9

Evolutionary Psychology, Moral Heuristics, and the Law

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ABSTRACT

The modern world, with its vast nation states peopled with millions of strangers, has little in common with the social world in which humans evolved—a world of tiny bands peopled with a few dozen friends, relatives, and competitors. To negotiate that intimate social world, evolution equipped our minds with moral heuristics: decision rules that generate intuitions about fairness and justice, punitiveness and approval, right and wrong. Each was designed by natural selection to operate in a different type of ancestral social situation, and each is triggered by cues that, in an ancestral past, indicated that type of situation was occurring. Political debate in the present is often a struggle over how to characterize events in terms of these ancestral situation-types, because alternative framings trigger different evolved moral heuristics.

Once triggered, a moral heuristic produces intuitions about what course of action would be virtuous or immoral, as well as intuitions about the likely consequences of taking that course of action. These intuitions motivate lawmakers and citizens to enact laws promoting or even mandating certain courses of action. But the mismatch between the ancestral world and current conditions is so great that laws that seem virtuous to our hunter-gatherer minds often have unanticipated social consequences that are disastrous, and laws that seem morally dubious can be engines of social welfare. We illustrate with examples drawn from the evolutionary psychology of cooperation and sharing.

HUMAN NATURE AND THE LAW

The political scientist Edward Banfield once asked the undergraduates in a seminar for their gut answer to a question: Are people "basically good" or "basically bad"? After a show of hands, he claimed that your answer predicts what kind of laws and institutions you favor: liberals answer "basically good" whereas conservatives answer "basically bad." Banfield's speculations about the source of political belief may be unusual but the way he framed his probe question is not: Many people think it is sensible to ask whether human nature is inherently

"good" or "bad," and believe the answer has implications for the law. A central theme of this chapter is that this way of framing the question is incoherent: it is a value judgment, devoid of any claims about how the mind works. To be useful to citizens and lawmakers, a claim about human nature needs to be a claim about how the mind actually works: about the design of programs that process information, allowing us to learn, reason, feel, judge, and react. Human nature is not inherently good or bad: it is, "inherently," a collection of programs, which execute their functions. The real question is: Which programs reliably develop in the human mind, and how do they process information? Evolutionary psychology seeks to answer this question. Accurate answers, when they are eventually arrived at, will have implications for lawmaking. We will extrapolate (provisionally and perhaps wrongly) from the field in its infancy. Some of its implications are strange, and may invite modifications in how legislation is created and conceptualized.

Heuristics and Evolutionary Psychology

The topic of this Dahlem Workshop was heuristics and the law, so before proceeding let us quickly consider the relationship between the study of heuristics and evolutionary psychology.

A heuristic is a fast and frugal decision rule, a mental program that produces a judgment quickly based on limited information (see Gigerenzer, this volume). Most research on heuristics has focused on decision rules for making judgments that depend on some understanding of probability, risk, or quantity: E.g., given that you tested positive for a disease, how likely is it that you have it? Given what you know about cities, which of a pair is likely to be more populous? However, fast and frugal decision rules exist for making social and moral judgments as well. Indeed, a growing body of evidence supports the view that the human mind was tailored by natural selection to develop certain social and moral heuristics: decision rules that quickly produce social and moral judgments, based on limited information. We will consider some of these social and moral heuristics below, with attention to how they may be shaping the way debates about social policy and the law are framed.

WHAT IS EVOLUTIONARY PSYCHOLOGY?

In the final pages of the *Origin of Species*, after Darwin had presented the theory of evolution by natural selection, he wrote, "In the distant future I see open fields for far more important researches. Psychology will be based on a new foundation, that of the necessary acquirement of each mental power and capacity by gradation" (Darwin 1859, p. 488). More than a century later, a number of scientists began to work out exactly how Darwin's fundamental insights could be

used as a foundation on which to build a more systematic approach to psychology (for review, see Tooby and Cosmides 1992; see also Symons 1979; Cosmides and Tooby 1987; Daly and Wilson 1988; Buss 1989; Pinker 1997; Gigerenzer 2000). We were motivated by new developments from a series of different fields:

Advance #1 The cognitive revolution provided, for the first time in human history, a precise language for describing mental mechanisms, as programs that process information.

Advance #2 Advances in paleoanthropology, hunter–gatherer studies, and primatology provided data about the adaptive problems our ancestors had to solve to survive and reproduce and the environments in which they did so.

Advance #3 Research in animal behavior, linguistics, and neuropsychology showed that the mind is not a blank slate, passively recording the world. Organisms come "factory-equipped" with knowledge about the world, which allows them to learn some relationships easily, and others only with great effort, if at all. Skinner's hypothesis—that learning is a simple process governed by reward and punishment—was simply wrong (Skinner 1976).

Advance #4 Evolutionary game theory revolutionized evolutionary biology, placing it on a more rigorous, formal foundation of replicator dynamics. This clarified how natural selection works, what counts as an *adaptive* function, and what the criteria are for calling a trait an *adaptation*.

We thought that these new developments could be interlaced into a unified research framework, with precise connections linking it to the social sciences, medicine, and the humanities. We called this framework *evolutionary psychology.* The goal of research in evolutionary psychology is to discover, understand, and map in detail the design of the human mind/brain, as well as to explore the implications of these new discoveries for other fields. The long-term goal of the field is to map "human nature"—that is, the species-typical information-processing architecture of the human brain—together with the developmental programs that build it.

Like other cognitive scientists, when evolutionary psychologists refer to "the mind," they mean the set of information-processing devices, embodied in neural tissue, that are responsible for all conscious and nonconscious mental activity, and that generate all behavior. Like other psychologists, evolutionary psychologists test hypotheses about the design of these information-processing devices—these programs—using laboratory methods from all branches of psychology, especially cognitive, developmental, and social psychology, as well as methods drawn from experimental economics, neuroscience, genetics, and cross-cultural field work.

Evolutionary psychologists go beyond traditional approaches in the study of the mind, however, by actively applying an insight that other researchers overlook: The programs comprising the human mind were designed by natural selection. These programs were not selected to solve the total array of logically possible computational problems. Instead, they were selected on the basis of how well they solved the adaptive problems faced by our hunter–gatherer ancestors (e.g., finding a mate, cooperating with others, hunting, gathering, protecting children, avoiding predators). Natural selection tends to produce programs that solve problems like these reliably, quickly, and efficiently. Knowing this allows one to approach the study of the mind like an engineer. Evolutionary psychologists commonly begin with a good specification of an adaptive information-processing problem; they then perform a task analysis of that problem. This allows researchers to see what properties a program would need to have in order to solve that problem well. This approach allows evolutionary psychologists to generate testable hypotheses about the structure of the programs that comprise the mind, rather than simply casting about randomly, using blind empiricism.

From this point of view, there are precise causal connections that link the four developments above into a coherent framework for thinking about human nature and human society (Tooby and Cosmides 1992). These connections (C-1 through C-6) are as follows:

C-1 Each organ in the body evolved to serve a function: the intestines digest, the heart pumps blood, the liver detoxifies poisons. The brain is also an organ, and its evolved function is to extract information from the environment and use that information to generate behavior and regulate physiology. From this perspective, the brain is a computer, a physical system that was designed to process information (*Advance #1*). Its programs were designed not by an engineer, but by natural selection, a causal process that retains and discards design features on the basis of how well they solved problems that affect reproduction (*Advance #4*).

The fact that the brain processes information is not an accidental side effect of some metabolic process; the brain was designed by natural selection *to be* a computer. Therefore, if you want to describe its operation in a way that captures its evolved function, you need to think of it as composed of programs that process information. The question then becomes: What programs are to be found in the human brain? What are the reliably developing, species-typical programs that, taken together, comprise the human mind?

C-2 Individual behavior is generated by this evolved computer, in response to information that it extracts from the internal and external environment (including the social environment) (*Advance #1*). To understand an individual's behavior, therefore, you need to know both the information that the person registered *and* the structure of the programs that generated his or her behavior.

C-3 The programs that comprise the human brain were sculpted over evolutionary time by the ancestral environments and selection pressures experienced by the hunter–gatherers from whom we are descended (*Advances #2* and *#4*). Each evolved program exists because it produced behavior that promoted the survival and reproduction of our ancestors better than alternative programs that arose during human evolutionary history. Evolutionary psychologists emphasize hunter–gatherer life because the evolutionary process is slow—it takes thousands of years to build a program of any complexity (Tooby and Cosmides 1990). The industrial revolution—even the agricultural revolution—are brief moments in evolutionary time, too short to have selected for complex new cognitive programs.

C-4 Although the behavior our evolved programs generate would, on average, have been adaptive (reproduction-promoting) in ancestral environments, there is no guarantee that it will be so now. Modern environments differ importantly from ancestral ones, particularly when it comes to social behavior. We no longer live in small, face-to-face societies, in semi-nomadic bands of 25–100 men, women and children, many of whom were close relatives. Yet our cognitive programs were designed for that social world.

C-5 Perhaps most importantly, the brain must be comprised of many different programs, each specialized for solving a different adaptive problem our ancestors faced. That is, the mind cannot be a blank slate (*Advance #3*).

In fact, the same is true of any computationally powerful, multi-tasking computer. Consider the computer in your office. So many people analyze data and write prose that most computers come factory-equipped with a spreadsheet and a text-editor. These are two separate programs, each with different computational properties. This is because number-crunching and writing prose are very different problems: the design features that make a program good at data analysis are not well-suited to writing and editing articles, and vice versa. To accomplish both tasks well, the computer utilizes two programs, each well-designed for a specific task. The more functionally specialized programs it has, the more intelligent your computer is: the more things it can do. The same is true for people.

Our hunter–gatherer ancestors were, in effect, on a camping trip that lasted a lifetime, and they had to solve many different kinds of problems well to survive and reproduce under those conditions. Design features that make a program good at choosing nutritious foods, for example, will be ill-suited for finding a fertile mate. Different problems require different evolved solutions.

This can be most clearly seen by using results from replicator dynamics (*Advance #4*) and data about ancestral environments (*Advance #2*) to define adaptive problems, and then carefully dissecting the computational requirements of any program capable of solving those problems. Thus, for example, programs designed for logical reasoning would be poorly

designed to detect cheaters in social exchange, and vice versa (Cosmides and Tooby 2005). As we will discuss, it appears that we have programs that are functionally specialized for reasoning about reciprocity and exchange.

C-6 To understand human culture and social organization, one needs to understand these evolved programs. The mind is not like a tape recorder, passively recording the world but imparting no content of its own. Evolved programs—many of them content-specialized—organize our experiences, generate our inferences, inject certain recurrent concepts and motivations into our mental life, give us our passions, and provide cross-culturally universal interpretive frameworks that allow us to understand the actions and intentions of others. They invite us to think certain content-inflected thoughts; they make certain ideas, feelings, and reactions seem persuasive, interesting, and memorable. Consequently, they play a key role in determining which ideas and customs will easily spread from mind to mind, and which will not—that is, they play a crucial role in shaping human culture and in stabilizing certain social forms.

Instincts—when the word is used at all—are often contrasted with reasoning and decision making. But the reasoning programs and decision rules that evolutionary psychologists have been discovering are (a) complexly specialized for solving an adaptive problem; (b) they reliably develop in all normal human beings; (c) they develop without any conscious effort and in the absence of formal instruction; (d) they are often applied without any awareness of their underlying logic, and (e) they are distinct from more general abilities to process information or behave intelligently. In other words, they have the key characteristics that used to be encompassed by the concept *instinct* (Pinker 1994). In fact, one can think of these specialized circuits as *cognitive instincts*. They make certain kinds of inferences and decisions just as easy, effortless, and "natural" to us as humans, as echolocating is for a dolphin or swimming is for a penguin.

Consider this example from the work of Simon Baron-Cohen (1995), using what is known as the Charlie task. A child is shown a schematic face ("Charlie") surrounded by four different kinds of candy. Charlie's eyes are pointed, for example, toward the Milky Way bar. The child is then asked, "Which candy does Charlie want?" Like you and I, a normal 4 year old will say that Charlie wants the Milky Way (i.e., the object of Charlie's gaze). In contrast, children with autism fail the Charlie task, producing random responses. However—and this is important—when asked which candy Charlie is looking at, children with autism answer correctly. That is, children with this developmental disorder can compute eye direction correctly, *but they cannot use that information to infer what someone wants*.

We know, spontaneously and with no mental effort, that Charlie *wants* the candy he is *looking at*. This is so obvious to us that it hardly seems to require an inference at all. It is just common sense. However, this "common sense" is

caused: it is produced by cognitive mechanisms. To infer a mental state (*wanting*) from information about eye direction requires a computation. There is a little inference circuit—a reasoning instinct—that produces this inference. When the circuit that does this computation is broken or fails to develop, the inference cannot be made. Those with autism fail the Charlie task because they lack this reasoning instinct.

As a species, we have been blind to the existence of these instincts—not because we lack them, but precisely because they work so well. Because they process information so effortlessly and automatically, their operation disappears unnoticed into the background. These instincts structure our thoughts so powerfully that it can be difficult to imagine how things could be otherwise. As a result, we take "normal" inferences and behavior for granted: We do not realize that "common sense" thought and behavior needs to be explained at all.

But it does. The joint application of an evolutionary and cognitive framework to studying the human mind is still new, but it is already becoming clear that all normal human minds reliably develop a standard collection of reasoning, emotional, and motivational programs. The social and moral intuitions these programs generate penetrate our subjective awareness, but not the intricate computational structure of the machinery that produces them. For example, people have the strong intuition that brother–sister incest is morally wrong. Moreover, it turns out that the *degree* of moral wrongness they feel is calibrated by variables that would have predicted who was a genetic relative under ancestral conditions (such as how long one co-resided during childhood with an opposite sex older sibling; Lieberman et al. 2003, 2006). But people are unaware of the computations that produce this moral intuition, resulting in what Haidt (2001) calls "moral dumbfounding": When all the reasons they give for their opposition to incest (lack of consent, genetic defects in children) have been neutralized (assume both parties consent; they used foolproof contraception), people still cling to their strong intuition that sibling incest is morally wrong, finally asserting that they "just know" it is (Haidt 2001).

The structure of the programs that generate our social and moral intuitions can no more be seen by the naked "I"—by introspection alone—than the structure of a subatomic particle can be seen by the naked eye. But their structure can be revealed through careful experimentation. Research is showing that there are a multiplicity of such programs, each individually tailored to the demands of particular evolutionary functions—inbreeding avoidance, risk-sensitive foraging, reciprocal cooperation, collective action, and so on—and many equipped with what philosophers would once have called "innate ideas" (Tooby et al. 2005). A number of functionally distinct computational systems produce a variety of specific moral intuitions, each appropriate to a particular domain of human life. These make some conceptions of fairness, justice, right, and morality easier to attend to, remember, contemplate, and accede to than others (Boyer 2001; Fiske 1991; Haidt 2001; Cosmides and Tooby 1992, 1994, 2004). There

are many more of these systems than anyone had suspected, and they respond far more sensitively to the particulars of human life than anyone had imagined.

To know which moral intuitions will be triggered in lawmakers,[1] judges, jurors, lawyers, scholars, and voters, one needs to understand these particulars. Which situational cues activate a given program? What inferences, emotions, and motivations will that program produce? Is the program designed to trigger responses that are contingent on the behavior of others? Most importantly, will the intuition about right and wrong it generates in the minds of lawmakers and citizens lead them to propose a policy that will have the consequences they are hoping for? In many cases, we suggest, the answer will be "no." Because so many laws and legal institutions in developed nations deal with social welfare, redistribution, property rights, fraud, and retribution, we will illustrate these points briefly using examples from the literature on the evolution of adaptations that motivate cooperation and sharing. In each case, we will give examples of how these cognitive adaptations—these moral heuristics—are activated by situational cues, and how they are invoked in the process of lawmaking.

DECISION RULES GOVERNING SHARING

Karl Marx thought that extant hunter–gatherers (and by extension, our ancestors) lived in a state of primitive communism, where all labor was accomplished through collective action and sharing was governed by the decision rule, "from each according to his ability to each according to his need." He thought the overthrow of capitalism would bring forth an economically advanced society with similar properties: abolish private property and all labor will once again be accomplished through collective action and, because the mind reflects the material conditions of existence, the hunter–gatherer communal sharing rule will emerge once again and dominate social life. Based on Marx's theory, 20th century laws governing property, the organization and compensation of labor, the regulation of manufacturing and trade, and the legitimacy of consent and dissent were changed across the planet, especially in China, the former Soviet Union, Cambodia, Cuba, North Korea, Vietnam, and Eastern Europe. These changes had a profound impact on the lives of the citizens of these nations, although not the utopian ones Marx had envisioned. In this light, it is reasonable to ask whether Marx's view of hunter–gatherer labor and sharing rules was correct. If not, what social and moral heuristics regarding cooperation did the selection pressures endemic to hunter-gatherer life build?

[1] Henceforth, we will use the term "lawmakers" to refer to everyone involved in making the law, including legislators, policy analysts, lobbyists, advocacy groups, etc., in keeping with usage at the conference.

Hunter–Gatherer Sharing

Hunter–gatherers share many of the resources they acquire, and it appears our ancestors have been provisioning one another with food for at least 2 million years (Isaac 1978; Marshall 1976; Shostak 1981; Gurven 2004). The hunting of large animals is often organized as a collective action, and meat—whether caught by an individual or a cooperating group—is often shared at the band-wide level (Cashdan 1989; Kaplan and Hill 1985; Kaplan et al. 1990; Lee and DeVore 1968). These meat transfers are not characterized by direct reciprocation in any obvious way, although that remains one explanatory theory for the existence of such sharing. Although there are complex and dynamic rules governing the sharing process, an argument could be made that the outcome achieved for meat may be closest to that predicted by Marx's sharing rule.

Meat notwithstanding, hunter–gatherer life is not an orgy of indiscriminate sharing, nor is all labor accomplished through collective action. Aside from meat, very little is shared at the band-wide level. Plant foods are usually gathered by individuals, who share them primarily with other members of their nuclear family (Kaplan and Hill 1985; Kaplan et al. 1990; Marshall 1976). When sharing outside the family occurs, the neediest in the community are not the first or most likely targets (although need plays a role). Conditional sharing—reciprocation—is common. Within a community, each family partners with a small number of other families, and resource sharing is characterized by informal, implicit reciprocation with delay (Gurven et al. 2000; Gurven 2004). When an individual fails to reciprocate (or reciprocates with too little), this is a source of anger, discussion, and enormous tension (Marshall 1976; Shostak 1981). Access to foraging territories is governed by explicit, formal reciprocation, as are gift exchanges with specific individuals in distant bands who are cultivated as allies for future times of need (Wiessner 1982). Reciprocation in the form of explicit, simultaneous trade also occurs, often as economic interactions with individuals in neighboring bands (Marshall 1976; McBrearty and Brooks 2000).

That sharing among hunter–gatherers is more various, more relationship-specific, and more nuanced than Marx thought is not surprising from an evolutionary perspective. Over the past forty years, evolutionary analyses have repeatedly shown that selection would not favor indiscriminate sharing, nor would it favor a one-situation-fits-all decision rule for sharing. Different kinds of sharing rules carry selective advantages in different situations, and there is evidence that the human mind indeed contains several different programs that regulate sharing. Each produces different moral intuitions about when to provide help and to whom, and each is activated by different situational cues. Thus, based on limited information, different decision rules for sharing are activated: different moral heuristics. Our first example involves the different sharing rules activated for meat versus gathered foods.

Luck and Effort as Cues Triggering Alternative Decision Rules

Why are meat and gathered food shared in such different patterns? It turns out that the real variable triggering different sharing rules is not meat versus plants per se, but whether variance in acquisition of the resource is high and due mostly to luck, or low and due mostly to effort.

Among hunter–gatherers, there is daily variation in an individual's foraging success, as well as variation between individuals in a band. Broadly speaking, the variance is caused by differences in effort expended, foraging skills, and pure luck—random factors outside the individual's control. The contribution of luck versus effort differs, however, depending on the resource, with important implications for the evolution of sharing rules (Cashdan 1989; Cosmides and Tooby 1992; Fiske 1991; Gurven 2004; Kaplan and Hill 1985; Kaplan et al. 1990; Kameda et al. 2003; Sugiyama 2004; Sugiyama and Scalise Sugiyama 2003). For some resources, including many gathered foods, variance in foraging success is low, and what variance exists is due more to differences in effort than luck or skill.[2] When everyone reliably has access to the same goods, there is little benefit to sharing widely, but there are real potential costs. The smaller the role played by chance, the more differences between individuals in amount of food foraged will reflect differences in effort or skill. When this is true, band-wide food sharing would simply redistribute food from those who expend more effort or are more skilled to those who expend less effort or are less skilled. Sharing under these circumstances offers few, if any, fitness payoffs for those who have acquired more food. Without chance creating reversals of fortune, there is little reason to expect that the future will be different from the present and, therefore, little reason to expect that those with less food now will be in a better position to reciprocate in the future. Under these circumstances, selection will favor adaptations that cause potential recipients to welcome sharing, but potential donors to be reluctant to share. Decision rules producing reluctance to share should be triggered, then, by the perception that a potential recipient's bad outcome resulted from his or her lack of effort.[3]

For other resources, such as meat and honey, luck is a major contributor to variance in foraging success. Among the Aché of Paraguay, for example, hunters making a good faith effort come back empty-handed four out of ten times (Kaplan and Hill 1985; Kaplan et al. 1990; see also Cashdan 1989). Moreover,

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2 It is unclear whether skill in gathering differs greatly between people, and practice (effort) may contribute to skill.

3 Because selection to avoid unnecessary and unrewarding effort is a pervasive selection pressure, one also expects a human psychology that attenuates effort whenever individual or family welfare does not decrease as a result. The tendency to direct effort to conditions where it leads to increases in personal and family welfare entails that humans generally should manifest some (nuanced) tendency to become free riders when circumstances permit. That means those expending effort are always at risk of exploitation by those who are free-riding.

hunting success and failure is largely uncorrelated across individuals: today you may have something and I nothing, tomorrow the reverse may be true. Under these conditions, an individual is better off redistributing food from periods of feast to periods of famine. There are two ways of doing this: through food storage or through pooling resources with others. Decay and the energetic costs of transport for semi-nomadic people mean food storage is not an option for many hunter–gatherers, but pooling resources is: If two people average their returns, variance decreases—each buys fewer days of privation at the price of fewer periods of superabundance. By adding more individuals to the risk-pooling group, variance may continue to decrease. Through a system of band-limited generalized reciprocity, food can be stored in the form of social obligations. When hunter–gatherers face frequent and random reversals of fortune, selection can favor decision rules that generate a positive desire to relieve the suffering of community members in need. These should be triggered by the perception that the suffering is caused by bad luck, rather than lack of effort (Kaplan and Hill 1985, Kaplan et al. 1990; Kameda et al. 2003). The bad luck could be caused by the vagaries of the hunt (animals, unlike plants, try to escape), by the random distribution of the resource (as with honey), or by illness and injury, a major cause of downtime among foraging people (Sugiyama 2004).

Thus sharing rules are not a function of a monolithic "culture": foragers within the same cultural group employ different sharing rules for high and low variance resources (Kaplan and Hill 1985). If this were caused by the contingent activation of alternative, domain-specific programs, then we should expect to see the same pattern in people living in industrialized cultures. Recent experiments in Japan and the United States show this is the case (Kameda et al. 2002). Like foragers, Japanese and American students were more likely to share money with others—and to demand shares from others—when it was obtained through a high variance, luck-driven process than by a low-variance process, even when effort expended was held constant. Was the effect of windfalls on intuitions about sharing caused by the students' explicit ideologies about sharing and distribution of resources? No: although ideology had some effect on the students' general willingness to share and demand resources, the effects of windfalls on sharing were found even when Kameda et al. (2002) statistically controlled for their subjects' individual attitudes toward distributive rules.

These findings suggest that different, incommensurate sharing programs—different evolved moral heuristics—are activated by the perception that bad outcomes are caused by bad luck versus lack of effort. These programs should have a grammar of their own, an internal structure. Consider, for example, the following two sentences:

1. If he is the victim of an unlucky tragedy, then we should pitch in to help him out.
2. If he spends his time loafing and living off of others, then he does not deserve our help.

The inferences they express seem perfectly natural; there seems to be nothing to explain. They may not always be applicable, but they are perfectly intelligible. But consider the following:

*3. If he is the victim of an unlucky tragedy, then he does not deserve our help.[4]
*4. If he spends his time loafing and living off of others, then we should pitch in to help him out.

Sentences (*3) and (*4) sound eccentric in a way that (1) and (2) do not. Yet they involve no *logical* contradictions. The inferences they embody seem to violate a grammar of social reasoning, in much the same way that "Alice might slowly" violates the grammar of English but "Alice might run" does not (Cosmides 1985; Cosmides and Tooby 1989, 1992, 1994). Indeed, "He spends his time loafing and living off others, so we should pitch in to help him out" (*4) sounds so strange that George Bernard Shaw used it as a point of humor in Pygmalion. Eliza Doolittle's eponymously named father argues that he should get *more* charitable help than the deserving poor, precisely because he is a lazy, drunken womanizer. After all, he has the same needs for clothing, food, and shelter as the deserving poor, but he requires far more to cover his liquor and other vices. For this argument, which violates the social grammar underlying (1) and (2), Doolittle received a grant for being a moral philosopher of great originality. No one, in fiction or in real life, would be considered original for advocating (1) or (2).

If this picture is close to correct, then the mind contains reasoning and motivational mechanisms that can reliably generate the moral intuitions expressed by (1) and (2), without also generating those expressed by (*3) and (*4). The grammar structuring these moral intuitions was selected for because of the fitness effects it had ancestrally. However, if this grammar is a reliably developing feature of the human mind—if it is part of our evolved psychology—it should continue to shape our moral intuitions about sharing and redistribution now, in policy makers, lawmakers, and the citizens they must convince. Debates about the content of the law should continue to reflect the intuitions expressed by (1) and (2)—and they do.

Consider, for example, the political and moral debate concerning increases in government help for the homeless in the United States. Those with opposing postures frame their positions in ways that exploit the structure of this evolved psychology. A persistent theme among those who favor increases (i.e., who wish to motivate more sharing) is the idea that "there but for fortune go you or I." That is, they emphasize the random, variance-driven dimensions of the situation. The potential recipient of aid is viewed as worthy because he or she is the unlucky victim of circumstances, such as unemployment, discrimination, or mental illness. On the other hand, those who oppose an increase in sharing with the

[4] We marked sentences with an * to denote them as "ungrammatical" to our mind's moral grammar of cooperation in the same way that linguists routinely star sentences that are ungrammatical.

homeless emphasize the putatively chosen or self-caused dimensions of the situation. Potential recipients are viewed as unworthy of aid because they "brought it on themselves." They are portrayed as able-bodied but lazy, or as having debilitated themselves by choosing to use alcohol and narcotics. The counterresponse from those who want to motivate more sharing is to portray alcohol and drug use not as a choice, but as an illness, and so on.

Lawmakers and citizens do not argue about the underlying logic of the decision rules expressed by (1) or (2). They argue about whether discrete classes of individuals meet the input conditions specified in the antecedent clause of (1) and (2)—in this case, about whether this bad outcome, homelessness, was caused by bad luck or by lack of effort. They do not argue about which sharing pattern is then entailed. They do not need to: the implication for sharing is embedded in the grammar of the evolved moral heuristics.

The Law and Social Welfare

Many laws are advocated on the basis that they promote general social welfare (Sen 1989; Epstein 1995). Moral intuitions expressed by the decision rules in (1) and (2) were not, however, selected for because they promoted or maximized general social welfare within a hunter–gatherer band. These decision rules were selected for because they promoted their own reproduction, by promoting the reproduction of the individuals whose minds were equipped with them and therefore shared in accordance with them. That is how natural selection works. Our minds are not equipped with moral intuitions designed to promote general social welfare, even in the contexts for which they evolved.[5] When they have this effect—and sometimes they do, as we discuss below—it is a side effect of their design, a fortuitous accident emerging when minds designed for a vanished world interact in a modern context.

Moral heuristics, like other decision rules, were designed to operate well in particular environments; they cannot be expected to produce the same effects outside these conditions. There is no such thing as an omniscient, omnipotent algorithm, one that can calculate the best course of action in any imaginable environment (Cosmides and Tooby 1987; Gigerenzer and Selten 2001; Tooby and Cosmides 1992). Decision rules are *mechanisms*, programs with a causal structure. They were designed to produce fitness-promoting outcomes in the environments that selected for their structure. In the case of the moral heuristics described by (1) and (2), that environment was a band of roughly 25–50 cooperating people; many of them were relatives, who could be closely

[5] It is possible that some moral intuitions were selected to direct small group level coordination to mutually beneficial outcomes (but such group-restricted coordination is hardly *genera*l social welfare). Regardless of whether that happened, it is a certainty that small group coordination is only one of many selection pressures shaping the human repertoire of evolved moral heuristics.

monitored for free riding because of the close proximity of their living conditions. Donors would be intimately familiar with the characters and need levels of potential recipients.

What happens when these moral intuitions operate outside the environment for which they were designed, in a modern nation of strangers, numbering in the millions? One goal of law is to create "rules of the game" (North 1990) to promote the general social welfare. Will the rules embedded in heuristics like (1) and (2) be good candidate rules of the game? Does the easy activation of these particular moral intuitions lead lawmakers and citizens to overlook better solutions, ones more likely to have a consensually desired outcome in the modern world?

When millions of relatively anonymous people interact in a modern market, the results can be counterintuitive and surprising. For example, rent control is often advocated as a way of giving homes to the homeless and of preventing the working poor from becoming homeless. Rent control makes sense to a hunter–gatherer mind: If housing is more expensive than a poor person can afford, then use the law to make it less expensive. *If he is the victim of bad luck, we should pitch in and help him out.*[6] Those who have the unequally distributed resource—landlords—should share it with those in need. Punish landlords who violate this sharing rule (see below on punishment in collective action).[7] Use the force of the state to punish landlords who charge "too much."

Yet does rent control have the effect of *actually* helping the homeless? Using a large sample of cities in the United States, Tucker (1990) analyzed what factors predict rates of homelessness. Surprisingly, unemployment and poverty rates did not predict rates of homelessness, but rent control and mean temperature did—indeed, they were major and significant predictors. Cities with rent control had significantly *higher* homeless rates than cities without it. It turns out rent control has a range of unanticipated secondary effects. In particular, it deters construction of rental units and motivates the owners of existing housing to avoid placing or keeping units on the rental market. The supply of rental units consequently shrinks or stagnates, resulting in fewer places for poor people to live and skyrocketing prices in unregulated or informal sectors of the housing market. Voting for rent control may make citizens feel good about themselves (even when they are not directly benefitting themselves), as it is a way of acting on the moral intuition expressed by (1). However, by doing so, they appear to be condemning the actual victims of bad luck to a brutal life on the streets.

6 Many cities first adopted rent control during World War II. This is interesting for two reasons: (a) war creates many victims of unlucky tragedy; (b) warfare is one of the few contexts that activates coalitional cooperation with norms of communal sharing among hunter–gatherers (see next section).

7 Secondarily, of course, landlords are a minority. So the impulse is typically: force others—landlords—to share with those in need (as well as those not in need, renters voting in their self-interest).

Providing housing vouchers (for example) from general tax revenues would allow the homeless to obtain housing without these negative effects on the rental supply.

COLLECTIVE ACTION, FREE RIDERS, AND PUNISHMENT

Marx's theory appeals to some of our evolved moral heuristics (as well as to our hunger for a small-scale world of affectionate communal sharing). He advocated a world in which most labor is organized as a collective action, where people cooperate as a group to produce goods that are then communally shared. Game theorists, economists, political scientists, anthropologists, evolutionary biologists, and psychologists have been studying the psychology and dynamics of this form of collective action, and some of the results are surprising. The dark harvest of nation states centrally organized around collective action has principled explanations rooted directly in an evolved psychology of cooperation and punishment (Tooby et al. 2006).

Coalitional cooperation (as opposed to a two-person exchange) exists when three or more individuals coordinate their behavior with one another to achieve a common goal, and then share the resulting benefits. Among hunter–gatherers, coalitional cooperation among nonkin most commonly occurs in two contexts: cooperative hunting and intergroup aggression (small-scale warfare). Most other labor is pursued in other ways.

Whether the common goal is to produce resources (as in cooperative hunting) or to seize them from others (as in intergroup aggression), achieving that goal requires a sophisticated form of cooperation. Individuals within the group must coalesce into a coalition, i.e., a cooperative unit whose members act together to attain a goal. This form of collective action often produces public goods but—as economists, evolutionary biologists, and game theorists have recognized—the payoff dynamics inherent in collective action create the incentive to free ride, rendering coalitional cooperation unstable and difficult to sustain (Olson 1965; Henrich and Boyd 2001; Price et al. 2002).

Kin selection mitigates some of these problems, and information-processing mechanisms that enable coordinated action and cooperation among multiple genetically related individuals have evolved a number of times (e.g., the social hymenoptera (bees, ants); Hamilton 1964). However, coalitional cooperation among unrelated individuals is zoologically rare, with humans and chimpanzees as the only uncontroversial examples (Wilson and Wrangham 2003; Wrangham and Peterson 1996). Unlike most other species, humans readily form multi-person cooperative alliances that change dynamically, rapidly dissolving, shifting, and re-forming as new tasks, issues, and conflicts arise. What is the evolved psychology that makes this possible?

Free Riding, Punishment, and Collective Action

When faced with the decision to participate in a collective action, there are two choices: free ride or participate. Ever since Mancur Olson's trenchant analysis, economists have understood that free riding generates a higher payoff than cooperation: participants and free riders get the same benefit—a successful outcome—but free riders do not incur the cost of participation (Olson 1965). This incentive to free ride results in a paradoxical outcome: participation unravels and the project fails, even though each individual would have been better off if the project's goal had been successfully achieved.

Evolutionary biologists find cooperation in collective actions puzzling for a different, but related, reason. In evolutionary biology, the different payoffs to alternative choices are relevant only if they cause differential reproduction of alternative designs (alternative programs) that cause those choices. The fact that collective action is rare in the animal kingdom means that most organisms *lack* programs that cause participation: free riding, therefore, is the default choice. If payoffs to collective action translate into reproductive advantages, then how could designs causing participation have gained a toe-hold in a universe dominated by non-participants? Those who participated in a successful collective action would have experienced an increase in their fitness, but free riders would have benefited even more (by getting the benefits of the achieved goal without suffering the costs of participation). The currency is differential reproduction of participant versus free-riding designs; this means that individuals equipped with programs that caused free riding would have out-reproduced those equipped with programs that caused participation. Consequently, free-rider designs would have been selected for, and any participation designs that arose in a population would have been selected out. If so, then why do we see individual human beings routinely and willingly participating in collective actions? How did participant designs outcompete free-rider designs? How is the free-rider problem solved?

Recent models of the evolution of collective action have focused on the role of punishment in solving the free-rider problem (Boyd et al. 2003; Gintis 2000; Boyd and Richerson 1992; Henrich and Boyd 2001; Kameda et al. 2003; Panchanathan and Boyd 2004). These models show that willingness to contribute to a public good can be evolutionarily stable as long as free riders are punished, along with those who refuse to punish free riders. These analyses propose that humans have evolved moral heuristics that produce the intuition that free riders should be punished.

There is evidence supporting this prediction. Recent research from evolutionary psychology and experimental economics indicates that individuals who contribute to public goods feel punitive toward free riders. Research in experimental economics using public goods games has shown not only that contributors do punish free riders, but they are willing to *pay* out of pocket to do so

(Dawes et al. 1986; Fehr and Gachter 2000a; Masclet et al. 2003; Ostrom et al. 1992; Sato 1987; Yamagishi 1992). In sharp contrast to predictions of rational choice theory, people incur personal costs to punish free riders even in one-shot games; that is, even when it appears that they are unlikely to have future interactions with the individual they punished and, therefore, are unlikely to recoup their losses in the form of increased cooperation from that person in the future (for review, see Gintis 2000). Decision rules designed to maximize personal payoffs in response to modern situations would *not* produce this outcome, but decision rules designed for a small social world of repeated interactions would.[8]

Psychological studies support the view that one's own willingness to contribute to a collective action triggers punitive sentiments toward free riders[9] (Price et al. 2002; Price 2003, 2005). The more one contributes, the more punitive one feels toward those who do not. This occurs not only in undergraduate populations (Price et al. 2002), but in Shuar hunter–horticulturalists engaged in sugar cane cultivation in the Ecuadorian Amazon (Price 2003, 2005). Analysis of individual decision making in experimental economics games converges on the same pattern: punishment is more severe as a function of how much less the free rider has contributed than the punisher, and how far below the group average the free rider's contribution falls (Masclet et al. 2003).[10]

Research on contributions to public goods in experimental economics shows that people continuously monitor the state of play, adjusting their behavior accordingly (Brewer and Kramer 1986; Fehr and Gachter 2000a, b; Kurzban et al. 2001; Masclet et al. 2003). If the game allows punishment, higher contributors inflict punishment on under-contributors right away (which has the secondary consequence of allowing levels of cooperation to spiral up toward the welfare-maximizing optimum of 100% contribution to the common pool; Fehr and Gachter 2000a; Masclet et al. 2003; for analysis, see Price et al. 2002). When there is no opportunity to punish, high contributors ratchet back their own contribution to something like the group average. As this monitoring and adjustment process iterates, contributions gradually diminish to rational choice theory expectations (Kurzban et al. 2001). However, this iterative ratcheting back does not reflect the emergence, through learning, of rational choice: when a new collective action begins, the very same people start out contributing to the common pool at relatively high levels (about 60% of their endowment; rational choice theory predicts 0%).

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8 Not only do hunter–gatherers typically experience repeated interactions, but the possibility always remains that they will interact with a given individual in the future—they cannot be sure a situation is one-shot until one of them is dead.

9 The level of punitive sentiment toward free riders is predicted by subjects' willingness to contribute, even when their self-interest in achieving the group goal is controlled for statistically.

10 Sometimes very low contributors punish very high contributors as well, perhaps to discourage high contributors from inflicting punishment on them (Masclet et al. 2003).

In other words, people have a taste for punishing free riders, and collective actions are more likely to succeed when they exercise this taste. The desire to punish free riders does not result from a strategic rational analysis, with backward induction, of the current and future payoffs of alternative decisions. If it did, people would not pay to punish in one-shot games, and their level of punitive sentiment would be independently predicted by how much they think they will benefit from the collective action succeeding (it is not; see Price et al. 2002). Instead, the decision rule is more like a moral heuristic that is activated by participating in a collective action, which uses limited information to judge how much punishment is deserved. The inputs are (a) one's own level of contribution, (b) the average contribution level in the group, and (c) the contribution level of each individual in the group. More punitive sentiment is felt toward those who contribute less than the self as well as those who contribute less than the group average.

Lawmakers Are Members of the Species Too

Every year, idealistic young Americans vie for internships and jobs with public advocacy groups in Washington, D.C., yearning to work for the public good. Nevertheless, many volunteers (and even paid workers) are lost to "burnout": a catastrophic drop in morale triggered by the accumulating perception that only you and a few others are making substantial contributions, while most people free ride. This realization is frequently accompanied by bitterness and anger (punitive sentiment?) toward non-participants, who are disparaged as indifferent, selfish, ignorant, or malign. The punitive moral heuristic described above implies that the very experience of working hard for a collective good should trigger negative sentiments toward those who do not: Contribution entitles you to punish noncontributors. The loss of interest in making further contributions is also expected: these are private groups that lack the ability to punish free riders, a circumstance that triggers the strategy of iterative ratcheting back.

Less obviously, the moral heuristic that generates punitive sentiment in proportion to one's own contributions to a collective action might color the legal solutions favored by those who work hard for advocacy groups (or collectivist governments). Consider the implications of the work showing that, although willingness to participate in a collective action triggers punitive sentiments toward free riders, it does not trigger a desire to reward fellow participants (Price et al. 2002; Price 2003, 2005).

Producing cleaner air is a classic public good. In an effort to reduce air pollution, one could advocate a pro-reward policy (e.g., tax incentives for businesses that contribute to the goal by reducing their pollution) or a punitive policy (e.g., fines levied on businesses that do not reduce their pollution). Which is more effective is an empirical matter, and the goal of clean air is best served by choosing the most effective policy. (N.B.: the authors have no opinion about which works

best). Still, the very act of participating in a collective action triggers punitive sentiments toward free riders (businesses that do not reduce their pollution), not pro-reward sentiments toward contributors (businesses that do reduce their pollution) (see Price et al. 2002). Indeed, the more energetically one works for an environmental advocacy group, the more punitive one should feel toward businesses who do not curtail their pollution and toward fellow citizens who do not contribute to the group's work. Once this moral sentiment is activated, policies that impose sanctions and laws that mandate contributions toward the goal (through taxes and state agencies) may seem more reasonable and just. Indeed, individuals who, before joining an environmental advocacy group, had favored pro-reward policies might be expected to undergo a change of heart after joining. Once they are actively participating, they can be expected to experience an ethical tug in the direction of punitive sanctions and enforced contributions, and away from policies that reward businesses for curtailing pollution.

More broadly, different subsets of the population have different values and envision or embark on different collective projects. From the point of view of an individual involved in one project, others with diverging projects (and different views and values) appear to be free riders with respect to one's favored enterprises. Because government monopolizes the means of unilateral punishment, struggles over the reins of power can be expected, even by the initially well-intentioned. Their sacrifices for their governing enterprise will intensify the activation of their moral heuristics so that dissenters and those who (to their vision) undercontribute will seem to deserve punishment. Indeed, to the extent that members of any government department imagine themselves to be involved in projects for the collective good, they can be expected to accumulate punitive sentiment toward the public at large. As the 19th century novelist Liu E comments, "everyone knows that corrupt mandarins are evil, but few know that irreproachable mandarins are worse; [they] delude themselves that because they turn down bribes, they have the right to impose any decision they wish. Their clear consciences…can lead them to massacre the innocent" (quoted in Leys 1979, p. 137).

Working with Human Nature

Are there ways of harnessing these moral sentiments in the service of reducing negative externalities such as pollution? Clean air is a public good, but the individuals charged with enforcing pollution standards are government bureaucrats at agencies like the Environmental Protection Agency (EPA). Imagine a slightly different system: "pollution courts," where companies that had contributed to the public good by demonstrably reducing their own pollution levels had standing to both present evidence of pollution by their free-riding competitors and request the imposition of fines. Might this give companies an incentive (a) to prove they deserve standing (by lowering their own pollution levels) and (b) to

investigate cases of pollution, thereby reducing the EPA's burden? Could this system wipe out the profit advantage the free-riding polluter has over companies that voluntarily curtail their pollution?

Another possibility is to develop market-based solutions, which operate by creating incentives to reduce pollution while allocating productive resources efficiently. For example, in cap and trade schemes, legislatures put a cap on the total amount of gas emissions permitted, and a market is created in which rights to emit a certain quantity of these gases can be bought and sold (for an informative discussion of market-based methods for improving the environment, see *The Economist*, April 23, 2005). But market-based solutions do not punish free riders directly, and they are rarely advocated by environmental groups. Is this because they are ineffective? Or is it because they do not satisfy the punitive sentiments lawmakers and citizens feel toward free-riding polluters?

Becoming aware of our moral heuristics is as important as careful economic policy analysis. To solve problems, we need to know our own minds: it is the only way to distinguish between policies that are appealing because they make us feel virtuous and policies that are unappealing but actually work.

Punitive Heuristics and the Organization of Production

Marx argued for a system in which most labor is organized as a collective action on a grand scale, but most collective action events among hunter–gatherers involve a small group (3–7) of well-acquainted individuals who live together and can respond to individual differences in performance sensitively and dynamically. Interestingly, psychological experiments suggest that in the absence of punishment, contributions to public goods start to fall as group size starts to exceed eight individuals (Brewer and Kramer 1986). Will an evolved psychology of collective action designed for working groups of a few well-known, easily monitored individuals scale up to factories and farms with thousands or societies of millions? Can collective action work well on all scales of social organization? How does Marx's vision of each individual working to the best of his ability, and giving the fruits of his labor to others according to their need, square with the existence of free riders? Will collective actions on a grand scale elicit free riding on a grand scale? Under these conditions, will heuristics motivating punishment of free riders be activated in those committed to making the system of collective cooperation work, creating a punitive social climate? What outcomes should we expect when the law prohibits private action and mandates collective action?

Communitarian methods of organizing production have a strong ethical pull for many people, including ourselves. Equal division of profits can seem fair (under the assumption that everyone is contributing equally) or at least humane (under the assumption that everyone who is capable of contributing is doing so). The fairness of these compensation schemes is predicated on the assumption

that no one free rides. Their efficacy is predicated on the assumption that if free riding does occur, contributors will continue to work at the same level—there will be no iterative ratchet effect. Are these reasonable assumptions? Lawmakers and citizens need to consider whether certain methods of compensation invite free riding and dwindling participation, given the kind of minds we have.

Price (2003, 2005) conducted detailed studies of punitive sentiments toward free riders among a group of Shuar men living in the Ecuadorian Amazon. These men had decided to cultivate sugar cane, and they had organized their labor as a collective action. The labor consisted primarily of using machetes to clear the fields for cultivation. Everyone who participated was guaranteed an equal share of the proceeds from selling the crop, and there were consensually agreed upon fines for not showing up to clear the fields. Price found out how large each man felt the fine for free riding should be, and discovered that the size of the fine was predicted by how much each man actually contributed to this collective action project.

Interestingly, the Shuar collective action in sugar cane cultivation ultimately failed. The fines had no bite: instead of being levied after each work episode (each episode in which participation occurred and could be monitored), the fines were to be deducted from each individual's profit once the crop was harvested and sold. The iterative ratchet effect ensued. Over time, participation in the cultivation effort dwindled to the point where the project failed and there were no proceeds to share. It is worth noting that everyday life among the Shuar involves norms promoting generosity and sharing at levels rarely seen in large scale industrial societies.

Farms, factories, restaurants—all involve multi-individual cooperation and hence collective action. The question is: Should these projects be organized as public goods (everyone benefits equally, regardless of their level of participation), or should payoffs be organized such that effort is rewarded and free riding is punished? One of many natural experiments was provided by agricultural policy in the former Soviet Union. The state nationalized farmland and forced farmers to organize their labor as a collective action. But they allowed 3% of the land on collective farms to be held privately, so local farming families could grow food for their own consumption and privately sell any excess. The results were striking. Estimates at the time were that this 3% of land produced 45% to 75% of all the vegetables, meat, milk, eggs, and potatoes consumed in the Soviet Union (Sakoff 1962). The quality of land on the collectively-held plots was the same; their low productivity was due to the iterative ratchet effect. People shifted their efforts away from the collective to the private plots. Without these private plots, it is likely that the people of the Soviet Union would have starved. In China, when all peasant land was collectivized into mass communes of roughly 25,000 people apiece, the result was the largest famine in human history. Population statistics indicate that at least 30 million people starved to death during 1958–1962, and cannibalism was widespread (Becker 1997). Presumably this was not the

intention of the lawmakers. The operation of our evolved psychology creates large scale dynamics in mass societies. We need to pay careful attention to these dynamics scientifically, rather than being deluded by the outputs of our moral heuristics—heuristics that evolved when the social world was radically smaller.

A great deal is still unknown about the motivational systems deployed in collective actions. But so far, the evidence suggests that the human mind has motivational systems that:

1. lower one's level of contribution when this does not adversely affect the welfare of oneself, one's family, or one's small circle of cooperators (note 3);
2. lower the amount of effort one expends on a collective action as a function of whether others are free riding; and
3. increase punitive sentiments toward undercontributors by contributors (which, presumably, includes those in leadership and coercive military social roles).

Sufficiently large collective actions decouple reward from effort, initiating a process of declining effort by some, which stimulates matching withdrawal by others. This free riding and the dwindling participation it engenders intensify punitive sentiments toward undercontributors, culminating in social systems organized around coercion and punishment (where rulers can deploy it) or culminating in dissolution (where they cannot). Indeed, the rapid and universal recourse by a diversity of communist regimes to extreme (and sometimes genocidal) punitiveness as a regular tool of state policy may have been driven, at least in some measure, by the operation of these moral heuristics.

Collective action and commensal sharing—constitutive of our closest family relationships—beckon to us as the ideal form of human social organization: everyone participates, everyone benefits, no one is left behind. Acting on this appetite, without solving the problematic outputs of our moral heuristics, will mean the future of collectivist nation states will be like the past.

PRIVATE EXCHANGE AS A FAST AND FRUGAL HEURISTIC?

The human cognitive architecture contains a neurocognitive system that is well-engineered for reasoning about dyadic social exchange: cooperation for mutual benefit between two social agents (Cosmides 1989; Cosmides and Tooby 1989, 1992, 2005; Fiddick et al. 2000; Gigerenzer and Hug 1992; Stone et al. 2002; Sugiyama et al. 2002). By well-engineered, we mean there is a precise fit between (a) the design features of the inference and decision rules that comprise this system and (b) engineering specifications derived from models of the evolution of reciprocation developed by evolutionary game theorists and

behavioral ecologists (Cosmides and Tooby 1992, 2005). The neurocognitive system regulating social exchange includes a functionally and neurally isolable subroutine for detecting cheaters (individuals who accept benefits but do not reciprocate them). To detect cheaters, this moral heuristic samples very limited information, attending only to those who have failed to provide a benefit (to see if they accepted one) and those who accepted a benefit (to see if they failed to provide one).

The inference procedures and decision rules involved were designed to regulate private exchange and reciprocal sharing, not to motivate helping at a grander societal level. Yet since Adam Smith, economists have known that under certain conditions (e.g., many interactants, minimal externalities, consensual interactions) freely conducted trade does systematically promote general social welfare. Adam Smith himself was exact on this point: He argued that private exchange promotes the wealth of nations, even when traders intend to pursue private gain rather than social goods. In apparent defiance of common sense, societies dominated by central economic planning (rationally designed to produce increases in general welfare) end up producing far lower levels of welfare than societies in which the private exchanges (not aimed at producing general welfare) substantially replace government decision making.

It is worth considering whether this is because private trade itself embodies fast and frugal heuristics that produce high levels of social welfare in the modern world. When coercion and fraud are disallowed so that interactions between people are based on their mutual consent, two individuals agree to an exchange only when each expects a net benefit from the interaction.[11] Each voluntary exchange that is undertaken with correct foreknowledge of its consequences would therefore increase the welfare of the interactants themselves, or they would not choose it.[12]

In such a system, each individual can operate with very limited information about values and preferences—you need to compute your own, situation-specific preferences and trade-offs, and do not need to know very much about others: You can simply listen to their proposals, and select those that in your evaluation will improve your welfare the most. Significantly, the human mind was intensely selected to evolve mechanisms to evaluate its own welfare, and so is equipped by natural selection to compute and represent its own array of preferences in exquisite and often unarticulable detail. The array of n-dimensional rankings that inhabits our motivational systems is too rich to be communicated to others or represented by them, which is one reason why displacing value-guided decision making to remote institutions systematically damages social

[11] Because the law forbids coercion and fraud, exchanges involving the infliction of coercion or fraud on others are disallowed.

[12] Perfect foreknowledge of consequences is unnecessary for the argument to work. All that is needed is that these estimates of benefit net to an on average benefit summed over interactions.

welfare. Under a system of private exchange, this richness need not be communicated or understood by anyone else—its power is harnessed effectively by a simple choice rule built into the human mind: pick the alternative with the highest payoff.[13] The prices others set for what they are willing to exchange constitutes a fast and frugal heuristic for discovering others' exchange preferences, even when they are strangers. The emergence of money (a culturally accepted medium of exchange) makes the operation of this heuristic even faster and simpler: price can be communicated by a unidimensional quantity. If someone cheats you, there is a fast and frugal way to punish the cheater and protect yourself in the future: trade with others instead.[14] (Indeed, this option is more easily exercised in large modern societies with many alternative trading partners and low costs of information than it was in small ancestral ones with few.) The parties themselves are generally the most motivated, the most attentive, and the best situated to discover defects or insufficient value in the exchange outcome. They are the individuals most motivated to alter their subsequent choices advantageously. Because the transaction is private, you do not need to get prior permission from an unmotivated and remote government representative to improve your welfare through trade, or to change to a different supplier (De Soto 1989). (For government actors to systematically improve upon self-regulation by participants, welfare promoting government actors would need to be motivated by the welfare of the participants—a public choice problem—know the values of the participants as well as the participants do themselves—requiring unbounded rationality—and otherwise have access to huge arrays of information that is generally inaccessible to them.)

Recursively, formalized dyadic exchange interactions can network individuals into *n*-person units (partnerships, corporations, non-profit organizations, etc.) that can then be substituted back into dyadic interactions as one of the two parties (Tooby et al. 2006). Rich complexities internal to the organization need not be understood or represented by external parties who interact with it; they

[13] Obviously the cognitively impaired can be exploited, and exploitation can also occur whenever outcomes cannot be evaluated over the short run.

[14] A legal system committed to enforcing contracts can also provide redress and restitution, of course. Our point is that there is a clean way of avoiding future exploitation, even without the courts. Interestingly, this method—avoid interacting with the cheater in the future—is not available when labor is organized as a collective action. Avoiding a free rider means abandoning the entire group effort, not just a single individual. It may be the fact that collective action ties people together that selects for punitive sentiments toward free riders in those contexts. Interestingly, punishment of free riders increases their subsequent contributions to public goods games, but it does not do so in situations involving dyadic exchange (McCabe et al. 1998). The most common response to cheating in exchange may be simply to cooperate with someone else, rather than to inflict costly punishment. If so, then the motivational system of cheaters may be to be particularly responsive to the possibility of exclusion and ostracism, rather than punishment.

can cognitively reduce it to a single agent on the other side of a two-party exchange. That is, voluntary exchange directly scales up to include increasing numbers of interactants, so long as it is structured at each interaction as a system in which each party can choose without coercion the best alternative it is offered by any other party. Each dyadic interaction pumps up average welfare among the interactants, and since everyone is linked through these distributed dyadic interactions, the increase in welfare is distributed (although not always equally) throughout the network. The system uses limited information about values that is only available locally (what do I want, what am I willing to do) and simple heuristics (choose the alternative that is better for me/us) to progressively move to ever-increasing levels of social welfare. There are no problems of unbounded rationality: Unlike a command and control economy, the government does not need to set prices by figuring out how much each individual in the society values each resource and act (Hayek 1972). The law in combination with distributed choice becomes, in effect, a system for distilling out increasingly well-ordered benefit–benefit transactions, which no set of planners could have foreseen or implemented.

Of course, people are only free to seek out benefit–benefit interactions[15] when the rules of the game—the law—prevent coercion through sanctioning those who seek to gain a benefit by forcing others to incur costs (for a detailed legal analysis, see Epstein 1995). This is why government coercion is so commonly welfare destroying across the globe. The voluntariness of exchange creates a built in fail-safe floor in the damage it can do: Others typically cannot make you worse off through exchange. Under voluntary consent, the worst others can do is refuse your offers, leaving you with the same welfare level you had before. In contrast, the passage and coerced compliance with laws by lawmakers has no such fail-safe floor enforced heuristically by distributed choice. That is, there are no limits to how much worse off the individual or the collective can be made under coercion, and often no way to know in advance what the costs will be. The inevitable failure to represent all of the consequences in all the varied and unimagined circumstances where a law will be applied eliminates any necessary relationship between the lawmakers' intentions and actual outcomes. By prohibiting a given category of interactions, the law throws away local or rapidly changing information about variation in values in a way voluntary consent expressing itself in changing prices does not.

In short, voluntary exchange systematically propels net aggregated social welfare upwards in a hill-climbing process to the extent the opportunity to engage in it is distributed through the population. The system is driven by consent-driven feedback to sort for ever-increasing benefit-benefit interactions among sets of individuals, so that modern market interactions far transcend what any boundedly rational entity (such as a government) could have planned or

[15] See De Soto (1989) for a sobering analysis of how the transaction costs of multiple permits impairs trade and creates poverty.

discovered. In contrast, the process of decree even by elected representatives has no such richly sensitive feedback element to tailor law to individual circumstances.

In *Simple Rules for a Complex World*, Richard Epstein (1995) provides a detailed exposition of the kinds of laws—simple and few—needed for dyadic cooperation to become a fast and frugal engine of social welfare. It is not perfect: as with any system, negative externalities can occur even when force is disallowed, and there need to be legal mechanisms for minimizing them. Moreover, it requires political and legal institutions that limit the extent to which the coercive force of the state can be used by lawmakers, businesses, and coalitions of citizens to favor special interests, using compulsion to take what they cannot gain consent for through persuasion or trade. Even with these problems, when compared to the performance of command and control economies, freer economies—ones where the rule of law more closely approximates Epstein's system—have a far better empirical track record in providing the most goods for the greatest number. Berlin, the site of this Dahlem workshop, provides a particularly clear natural experiment. The striking differences between East and West Berlin before the fall of the Wall were visible for all to see. Logically speaking, large scale collectivization during the 20th century *could* have liberated human productive energies, but empirically, it did not. Whether one is speaking about Ujamaa villages in Tanzania, the impact of block committees in Cuba, intentional communities like New Harmony in the U.S., famine-stricken North Korea versus South Korea, or Taiwan and Hong Kong versus Maoist China, the negative effects of channeling human productive energies through collective action are large, systematic, and remarkably consistent.

In this light, we find the following observation interesting: When considering how to improve social welfare as a whole, removing restrictions on private trade is rarely considered by anyone without an economic education (e.g., the 1947 price decontrols that ended widespread hunger in West Germany were widely opposed[16]). Such proposals seem counterintuitive, retrograde, and even sinister. Is this because it is an ineffective method, or because the neurocognitive

[16] It is common knowledge that in 1947, the elimination of price controls, combined with tax rate reductions and currency reform led to a dramatic turnaround in German economic performance—the so-called German Economic Miracle (Lutz 1949; Heller 1949; Hirshleifer 1987; Mendershausen 1949; Wallich 1955). Prior to these reforms, price controls on food had kept hunger widespread. Yet with decontrol, "[t]he spirit of the country changed overnight. The gray, hungry, dead-looking figures wandering about the streets in their everlasting search for food came to life," as Yale economist Henry Wallich observed (Wallich 1955). American New Deal advisors of the occupation forces, as well as German politicians, generally opposed the deregulation that saved so many lives (Wallich 1955; Heller 1949). American opposition was fortunate, in that it allowed Ludwig Ehrhardt to present the reforms politically as a form of nationalist opposition to foreign authority—the exploitation of another fast and frugal moral heuristic, ethnocentrism, to save lives.

system activated by opportunities to trade produces intuitions about private gain rather than public good? We intuitively recognize how we might benefit from others sacrificing for the common good; but our minds are not designed to recognize how we benefit in aggregate from others' private exchanges.

CONCLUSIONS

In an article on psychology and the law, Richard Korobkin explains that the law has two broad functions, one intrinsic and the other instrumental. The intrinsic function is fulfilled "when law codifies *some social conception of right, justice, or morality*." The instrumental function is fulfilled "when law is used to shape the behavior of those governed in a way that creates a society that is closer in practice to *some social conception of right, justice, or morality* than it would otherwise be" (Korobkin 2001, pp. 319–320; italics added).

There is a tension between these two functions. Our minds are equipped with moral heuristics that were designed for a small world of relatives, friends, and neighbors, not for cities and nation states of thousands or millions of anonymous people. Laws that satisfy our moral intuitions—our conceptions of right, justice, and morality—satisfy the law's intrinsic function through codifying some of our intuitions about justice. But because our moral heuristics are now operating outside the envelope of environments for which they were designed, laws that satisfy the moral intuitions they generate may regularly fail to produce the outcomes we desire and anticipate; that is, laws that satisfy the law's intrinsic function may fail to satisfy its instrumental function.

Even worse, moral heuristics may cause us to overlook policies that do satisfy the law's instrumental function. These mental programs so powerfully structure our inferences that certain policies may seem self-evidently correct and others patently exploitive. But modern conditions often produce outcomes that seem paradoxical to our evolved programs: self-interested motives can be the engines that reliably produce humane outcomes, and what seem like good intentions can make a hell on earth.

Many legal ethicists are consequentialists. If you are a consequentialist, however, then real consequences should matter to you. To determine what the consequences of a new law will be, we cannot rely solely on rational choice theory because it is not an accurate description of human nature. Nor can we rely on the intentions or intuitions of lawmakers and citizens: As members of the species, our intuitions about a policy's likely consequences are often readouts of moral heuristics designed to operate in a social world of a few score individuals, not a nation of millions.

How, then, can policy makers predict the likely consequences of new laws? Economic analysis and agent-based modeling provide methods for inferring how the choices of many individual decision makers aggregate into patterns at

the societal level. To be an improvement over rational choice theory and moral intuitions, however, these analytic methods must be grounded in accurate scientific knowledge about the design of the human mind. To do this, we need to know the evolved decision rules to be found in the human mind, including its rich collection of social and moral heuristics.

Leaving aside the instrumental, what can evolutionary psychology tell us about the intrinsic function of the law? When considering the law's intrinsic function, it is worth reflecting on where our conceptions of right, justice, and morality come from. Some of these conceptions spring from evolved moral heuristics. But these did not evolve because they produced objective justice (whatever that may be), even when operating in the ancestral environments that selected for their design. They evolved only because they advanced the fitness of their own genetic basis under ancestral conditions. These bizarre events of ancestral DNA editing are a strange foundation on which to confidently erect moral principles or modern legal systems.

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