat{m}_t(\hat{p}_t)$. Then, as $\hat{p}_t$ increases $\hat{m}_t$ increases. $\hat{m}_t(\hat{p}_t) \to m_1^*$ as $\hat{p}_t \to 1$ and $\hat{m}_t(\hat{p}_t) \to m_2^*$ as $\hat{p}_t \to 0$.

### 2.3 Social Learning Dynamics

The social learning dynamics occurs in the members’ Bayesian updated beliefs of the true population distribution $\hat{p}_t = P(F = F_1|\Omega_t)$. For simplicity, for now, suppose that the moral values of $I$s are drawn from a separate, known distribution $G(m_i)$. This allows us to focus on the social learning process that occurs among the $N$ neighbors only. This assumption will be relaxed in the next section when we consider the role of law.

At $t = 1$, each member will observe the actual, realized actions by other members, $\hat{N}_0$, which may be greater or less than $E(N_0)$. This information of observed $\hat{N}_0$ will be used to infer whether the true distribution is more likely to be $F_1$ at $t = 1$. That is, the members form an expectation of $E(N_1|\hat{N}_0)$ based on the observed $\hat{N}_0$. If $\hat{N}_0 < E(N_0)$, at $t = 1$, the members expect that there is a higher probability that the true distribution is $F_1$, i.e., $P(F = F_1|\hat{N}_0) = \hat{p}_1 > p$. Similarly, the observation of $\hat{N}_1$ at $t = 1$, which may be greater or less than $E(N_1|\hat{N}_0)$, will be used to update their inference of the probability at $t = 2$, $\hat{p}_2$. If $\hat{N}_1 < E(N_1|\hat{N}_0)$, then $\hat{p}_2 > \hat{p}_1 > p$, for example, and so on. That is, in this case, the set of information $\Omega_t = \Omega(\hat{N}_{t-1}, \hat{N}_{t-2}, \hat{N}_{t-3}...)$ only consists of observed moral enforcement by the neighbors over time.

Since (4) and (5) are defined for any $p$, for $p = \hat{p}_t$, we can define $E(N_t|\Omega_t)$ as
follows.

\[
E(N_t|\Omega_t) = E \sum (\beta_{jt}|\Omega_t) = \mathcal{N} [\hat{p}_t(1 - F_1(m_{N_t})) + (1 - \hat{p}_t)(1 - F_2(m_{N_t}))]; 
\]
(8)

From Lemma 2, \(\hat{m}_t\) increases as \(\hat{p}_t\) increases. Thus, \(E(N_t|\Omega_t) = \mathcal{N} [1 - \hat{m}_t/c]\) decreases as \(\hat{p}_t\) increases. From (2), \(I\) chooses \(A\) if and only if \(m_{it} \leq \frac{b - rs}{(1 - w)} - \frac{wm}{(1 - w)}E(N_t|\Omega_t),\)

i.e.,

\[
m_{it} \leq \frac{b - rs}{(1 - w)} - \frac{wm}{(1 - w)}\mathcal{N} [\hat{p}_t(1 - F_1(m_{N_t})) + (1 - \hat{p}_t)(1 - F_2(m_{N_t}))] 
\]
(9)

If the true distribution is \(F_2\), there is a wrong information cascade when \(\hat{p}_t \rightarrow 1\). What facilitates such a wrong information cascade? What is the role of legal rules in this context? The main analysis of this paper focuses on the answers to these questions.

2.3.1 At \(t = 0\)

\(I''\)’s behavior From (7), \(I\) chooses \(A\) if

\[
m_{i0} \leq \frac{b - rs}{(1 - w)} - \frac{wm}{(1 - w)}E(N_0), 
\]
(10)

where \(E(N_0) = \mathcal{N} [p(1 - F_1(m_{N_0})) + (1 - p)(1 - F_2(m_{N_0}))] = \mathcal{N} [1 - m_0/c].\)

Neighbors Neighbor \(j\) condemns \(A\) if

\[
m_{j0} > c - \frac{c}{\mathcal{N}}E(N_0). 
\]
(11)

Suppose that \(\hat{N}_0\) people were actually observed to act against the immoral action \(A\) at the end of the period \(t = 0\). Since \(N_1^* < N_2^*\), if \(\hat{N}_0 < E(N_0)\), this implies that \(P(\hat{N}_0|F_1) > P(\hat{N}_0|F_2)\). Similarly, if \(\hat{N}_0 > E(N_0)\), the updated belief uses that \(P(\hat{N}_0|F_2) > P(\hat{N}_0|F_1)\).
2.3.2 At $t = 1$

Suppose that $A$ was taken and it was observed that $\widehat{N}_0 < E(N_0)$ (The argument is symmetrically applied to the case of $\widehat{N}_0 > E(N_0)$). Then,

$$\hat{p}_1 = P(F = F_1|\widehat{N}_0) = \frac{p \cdot P(\widehat{N}_0|F_1)}{p \cdot P(\widehat{N}_0|F_1) + (1 - p) \cdot P(\widehat{N}_0|F_2)}$$

Therefore, $\hat{p}_1 > p$ since

$$\hat{p}_1 = \frac{p \cdot P(\widehat{N}_0|F_1)}{p \cdot P(\widehat{N}_0|F_1) + (1 - p) \cdot P(\widehat{N}_0|F_2)} > p$$

$$\Leftrightarrow P(\widehat{N}_0|F_1) > P(\widehat{N}_0|F_2).$$

This is consistent given the observation of $\widehat{N}_0 < E(N_0)$.

$I$’s behavior Under the expectation of $\hat{p}_1 > p$, at $t = 1$, $I$ chooses $A$ if and only if

$$m_{i1} \leq \frac{b - rs}{(1 - w)} - \frac{wm}{(1 - w)} E(N_1|\widehat{N}_0),$$

where

$$E(N_1|\widehat{N}_0) = E(\sum \beta_j|\widehat{N}_0) = N \left[1 - \widehat{m}_1(\hat{p}_1)/c\right],$$

$$< E(N_0) = N \left[1 - \widehat{m}_0(p)/c\right],$$

where $\widehat{m}_1 = c \{\hat{p}_1 F_1(m_{N_1}(\hat{p}_1)) + (1 - \hat{p}_1) F_2(m_{N_1}(\hat{p}_1))\} > \widehat{m}_0(p) = c \{p F_1(m_{N_0}(p)) + (1 - p) F_2(m_{N_0}(p))\}$. That is, based on $\hat{p}_1 > p$, $I$ expects that there will be fewer chances to observe public blame for $A$. Thus, $m_i$ is more likely to satisfy the condition than it was at $t = 0$. Then, it is more likely that $I$ will choose $A$. That is, if the same person is chosen by nature at $t = 1$ and $t = 0$, he is more likely to take the action $A$ at $t = 1$ after observing $\widehat{N}_0 < E(N_0)$.

Neighbor For a given $\widehat{N}_0 < E(N_0)$, at $t = 1$, $P[F = F_1|\widehat{N}_0] = \hat{p}_1 > p$ and

$$P[F = F_2|\widehat{N}_0] = 1 - \hat{p}_1 < 1 - p,$$

and thus, if $A$ is observed, $j$ expects that fewer people $E(N_1|\widehat{N}_0) < E(N_0)$ would condemn $A$. This makes $j$ less likely to continue to
condemn the action, i.e.,

\[ m_{j1} > c - \frac{c}{N} E(N_1|\bar{N}_0) = \hat{m}_1 > \hat{m}_0. \]

Thus, other things being equal, if the same people were drawn from the population as in period 0, at \( t = 1 \), fewer people will condemn, which makes it more likely that \( \bar{N}_1 < N_0 \).

**2.3.3 At \( t = 2 \),**

For given \( \bar{N}_1, \bar{N}_0 \) and \( \bar{N}_1 < \bar{N}_0 \), people infer the probability of true distribution being \( F_1 \) or \( F_2 \) in the following way.

\[
\hat{p}_2 = P(F = F_1|\bar{N}_0, \bar{N}_1) = \frac{P(F = F_1 \cap \bar{N}_0 \cap \bar{N}_1)}{P(\bar{N}_0 \cap \bar{N}_1)} = \frac{P(F_1) \cdot P(\bar{N}_0 \cap \bar{N}_1|F_1)}{P(F_1) \cdot P(\bar{N}_0 \cap \bar{N}_1|F_1) + P(F_2) \cdot P(\bar{N}_0 \cap \bar{N}_1|F_2)} = \frac{p \cdot P(\bar{N}_0|F_1) \cdot P(\bar{N}_1|F_1)}{p \cdot P(\bar{N}_0|F_1) + (1 - p) \cdot P(\bar{N}_0|F_2) \cdot P(\bar{N}_1|F_2)}
\]

Suppose that \( \bar{N}_1 < \bar{N}_0 \), as it is more likely to occur as shown above. Then, since \( P(\bar{N}_1|F_1) > P(\bar{N}_1|F_2), \hat{p}_2 > \hat{p}_1 \) as well, i.e.,

\[
\hat{p}_2 = \frac{p \cdot P(\bar{N}_0|F_1) \cdot P(\bar{N}_1|F_1)}{p \cdot P(\bar{N}_0|F_1) \cdot P(\bar{N}_1|F_1) + (1 - p) \cdot P(\bar{N}_0|F_2) \cdot P(\bar{N}_1|F_2)} > \frac{p \cdot P(\bar{N}_0|F_1)}{p \cdot P(\bar{N}_0|F_1) + (1 - p) \cdot P(\bar{N}_0|F_2)} = \hat{p}_1
\]

\[
\Leftrightarrow P(\bar{N}_1|F_1) > P(\bar{N}_1|F_2)
\]

Therefore, \( \hat{p}_2 > \hat{p}_1 > p, \hat{m}_2(\hat{p}_2) > \hat{m}_1(\hat{p}_1) \), and

\[
E(N_2|\bar{N}_1, \bar{N}_0) = N \left[ 1 - \hat{m}_2(\hat{p}_2)/c \right] < E(N_1|\bar{N}_0) < E(N_0)
\]

As a result, \( I \) is more likely to choose \( A \), i.e.,

\[
m_j \leq \frac{b - rs}{(1 - w)} - \frac{wm}{(1 - w)} E(N_2|\bar{N}_1, \bar{N}_0)
\]
The neighbor \( j \) is even less likely to condemn \( A \) than before.

\[
m_j > c - \frac{c}{N} E(N_2|\hat{N}_1, \hat{N}_0) = \hat{m}_2 > \hat{m}_1 > \bar{m}_0.
\]

That is, \( A \) is more likely to be taken, and people are less likely to condemn it, i.e., \( \hat{N}_2 < \hat{N}_1 \).

Suppose that \( \hat{N}_1 > \hat{N}_0 \), instead. The same inference of \( \hat{p}_2 > \hat{p}_1 \) may hold as long as \( \hat{N}_1 \) is not so large that \( \hat{N}_1 < E(N_0) \). Any changes in the perspectives can occur only if \( \hat{N}_1 > \hat{N}_0 \) and \( \hat{N}_1 > E(N_0) > \hat{N}_0 \). The result in this case will be \( P(\hat{N}_1|F_1) < P(\hat{N}_1|F_2) \) and, thus, \( \hat{p}_2 < p < \hat{p}_1 \). Given the offsetting information about the true distribution of morality from the two periods, the next period’s observation would tend to confirm one of the two observations as being more reliable, and determine the future inference process.

### 2.3.4 At \( t = 3 \) and thereafter

For given \( \hat{N}_2, \hat{N}_1, \hat{N}_0 \), people infer the probability of true distribution being \( F_1 \) in the following way.

\[
\hat{p}_3 = P(F = F_1|\hat{N}_2, \hat{N}_0, \hat{N}_1) = \frac{P(F = F_1 \cap \hat{N}_0 \cap \hat{N}_1 \cap \hat{N}_2)}{P(\hat{N}_0 \cap \hat{N}_1 \cap \hat{N}_2)} = \frac{p \cdot P(\hat{N}_0|F_1) \cdot P(\hat{N}_1|F_1) \cdot P(\hat{N}_2|F_1)}{p \cdot P(\hat{N}_0|F_1) \cdot P(\hat{N}_1|F_1) \cdot P(\hat{N}_2|F_1) + (1 - p) \cdot P(\hat{N}_0|F_2) \cdot P(\hat{N}_1|F_2) \cdot P(\hat{N}_2|F_2)}
\]

Then, \( \hat{p}_3 > \hat{p}_2 \) if and only if

\[
\frac{p \cdot P(\hat{N}_0|F_1) \cdot P(\hat{N}_1|F_1) \cdot P(\hat{N}_2|F_1)}{p \cdot P(\hat{N}_0|F_1) \cdot P(\hat{N}_1|F_1) \cdot P(\hat{N}_2|F_1) + (1 - p) \cdot P(\hat{N}_0|F_2) \cdot P(\hat{N}_1|F_2) \cdot P(\hat{N}_2|F_2)} > \frac{p \cdot P(\hat{N}_0|F_1) \cdot P(\hat{N}_1|F_1)}{p \cdot P(\hat{N}_0|F_1) \cdot P(\hat{N}_1|F_1) + (1 - p) \cdot P(\hat{N}_0|F_2) \cdot P(\hat{N}_1|F_2)} \\
\iff P(\hat{N}_2|F_2) > P(\hat{N}_2|F_2)
\]

From the above, we have shown that, because people’s actions are based on their Bayesian inference from observed actions, if \( \hat{N}_0 < E(N_0) \), it is more likely that \( \hat{N}_1 < \hat{N}_0 \), and if \( \hat{N}_1 < \hat{N}_0 \), it is even more likely that \( \hat{N}_2 < \hat{N}_1 \). Suppose \( \hat{N}_2 < \hat{N}_1 < \hat{N}_0 \). Since it is more likely that \( P(\hat{N}_2|F_1) > P(\hat{N}_2|F_2) \), \( \hat{p}_3 > \hat{p}_2 > \hat{p}_1 > p \), \( \bar{m}_3(\bar{p}_3) > \bar{m}_2(\bar{p}_2) \),
and
\[ E(N_3|\tilde{N}_2, \tilde{N}_1, \tilde{N}_0) = \mathcal{N}[1 - \hat{m}_3(\hat{p}_3)/c] < E(N_2|\tilde{N}_1, \tilde{N}_0). \]

Thus, as \( \tilde{N}_{t-1} \) declines, \( E(N_t|\tilde{N}_{t-1}, \tilde{N}_{t-2}, \tilde{N}_{t-3}, \ldots) \) declines. This makes it more likely for \( \tilde{N}_t \) to decline, and more likely to encourage \( A \), and so on. That is, as \( E(N_t|\Omega_t) \) declines, it is more and more likely that
\[ m_{jt} \leq \frac{b - rs}{(1 - w)} - \frac{wm}{(1 - w)} E(N_t|\Omega_t), \]
and the neighbor \( j \) will be less and less willing to condemn \( A \).
\[ m_{jt} > c - \frac{c}{N} E(N_t|\Omega_t) = \hat{m}_t > \hat{m}_{t-1} > \ldots > \hat{m}_0. \]

Suppose that \( \tilde{N}_0 < \tilde{N}_1 \) but that \( \tilde{N}_2 < \tilde{N}_1 \), instead. Then, the observation of \( \tilde{N}_2 < \tilde{N}_1 \) leads to \( \hat{p}_3 > \hat{p}_2 \). Moreover, \( \hat{p}_3 > \hat{p}_1 \) if
\[
p \cdot P(\tilde{N}_0|F_1) \cdot P(\tilde{N}_1|F_1) \cdot P(\tilde{N}_2|F_1) > \frac{p \cdot P(\tilde{N}_0|F_1)}{p \cdot P(\tilde{N}_0|F_1) + (1 - p) \cdot P(\tilde{N}_0|F_2)}
\]
\[
\leftrightarrow P(\tilde{N}_1|F_1) \cdot P(\tilde{N}_2|F_1) > P(\tilde{N}_1|F_2) \cdot P(\tilde{N}_2|F_2)
\]

That is, which of the past observations has a stronger connection to either of the two distributions will determine the inference of \( \hat{p}_3 \). A similar process applies to the later periods.\(^9\)

### 2.4 Declining Moral Standards

The above analysis shows that, if the first few observation of \( \tilde{N}_2, \tilde{N}_1, \tilde{N}_0 \) are lower than \( E(N_0) \), they will trigger an information cascade that leads to \( \hat{p}_t \to 1 \), i.e., \( P(F = F_1|\Omega_t) \to 1 \) even if the true distribution is \( F_2 \). Therefore, moral standards

\(^9\)The result is robust even if there are more than two possible distributions. What matters to the members is the "expected number" of people who would act to condemn. This expected number is always a real number \( \hat{N} \in \mathbb{R}^+ \). Hence, what matters is whether \( \hat{N} \) is large enough to convince \( I \) and \( j \) to act differently.
Proposition 1 The social learning process of morality makes it easy for public moral standards to decline and makes it difficult to enforce moral rules.

Suppose $N_1^\ast$ is significantly low. Declining moral standards would lead to a situation where a $N_1^\ast / N \approx 0$ fraction of the population will act to uphold the moral rules. This implies that there may be no meaningful enforcement of moral rules.

It is easy for public morality to decline because the members of society are required to learn the intrinsically implicit rules by means of social learning, social learning is imperfect, and the enforcement of moral rules requires social support. The decline in the standards accelerates as a result of the chain reactions in the social learning process. (i) As the members observe that a lower fraction of the population actually condemns immoral actions, they form a belief that their society consists of many immoral people. Then, their individual incentive to refrain from acting immorally declines. (ii) Due to the increase in immoral actions, the members are exposed more often to a situation in which the moral standards matter. They see more frequently how other members react to immoral actions. They update more frequently their beliefs concerning moral standards. Thus, the members become more dependent on social signals. (iii) More members decide to remain silent, and more immoral actions take place. Observing fewer instances of enforcement and more immoral actions serves to lower the expected moral standards even further.

3 The Role of Law

While moral rules are implicit and subjective, and their enforcement is arbitrary, law is explicit and objective, and its enforcement is (relatively) certain. Such features gives law a great advantage in regulating conduct. Because it creates clear expected costs of wrongdoing and the enforcement is not subject to a great deal of social support, law is more dynamically stable than moral rules. This paper finds that such features of law also help to prevent public morality from declining.

In particular, law affects social learning process through a deterrence of $A$. So far, we have assumed that the act of $A$ being taken does not add information to the social learning process. However, neighbors can also use the information of $A$ being taken by $I$ in updating their belief regarding the true distribution of population morality. Now
we consider a full social learning process incorporating such a channel of information update.\(^{10}\)

**Proposition 2** Law enforcement \(rs > 0\) either slows the speed of a decline in moral standards or expedites the speed of convergence for a positive information cascade, i.e., \(\hat{p}_t \rightarrow 0\).

**Proof.** See the Appendix. ■

Law enforcement slows the decline of public morality by alleviating the feedback effects described in (i) and (iii) above. Even if public moral standards are expected to be low, imposing a legal sanction \(s > 0\) reduces the incentive to undertake an immoral action (as long as \(r > 0\)), thereby lowering the effect of (i). As fewer immoral actions are carried out by the members, there is less need for them to update their belief regarding the true distribution of population morality, thus lowering (ii). Fewer immoral actions and a low degree of social influence combine to slow the speed of decline in (iii). Thus, imposing a legal sanction \(s > 0\) slows the decline of moral standards as long as \(r > 0\).

A positive information cascade under a legal sanction \(s > 0\) is somewhat different from a negative cascade in that the positive cascade occurs by means of the experiences of "inaction," whereas the negative cascade takes place when \(A\) is observed in each period. The decline of morality requires the observation of \(A\). Since it is the initial wrongdoing that begets the infinite negative feedback in the social learning process leading to the belief of low public morality, the most effective way to prevent a decline is to preempt the learning process by deterring the immoral action. In doing so, the existence of an objective and explicit punishment that lowers \(I\)'s incentive to take \(A\) in (i) bears substantial positive externalities in the later sequences of social learning of public morality.

If \(A\) is deterred, \(A_0^u\), at \(t = 0\), people infer that this is likely due to a higher possibility of \(F_2\), forming a belief that \(\hat{p}_{u1|A_0^u} < p\) ("No news is good news"). It will also reduce \(I\)'s incentive for taking \(A\) at \(t = 1\), and thus, again, \(A\) is unlikely to be observed. Even if \(A\) is taken, \(\hat{N}_1 > \hat{N}_0\) is likely to occur under the expectation of \(\hat{p}_{u1|A_0^u} < p\) and \(\hat{N}_1 > \hat{N}_0\) will lead to an expectation of \(E(N_2) > \hat{N}_1\), keeping the probability of \(A\) low in the next period, and so on. This process shows how the chance of a positive cascade is enhanced due to inaction.

\(^{10}\)The Appendix provides a detailed explanation of how the social learning process changes in this case.
Similarly, observing $A$ expedites the negative cascade process because it provides information about the nature of the true distribution. Thus, upon observing $A$, a negative cascade is more likely to take place than a positive cascade, even though it is possible to develop a long run equilibrium belief of $\tilde{p}_{ut} \to 0$ from sufficient moral enforcement by the neighbors after observing $A$.

Proposition 2 implies that if the correct distribution is $F_2$, with the enhanced deterrence effects on $A$, legal sanction expedites the social learning process of the true distribution. However, if the true distribution is $F_1$, legal sanction artificially raises society’s moral standards. This result suggests what to consider when deciding if there is a need for a law. In general, law prevents a decline in moral standards and facilitates a convergence in people’s belief about a high level of public morality, regardless of whether the society has a strong morality. Thus, such an institution is beneficial only if regulating conduct according to a high public morality is desirable. Suppose that the true distribution of population moral values of a society is $F_1$. Legal sanctions are likely to encourage the society to deviate from one that reflects the true underlying distribution of population to another that places more restrictions on behavior. As a result, many of the society’s members would incur a loss of welfare due to the loss of freedom. When would this be desirable?

If law needs to be independent of what the population desires, it typically would be when pluralism fails. In such a situation, there is a commitment value of law. In some cases, people may differ greatly in what they believe is moral. For example, consider abortion. Some believe that it should be allowed. They have their own moral reasons. Similarly, there are others who believe that, for different moral reasons, it should not be allowed. In such a situation of "moral conflict," Honoré (1993) asked, "Why not resolve the abortion issue by allowing those who do not object to abortion to have abortions or perform them if they wish, while those who think abortions wrong are free to refuse to have or to perform them?" Why should there be a law? He argues that law is our "commitment" to what should be allowed or what should be discouraged. The role of law in such a situation of moral conflict is to let us coordinate our behavior in a way that the law permits. With law, we simply decide what to discourage and what not to discourage. In this example, the two different underlying distributions $F_1$ and $F_2$ would just mean different ways of organizing behavior. Law may discourage a behavior that belongs to $F_1$, not because the unlawful behavior is immoral, but because we are convinced that it would be better to commit ourselves to
discouraging the behavior. The same logic can be applied to legal issues of abolishing laws against prostitution, adultery, and organ sales. These are the examples of when law should take a stance that is based on its long-term implications and how it would alter people’s way of coordinating behavior. Thus, whether or not law reflects a majority opinions is often irrelevant.

In this context, we can discuss the implications of the recent repeal of adultery statutes in Colorado. In 2013, Colorado decided that adultery should not be illegal on the ground that many people believe adultery is a personal and moral matter and, thus, the state should not intervene.\textsuperscript{11} Denver Democratic Representative, Daniel Kagan, the proposer of the legislative change in Colorado, stated, "I see it as saying adultery is a matter between a spouse and his conscience and his God, but not his local county sheriff."\textsuperscript{12} One of the main points of this paper is that one’s will to follow one’s "conscience" is a moving thing, especially since it is greatly influenced by the people around him, as evidenced in that adultery was once considered to be a serious crime,\textsuperscript{13} whereas most people today believe that it is a strictly personal matter. Moreover, the fact that adultery is a personal matter cannot be the reason that it should not be illegal. In general, a breach of contract is considered to be immoral. It is also illegal. Adultery is a breach of marital contract. Hence, one of the issues is why adultery should be treated differently than other contracts. This paper also argues that, if adultery should not be illegal, this needs to be decided on the basis of its long-term implications as it serves as our commitment to a certain way of organizing behavior.

\section{Moral Involvement in Law Enforcement}

Until now, we have assumed that law enforcement \( r \) is independent and fixed. However, law enforcement requires the involvement of citizens in many aspects that vary from reporting wrongful actions to providing evidence for conviction in court. That is, often \( r_t = f(\tilde{N}_t) \), and \( f' > 0 \). Thus, how effectively laws can be enforced also

\textsuperscript{11}Adultery continues to be illegal in many other states, including Georgia, Massachusetts, and Illinois.

\textsuperscript{12}"Colorado legislators look to decriminalize adultery," www.foxnews.com (February 22, 2013)

\textsuperscript{13}In 1644, Mary Latham and James Britton were hanged in Massachusetts for their adultery. In Iraq, people are stoned to death for adultery even nowadays. ("Islamic State militants stone man to death in Iraq" Reuters, August 2014)
depends on the extent to which the citizens are willing to become involved in the process of law enforcement.

What causes people to be unwilling to become involved? A low \( r_t \) often occurs because people believe that there is no real reward for their involvement, but only a cost, especially since they expect little support from the public and to be alone in doing the right thing. Whistleblowers are often punished for doing the right thing when the corruption by others makes it impossible to punish the true wrongdoers. Witnesses of crimes frequently pay a very high price when they come forward with information about a crime that they have witnessed. An awareness of such situations substantiates people’s belief that the cost of getting involved is prohibitively high. It is not surprising that, in many situations, citizens are unwilling to get involved. In 2010, a man in New York, trying to defend a woman who was being mugged, was stabbed and left to die, while more than 20 persons passed by. In Seattle, a teenager was beaten and robbed by other teenagers, "while three security guards stood by and watched."14 As shown in our analysis in Section 2, the decline of morality accelerates when the number of Good Samaritans \( \tilde{N}_t \) declines.

As \( \tilde{N}_t \) decreases, \( r_t \) decreases. As \( r_t \to 0 \), enforcement of the law becomes impossible, regardless of the severity of the punishment \( s \). Therefore, when the enforcement of the law \( r_t \) also depends on the voluntary involvement of citizens, declining moral standards accompanies ineffective law enforcement.

**Proposition 3** A decline in moral standards reduces the effectiveness of law enforcement.

When observing a lower \( \tilde{N}_t \), people expect a lower likelihood of law enforcement and a greater probability of successful crimes. In turn, this will lead to more crimes being committed, people becoming less forthcoming, and the ineffectiveness of law enforcement rising, and so on. This shows the importance of maintaining the morality of society to effectively enforce law. Without morality, law enforcement may not be possible.

Overall, our analysis highlights the interactive, mutually-enhancing relationship of morality and law. Law makes it difficult for moral rules to weaken. Maintaining moral standards, in turn, are important in causing people to become more willing to be involved in the process of law enforcement. This is particularly important because

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14 "Good Samaritan Left for Dead on City Sidewalk" (April, 25, 2010) www.abcnews.com
not every action is a legal matter. Laws are specific only to the actions that they define as being unlawful. In contrast, morality is embedded in almost all dimensions of the daily actions in the lives of people. Thus, morality based on matters that are not necessarily subject to legal judgment often engenders a sense of civic duty, which determines the effectiveness of law enforcement. Laws that maintain morality becomes easy to enforce.

5 Conclusions

This paper discusses the relationship between morality and law and re-examines the role of law, with a model that shows how easily moral standards can decline in the process of social learning. We find that law generally slows the decline of the standards and provides the lower bound of public morality. We argue that legal rules may be necessary when moral rules are easily swayed by social influence, especially when such a commitment to regulate behavior is desirable in the long run, even if the idea of such a commitment is not popular at present. We also show that a decline in morality can weaken the effectiveness of law when the enforcement of law depends on the morality of people, which determines their willingness to get involved.

A Appendix

A.1 Proof of Lemma 1

Since \( m_d^* \) is the largest value of \( m_d \), by construction, \( N_d^*/N = 1 - F(m_d^*) = 1 - m_d^*/c \). Thus, there is a \( N_d^*/N \) fraction of population with \( m_l > m_d^* \), \( d = 1, 2 \). Under Assumption 1, \( m_l > c F_d(m_l) \) for all \( m_l > m_d^* \). Therefore, \( 1 - m_l/c < 1 - F_d(m_l) < 1 - m_d^*/c = N_d^*/N \). Thus, from (3), a person \( j \) with \( m_j = m_d^* \) expects that all of the other neighbors \( l \) with \( m_l > m_j \), a \( N_d^*/N \) fraction of the people, would condemn A. Let \( m_{d-1}^* \) be the second largest \( m_d \), and \( m_{d-2}^* \) be the next largest \( m_d \), if any. Then, it must be that \( m_k < c F_d(m_k) \) for all \( m_k \) in the range where \( m_{d-1}^* < m_k < m_d^* \). Therefore, \( 1 - m_k/c > 1 - F(m_k) \). This implies that even if everyone else who has a slightly higher moral value is expected to condemn, the person with \( m_k \) would not condemn. Thus, the person with \( m_k \) expects that none of the \( m_k \) in the range where \( m_{d-1}^* < m_k < m_d^* \) would. For all \( m_n \) in the range where \( m_{d-2}^* < m_n < m_{d-1}^* \), if
any, \( m_n > cF_d(m_n) \). Let \( N_d^a / N \) be the fraction of people that \( m_n \) would expect to condemn of all of those people with \( m > m_n \). Since \( m_n < m_k, 1 - m_n/c > 1 - m_k/c > 1 - F(m_k) > N_d^a / N \), \( m_n \) in this range would not condemn. Similar logic applies to the range below if any. Thus, the rational expectation is that a \( N_d^s / N \) fraction of people condemn. Q.E.D.

### A.2 Proof of Lemma 2

1. \( m^*_2 < \hat{m}_0 < m^*_1 \) and, thus, \( N^*_1 < E(N_0) < N^*_2 \).

   By construction, at \( m^*_d, N_d^s / N = 1 - F(m^*_d) = 1 - m^*_d/c \). Then, \( \hat{m}_0 = p\hat{m}_0 + (1 - p)\hat{m}_0 = c\{pF_1(m_{N_0}(p)) + (1 - p)F_2(m_{N_0}(p))\} = m_{N_0}(p) \). Define \( \Gamma(\hat{m}) =: p[\hat{m} - cF_1(\hat{m})] + (1 - p)[\hat{m} - cF_2(\hat{m})] \). When \( \hat{m} = m_{N_0}, \Gamma(\hat{m}) = 0 \). Evaluating \( \Gamma(\hat{m}) \) at \( \hat{m} = m^*_1 \), we get \( \Gamma(m^*_1) = (1 - p)c[F_1(m^*_1) - F_2(m^*_1)] > 0 \) since \( F_2 \) FOSD \( F_1 \). Similarly, \( \Gamma(m^*_2) = pc[F_2(m^*_2) - F_1(m^*_2)] < 0 \). Since \( \Gamma(\hat{m}) \) is increasing in \( \hat{m} \) and continuous in the range where \( \hat{m} \geq m^*_2 \), \( \Gamma(m^*_1) > 0 \), \( \Gamma(m^*_2) < 0 \), and \( m^*_2 < m^*_1 \) imply that \( \hat{m}_0 \) satisfying \( \Gamma(\hat{m} = \hat{m}_0) = 0 \) must be that \( m^*_2 < \hat{m}_0 < m^*_1 \).

2. \( \hat{m}_t \to m^*_1 \) as \( \hat{p}_t \to 1 \) and \( \hat{m}_t \to m^*_2 \) as \( \hat{p}_t \to 0 \).

   By construction, \( \hat{m}_t = c\{\hat{p}_tF_1(m_{N_0}(\hat{p}_t)) + (1 - p)F_2(m_{N_0}(\hat{p}_t))\} \) and \( m_{N_0}(\hat{p}_t) \) are \( \hat{m}_0 \) and \( m_{N_0}(p) \) defined at \( p = \hat{p}_t \). Since \( F_1 \) and \( F_2 \) are continuous, \( \hat{m}_0 \) is continuous for any given \( p \in (0, 1) \). From (5), \( m_{N_0} \) is a fixed point that satisfies \( m_{N_0} = c\{pF_1(m_{N_0}) + (1 - p)F_2(m_{N_0})\} \) for a given \( p \). As \( p \) increases to \( p' \), the right-hand-side of (5) increases since \( F_2 \) stochastically dominates \( F_1 \). Then, the corresponding fixed point \( m_{N_0} \) at \( p' = \hat{p}_t \) must be higher. Thus, \( m_{N_0}(\hat{p}_t) \) is an increasing function of \( \hat{p}_t \). When \( p' \to 1, \hat{m}_t \to cF_1(m_{N_0}(p')) \), thus, \( m_{N_0}(p') \to m^*_1 \). Similarly, when \( p' \to 0, m_{N_0}(p') \to m^*_2 \). Q.E.D.

### A.3 When I's are included in the population

In this case, social learning must involve I’s choices as well. Neighbors update their belief of population distribution based on observed A or inaction. Social learning occurs through two channels: (i) updates in the probability of observing A and (ii) updates in the probability that the observed A is associated with \( F_1 \) distribution. Neighbors’ expectations differ when A is observed and when it is not. We define Perfect Bayesian Nash Equilibrium in the following.
A.3.1 At $t = 0$

Let $E(N_0|A_0)$ be the expected level of neighbors’ condemnation upon observing $A_0$ by $I$ at $t$. Then, at $t = 0$, $I$ takes $A$ if

$$m_{i0} < \frac{b - rs}{(1 - w)} - \frac{wm}{(1 - w)} E(N_0|A_0) = \tilde{M}_0,$$  \hspace{1cm} (14)

Thus, the probability of observing any offensive action at $t = 0$, $A_0$, is

$$P(A_0) = P(m < \tilde{M}_0) = pF_1(\tilde{M}_0) + (1 - p)F_2(\tilde{M}_0).$$  \hspace{1cm} (15)

Let $\Phi_0$ be the observation of action of $I$’s choice at $t = 0$, $\Phi_0 \in \{A_0, A_0^c\}$, where $A_0$ and $A_0^c$ refer to action and inaction, respectively. If $A$ is observed at $t = 0$ ($\Phi_0 = A_0$), neighbors expect that there is a $\tilde{p}_0$ probability that the true distribution is $F_1$.

$$\tilde{p}_0 = P(F = F_1|\Phi_0 = A_0) = \frac{pF_1(\tilde{M}_0)}{P(A_0)}.$$  \hspace{1cm} (16)

Note that $\tilde{p}_0 > p$ since $F_2$ FOSD $F_1$.

Then, in figuring out $m_{N_0}$ and $E(N_0|A_0) = \sum \beta_{j0}$, the rational expectation of $E(N_0|A_0)/\mathcal{N}$ is that

$$E(N_0|A_0)/\mathcal{N} = \tilde{p}_0(1 - F_1(m_{N_0|A_0})) + [1 - \tilde{p}_0](1 - F_2(m_{N_0|A_0})), \hspace{1cm} (17)$$

$$m_{N_0|A_0} = c \{\tilde{p}_0F_1(m_{N_0|A_0}) + (1 - \tilde{p}_0)F_2(m_{N_0|A_0})\}, \hspace{1cm} (18)$$

and such a $m_{N_0|A_0}$ exists. Then, neighbor $j0$ condemns $A$ if

$$m_{j0} > c \{\tilde{p}_0F_1(m_{N_0|A_0}) + (1 - \tilde{p}_0)F_2(m_{N_0|A_0})\} = \tilde{m}_0(\tilde{p}_0).$$  \hspace{1cm} (19)

Since $\tilde{p}_0 > p$, $\tilde{m}_0(\tilde{p}_0) > \tilde{m}_0(p)$. Thus, $E(N_0|A_0) = \mathcal{N}[1 - \tilde{m}_0(\tilde{p}_0)/c] < E(N_0) = \mathcal{N}[1 - \tilde{m}_0(p)/c]$. Thus, compared to (10), (14) is more likely to be satisfied. That is, $A_0$ is more likely to be observed when neighbors update their belief from $I$’s action.

Suppose that $A$ was taken and it was observed that $\tilde{N}_0|A_0 < E(N_0|A_0)$ at $t = 0$. 

\[ \text{Page 24} \]
This generates information that $P(A_0 \cap \tilde{N}_0 | F_1) > P(A_0 \cap \tilde{N}_0 | F_2)$. Then,

$$p_1 = \frac{P(F = F_1 | A_0, \tilde{N}_0)}{P(A_0 \cap \tilde{N}_0)} = \frac{P \cdot P(A_0 \cap \tilde{N}_0 | F_1)}{p \cdot P(A_0 \cap \tilde{N}_0 | F_1) + (1 - p) \cdot P(A_0 \cap \tilde{N}_0 | F_2)}$$

$$> p$$

Therefore, at $t = 1$, the probability of $F_1$ is higher.

**A.3.2 At $t = 1$**

Let $E(N_1 | A_1, A_0, \tilde{N}_0)$ be the expected level of neighbors’ condemnation upon observing $A_1$ by $I$ at $t = 1$. Then, at $t = 1$, $I$ takes $A$ if

$$m_{i1} < \frac{b - rs}{(1 - w)} - \frac{wm}{(1 - w)}E(N_1 | A_1, A_0, \tilde{N}_0) = \tilde{M}_1,$$

where (21)

The probability of observing $A_1$ is

$$P(A_1 | A_0, \tilde{N}_0) = P(F_1 | A_0, \tilde{N}_0) \cdot F_1(\tilde{M}_1) + P(F_2 | A_0, \tilde{N}_0) \cdot F_2(\tilde{M}_1)$$

$$= p_1 \cdot F_1(\tilde{M}_1) + (1 - p_1) \cdot F_2(\tilde{M}_1).$$

Since $p_1 > p$, comparing (15) and (22), we can show that $P(A_1 | A_0, \tilde{N}_0) > P(A_0)$, other things being equal. If $A$ is observed at $t = 1$ ($\Phi_1 = A_1$), neighbors expect that there is a $\tilde{p}_1$ probability that the true distribution is $F_1$.

$$\tilde{p}_1 = \frac{P(F = F_1 | \Phi_1 = A_1, A_0, \tilde{N}_0)}{P(A_1 | A_0, \tilde{N}_0)} = \frac{P(F_1 \cap A_1 | A_0, \tilde{N}_0) \cdot P(A_0 \cap \tilde{N}_0)}{P(A_1 | A_0, \tilde{N}_0) \cdot P(A_0 \cap \tilde{N}_0)}$$

$$= \frac{P(F_1 | A_0, \tilde{N}_0) \cdot F_1(\tilde{M}_1))}{P(A_1 | A_0, \tilde{N}_0)}$$

$$= \frac{p_1 \cdot F_1(\tilde{M}_1)}{p_1 \cdot F_1(\tilde{M}_1) + (1 - p_1) \cdot F_2(\tilde{M}_1)}.$$

Note that $\tilde{p}_1 > \tilde{p}_0 = \frac{p \cdot F_1(\tilde{M}_0)}{p \cdot F_1(\tilde{M}_0) + (1 - p) \cdot F_2(\tilde{M}_0)}$ if $\tilde{M}_0 \leq \tilde{M}_1$ under the MLRP.

$\tilde{M}_1$, however, depends on the neighbors’ expectation of $E(N_1 | \Omega_1) / N$, which depends on $\tilde{p}_1$, in turn. For a given $\Omega_1 = \{A_1, A_0, \tilde{N}_0\}$, neighbors’ rational expectation
of $E(N_1|\Omega_1)/N$ is that
\[
E(N_1|\Omega_1)/N = \tilde{p}_1(1 - F_1(m_{N_1|\Omega_1})) + [1 - \tilde{p}_1](1 - F_2(m_{N_1|\Omega_1})),
\]
(24)
\[
m_{N_1|\Omega_1} = c \{\tilde{p}_1 F_1(m_{N_1|\Omega_1}) + (1 - \tilde{p}_1) F_2(m_{N_1|\Omega_1})\}.
\]
(25)

Neighbor $j$1 condemns $A$ if
\[
m_{j1} > c \{\tilde{p}_1 F_1(m_{N_1|\Omega_1}) + (1 - \tilde{p}_1) F_2(m_{N_1|\Omega_1})\} = \tilde{m}_1(\tilde{p}_1).
\]
(26)

To show $E(N_1|\Omega_1)/N < E(N_0|A_0)/N$, suppose that neighbors initially expect $\tilde{M}_0 = \tilde{M}_1$ and $I$ faces the same incentives for $A$ at $t = 0$ and at $t = 1$. In this case, the $t = 0$ observation of $\tilde{N}_0|A_0 < E(N_0|A_0)$ leads to $p_1 > p$, $P(A_1|A_0, \tilde{N}_0) > P(A_0)$ and $\tilde{p}_1$ increases above $\tilde{p}_0$. Then, this increases $m_{N_1|\Omega_1}$ and lowers $E(N_1|\Omega_1)/N$, increasing $\tilde{M}_1$ above $\tilde{M}_0$. An increase in $\tilde{M}_1$ further increases $P(A_1|A_0, \tilde{N}_0)$, $\tilde{p}_1$, and lowers $E(N_1|\Omega_1)/N$, and so on. Thus, $\tilde{N}_0|A_0 < E(N_0|A_0)$ leads to $\tilde{p}_1 > \tilde{p}_0$, $\tilde{m}_1(\tilde{p}_1) > \tilde{m}_0(\tilde{p}_0)$, and $E(N_1|\Omega_1) = N [1 - \tilde{m}_1(\tilde{p}_1)/c] < E(N_0|A_0) = N [1 - \tilde{m}_0(\tilde{p}_0)/c] < E(N_0) = N [1 - \tilde{m}_0(p)/c]$. Thus, $A_1$ is more likely to be observed and neighbors are less likely to condemn it.

Thus, when $I$s incentives are incorporated and the observation of $A$ is taken into account for the information update, the speed of information cascades accelerates.

### A.4 Proof of Proposition 2.

When the social learning process incorporates information from an observation of $A$, this generates a different social learning process conditional on whether $A$ is observed or not. If $A$ is observed, the path follows the one described above. In the following, we describe a case when $A$ is deterred. Since neighbors’ reactions become available only after $A$ is taken, deterrence leads to an off-the equilibrium path. We characterize Perfect Bayesian Nash Equilibrium with sequentially rational beliefs off the equilibrium path.

At $t = 0$, $I$ is deterred from taking $A$ if
\[
m_i > \frac{b - rs}{(1 - w)} - \frac{wm}{(1 - w)} E(N_0|A^u_0) = \tilde{M}_0,
\]
which is based on a sequentially rational belief $E(N_0|A^u_0)$ that is consistent with the
choice of inaction. The probability of not observing any offensive action at \( t = 0 \), \( A_0^u \), is \( P(A_0^u) = P(m > \widehat{M}_0) = 1 - p F_1(\widehat{M}_0) - (1 - p) F_2(\widehat{M}_0) \). If \( rs > 0 \) increases, \( \widehat{M}_0 \) decreases and, thus, \( P(A_0^u) \) increases.

Suppose \( A \) is deterred at \( t = 0 \) due to a legal sanction \( rs > 0 \). Then, the sequentially rational belief \( E(N_0|A_0^u)/N \) must satisfy that

\[
E(N_0|A_0^u)/N = \hat{\rho}_{u0}(1 - F_1(m_{N_0|A_0^u})) + [1 - \hat{\rho}_{u0}](1 - F_2(m_{N_0|A_0^u}))
\]

\[
m_{N_0|A_0^u} = c \left\{ \hat{\rho}_{u0} F_1(m_{N_0|A_0^u}) + (1 - \hat{\rho}_{u0}) F_2(m_{N_0|A_0^u}) \right\},
\]

where \( \hat{\rho}_{u1} \), the belief that true distribution is \( F \) given inaction, is defined as

\[
\hat{\rho}_{u1} = P(F = F_1|A_0^u) = \frac{p \cdot P(A_0^u|F_1)}{p \cdot P(A_0^u|F_1) + (1 - p) \cdot P(A_0^u|F_2)}.
\]

Then, \( \hat{\rho}_{u1} < p \) since

\[
\hat{\rho}_{u1} = \frac{p \cdot P(A_0^u|F_1)}{p \cdot P(A_0^u|F_1) + (1 - p) \cdot P(A_0^u|F_2)} < p \equiv P(A_0^u|F_1) < P(A_0^u|F_2).
\]

At \( t = 1 \), another \( I \) and \( N \) are independently drawn from the population. Based on the information that there was no first period observation of \( A \), \( I \) refrains from \( A \) if

\[
m_{i1} > \frac{b - rs}{(1 - w)} - \frac{wm}{(1 - w)} E(N_1|A_1^u, A_0^u) = \widehat{M}_{u1},
\]

where \( E(N_1|A_1^u, A_0^u) \) is a sequentially rational belief that is consistent with inaction \( A_1^u \) given \( A_0^u \). Since \( \hat{\rho}_{u1} < p \), if \( \widehat{M}_{u1} \approx \widehat{M}_{u0} \), it is likely that \( P(A_1^u|A_0^u) > P(A_0^u) \), i.e.,

\[
P(A_1^u|A_0^u) = 1 - P(F_1|A_0^u) \cdot F_1(\widehat{M}_{u1}) - P(F_2|A_0^u) \cdot F_2(\widehat{M}_{u1})
\]

\[
= 1 - \hat{\rho}_{u1} \cdot F_1(\widehat{M}_{u1}) - (1 - \hat{\rho}_{u1}) \cdot F_2(\widehat{M}_{u1}) > P(A_0^u).
\]

That is, at \( t = 1 \), other things being equal, based on inaction from previous period, \( I \) expects a higher probability of condemnation than before. Thus, it is more likely
that $I$ refrains from $A$.

Suppose $A_1^u$ is observed. The sequentially rational belief of $\hat{M}_{u1}$ must satisfy that $E(N_1|A_1^u, A_0^u)$ is consistent with $\hat{p}_{u2} = P(F = F_1|A_0^u, A_1^u)$. When $A_1^u$ is observed at $t = 1$, this implies $P(A_1^u|F_1) < P(A_1^u|F_2)$ and, thus,

$$\hat{p}_{u2} = \frac{P(F = F_1 \cap A_0^u \cap A_1^u)}{P(A_0^u \cap A_1^u)} = \frac{p \cdot P(A_0^u|F_1) \cdot P(A_1^u|F_1)}{p \cdot P(A_0^u|F_1) \cdot P(A_1^u|F_1) + (1 - p) \cdot P(A_0^u|F_2) \cdot P(A_1^u|F_2)}$$

and so on. Thus, it is more likely that a positive cascade occurs, $\hat{p}_{ut} \to 0$.

Suppose, instead, that $m_{u1}$ was so low that the action was taken at $t = 1$ and thus $\hat{N}_1$ was observed. Note that, even if $A$ is taken, since each neighbor remembers that at $t = 0$, $A$ was not taken, with $\hat{p}_{u1} < p$, they still believe the distribution to be closer to $F_2$, while the observation of $A$ would be considered shocking, neighbors expect many people would condemn, $E(N_1|A_0^u) > E(N_0)$. Therefore, it is more likely that $\hat{N}_1 > E(N_0)$. Then, at $t = 2$,

$$\hat{p}_2 = P(F = F_1|A_0^u, A_1, \hat{N}_1) = \frac{P(F = F_1 \cap A_0^u \cap A_1 \cap \hat{N}_1)}{P(A_0^u \cap A_1 \cap \hat{N}_1)} = \frac{P(F_1) \cdot P(A_0^u \cap A_1 \cap \hat{N}_1|F_1)}{P(F_1) \cdot P(A_0^u \cap A_1 \cap \hat{N}_1|F_1) + P(F_2) \cdot P(A_0^u \cap A_1 \cap \hat{N}_1|F_2)}$$

(28)

$$= \frac{p \cdot P(A_0^u|F_1) \cdot P(A_1|F_1) \cdot P(\hat{N}_1|F_1)}{p \cdot P(A_0^u|F_1) \cdot P(A_1|F_1) \cdot P(\hat{N}_1|F_1) + (1 - p) \cdot P(A_0^u|F_2) \cdot P(A_1|F_2) \cdot P(\hat{N}_1|F_2)}$$

The observation of $A$ in period 1 may not be strong enough to overturn the belief that the true distribution is likely to be $F_2$ as long as the following holds.

$$\hat{p}_2 < \frac{p \cdot P(A_0^u|F_1)}{p \cdot P(A_0^u|F_1) + (1 - p) \cdot P(A_0^u|F_2)} = \hat{p}_{u1}$$

$$\Leftrightarrow \frac{P(A_1|F_1)}{P(A_1|F_2)} < \frac{P(\hat{N}_1|F_1)}{P(\hat{N}_1|F_2)}$$

$$\Leftrightarrow \frac{P(A_1|F_1) \cdot P(\hat{N}_1|F_1)}{P(A_1|F_2) \cdot P(\hat{N}_1|F_2)} < 1$$

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Given that \( \hat{p}_{u1} < p \), in the expectation of \( E(N_1|A_0^u) > E(N_0) \), it is more likely that \( \hat{N}_1 > E(N_0) \), and \( \frac{P(X_1|F_2)}{P(X_1|F_1)} > 1 \), whereas people may expect that \( P(A_1|F_1) \) is not much larger than \( P(A_1|F_2) \) since \( A \) did not occur at \( t = 0 \). In that case, \( \hat{p}_2 < \hat{p}_{u1} \). In order to overturn this expectation, it must be that \( \hat{N}_1 < E(N_0) < E(N_1|A_0^u) \) in addition to the occurrence of \( A \) by an \( I \) with a very low \( m_i \). Thus, a legal sanction \( s \) that increases a chance of inaction slows the negative cascade. Q.E.D.

References


