Sendhil Mullainathan’s paper does a terrific job of acquainting the reader with concepts in behavioral economics. Sendhil is one of the young wizards pioneering behavioral economics in two directions (which those of us working in behavioral economics since the 1980s have been hoping would emerge for years)—formalizing psychology mathematically in a way that makes it directly useful in economic theory, and searching for applications in field data (see Camerer and Loewenstein 2003 for a recent review). Sendhil has laid out the central questions clearly and thoroughly, so my discussion will focus on two topics that go beyond his essay:

1. Other concepts in psychology that can be used to think about development, particularly attribution theory and mental modeling.

2. The prospect for simple experiments that can tell us something about development, illustrated with two examples: a remarkable cross-cultural coordinated field experiment, and a laboratory experiment on simple capital investment economies with poverty traps.

New Psychology and “21st-Century Behavioral Economics”

Sendhil’s paper covers what might be called “20th-century behavioral economics.” That is, most of these ideas developed during the 1980s, when psychologists like Kahneman and Tversky used the rational choice model as a foil against which to understand limits on rationality; Kahneman shared the Nobel Prize with Vernon Smith in 2002. Their idea was to use deviations from rational principles such as utility-maximization and Bayesian updating, much as optical illusions are used to study perception: The deviations from rationality tell us about the basic mechanisms of judgment and choice.

Of the concepts Sendhil describes, a particularly important one for development is “loss-aversion”—the fact that losses loom larger than equal-sized gains (and probably

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activate different regions of the brain). An implication of this principle is that people really dislike giving up what they have gotten used to having or experiencing. This makes it difficult to implement reforms. At lunch with Vernon Smith after this symposium, Vernon mentioned that in implementing economic design (a practice pioneered by him and my Caltech colleague Charles Plott, among others), it is crucial to “grandfather” rules so that people with current entitlements won’t fear having them taken away. This dictum is the economic engineer’s way of incorporating awareness of loss-aversion to craft reforms that can be implemented from a behavioral point of view.

The fact that the psychologists who laid the groundwork for 20th-century behavioral economics focused on deviations from simple rationality principles constrained the kinds of psychology that they tapped—and that we imported into economics. This leaves a lot of other interesting ideas in psychology. I’ll discuss two of these: attribution and mental modeling.

**Attribution of Credit and Blame**

In most complex systems, we really don’t know who is at fault. Psychologists call the problem of determining cause and effect, and credit and blame, “attribution theory.” Attribution is important because, if we think oil prices are high because oil sheikhs and OPEC are conspiring, that may lead to one political decision. If, however, we think an incumbent president is to blame, that leads to a different decision.

Another important feature of attribution is that there’s lots of scope to disagree about who to blame. Often two groups “self-servingly” blame each other, and there may not be clear evidence that can establish who should be blamed (absent formal institutions such as court proceedings). A good example is economic sanctions and embargoes against countries whose policies we disagree with. It is fair to say that sanctions have not always worked well (the fact that they are often in place for so long might be taken as evidence of failure). Self-serving attribution of credit and blame might help explain why, for example, from an American point of view it seems obvious that the Cubans should blame Castro for the economic loss from American sanctions and push to overthrow him or demand reform that would end the sanctions. But the Cubans may see it differently—they may blame the Americans, which could actually increase Cuban support for Castro. (Being threatened by an outside force often brings people together, a phenomenon called the “common enemy effect” in social psychology.) Of course, I am not taking a stand on who is really to blame. In fact, that’s the key point: Because it is difficult to assign blame (the way the legal proceedings may in a negligence case), there is room for disagreement that is self-serving. The disagreement means that the sanctions will not work as well as hoped by those who imposed them.

**Mental Models**

In developing economies a cognitive scientist would study the mental models that participants in the economy have of what’s going on, a point stressed by Douglass North (1994). A mental model is the intuitive set of principles or ideas of how things
work, which governs people’s predictions about the effects of change. These mental models are oversimplified, and often illogical or physically incorrect. For example, before special training in physics, people often have ideas about physical systems that are flat wrong, but intuitive (McCloskey 1983). If you ask people what happens to a ball you are twirling on a string in a circular motion, when the string breaks, many of them tell you the ball will continue to arc in a circle away from the broken string—because the velocity of the ball contains “momentum,” which includes the circularity from its previous motion. Of course, we now know that this mental model is wrong. When the string breaks, the ball heads off in a straight line tangent to the imaginary perpendicular line between the center of the circular orbit and the ball’s position when the string broke. We know the “circular momentum” theory is wrong, but it was an accepted model in physics until about 1500, before the Newtonian revolution.

So it may well be that people in simple economies (or even current theorists!) have oversimplified mental models of political economy that are illogical or empirically incorrect. Yet these mental models often guide voting and protest and, as noted above, attributions of credit or blame. Incorrect mental models are especially important in dynamic systems where the lag time for policies to yield good results is unknown. This point has been clearly established by John Sterman and colleagues (Sterman 2002). Sterman illustrates his point with the problem of getting a hot shower in a hotel you just checked into but have not visited before. You turn on the hot water. If it takes a little while to turn hot, you turn it hotter, wait a little longer, then turn it even hotter. A minute later you step in and are soon blasted by scalding hot water.

The mistake the hapless shower-taker makes is underestimating the amount of hot water in the invisible supply line. You can easily imagine how, in implementing political reforms where it’s difficult to promise people when good things will happen, that a misunderstanding of dynamics could be important in causing political impatience.

It is well documented that education is important for economic growth. Literacy, awareness of scientific principles, and marketable human capital are obviously important parts of why education is good for economic growth. But another part of the value of education may be that it supplies people with better mental models and shines light on logical inconsistencies in their beliefs. Education generates a sense of who you can trust, whether you can trust what you read in the paper, and so on, which may in turn disarm naive beliefs, repair people’s faulty mental models of political economy, and enable good reforms.

**Experiments about Development, and during Development**

Experiments have been crucial in advancing behavioral economics. I’ll discuss two directions that may be relevant for development.

**Experiments about Development**

To an outsider, a striking fact about economic research on growth is the limited dialogue between theorists—those who do statistical analyses (cross-country growth
regressions)—and policymakers with a lot of field experience. Experiments may help bridge this gap by providing evidence from simple artificial domains that correspond to the artificial worlds of simple theory, since experiments can always be enriched to include features policy analysts and statistical analysis suggest are important.

Capra and others (2004) have been conducting simple experiments on economies with capital investment and “poverty traps.” In these experiments subjects choose levels of capital investment. Investment produces goods that produce utility. There is a critical mass of investment that boosts productivity, and all the subjects know this. The critical mass means there are two steady-state equilibria: one in which people invest below the critical threshold and produce and consume less (a technological poverty trap); and another in which investment is high, the threshold is crossed so that productivity is boosted, and people consume more and have higher utility (which in turn translates into higher actual money earnings from the experiment). Figure 1 (left graph) shows what happens in a typical baseline session. The y-axis shows utilities from consumption \( U(C) \)—the two equilibrium levels are the horizontal lines at 6 (poverty trap) and 18 (efficiency) over many periods of time in the experiment (x-axis). There is some movement up and down, but results basically get stuck near the poverty-trap equilibrium where \( U(C) = 6 \).

The middle panel in figure 1 shows what happens when people are allowed to propose capital allocation schemes and vote on them (the votes are binding). This

**FIGURE 1.**
Utility over Time in “Poverty Trap” Experiments

![Utility over Time in “Poverty Trap” Experiments](image)
portrays an economy in which the International Monetary Fund or some other coordinating agency (or a national industrial policy) requires certain levels of investment. As shown in this figure, voting often lifts investment up closer to the utility-maximizing level of 18, but votes usually do not stick for long and the experimental economy is often drawn down into the poverty trap result of \( U(C) = 6 \).

The right panel shows what happens when subjects are allowed to freely communicate using an instant messaging system. As with voting, allowing subjects to talk helps them agree to invest more (in the later stages), but only temporarily.

The message of these experiments is that even when high investment is better for everyone (Pareto-improving, in economic jargon), and when subjects can talk about the fact that everyone benefits from a productivity boost when total investment is high enough, it is hard to reach the best equilibrium and make it stick. Of course, these are simple experiments. But if it is difficult for a small number of college students to reach the good equilibria in these simple domains, one can’t help but wonder how a much more complex economy can do so. More importantly, criticisms of the external validity of the experiment can readily be translated into designs for new, richer, experiments and predictions about what would happen if the experiment were changed (played for more money, for more time, or played by actual firms or agency regulators). The point is that the experiments are a platform onto which complications can easily be added.

**Experiments on Social Capital during Development**

Another kind of experiment that is catching fire is the idea of “packing your laboratory” and conducting controlled experiments in developing countries. There you can study the people whose behavior you want to eventually effect, in domains that are familiar to the subjects (as in Harrison and List, currently in press, and in Karla Hoff’s companion discussion to mine, in this volume).

One dramatic field experiment project is a unique collaboration by a dozen anthropologists in 15 small-scale societies, mostly in Africa and the Amazon basin. These are all extremely small-scale societies, typically barter economies with little political structure and some degree of market exchange (such as selling extra crops or cows at market once a week). The anthropologists were interested because these are some of the last places on Earth that resemble hunter-gatherer economies from 100,000 years ago, and in which we think the human brain may have evolved.

The anthropologists in this field experiment conducted a series of simple games. I’ll describe only one, an “ultimatum” or take-it-or-leave-it bargaining game. One person is given a sum of money, say $10 (usually a sum with large local purchasing power, worth several days’ wages, so subjects are highly motivated). Then the anthropologists offer a fraction of the $10 to another subject (a stranger) in private. If the “responder” subject accepts the offer, both subjects earn the amounts of money agreed upon. If the responder says “No,” the offer is rejected and they get nothing. The game is a simple way of measuring norms of sharing, and whether people express “negative reciprocity” by rejecting offers they perceive as unfair. In many
experiments people typically offer a little less than half, and offers of less than $2 are rejected about half the time (see Camerer 2003, chapter 2).

Figure 2 shows the average ultimatum offer in each society on the y-axes. The x-axes represent how the societies rank, from high to low, in terms of market integration (roughly the amount of their consumption that comes from market-exchanged goods, the top graph) and the social payoff to cooperation (e.g., whether they build schools and plow fields together, the bottom graph). The numbers are rescaled so that zero is not a zero offer but is the mean across the groups (around 40 percent, which is typical of Western college students and others).

Ironically, in some of these groups you see something close to the subgame perfect prediction of game theory, which is that people who care only about getting the most money should accept very little, and the person making the offer should anticipate this
and offer very little. Among the Machiguenga in Peru, and the Quicha in Ecuador, the subgame perfect self-interest prediction of low offers is a good approximation. The Machiguenga are highly asocial (they have no proper names to refer to people other than their kin). They don’t seem to think a stranger should share with them; and they don’t get upset when they are offered very little (only one offer was rejected). Thus, the anthropologists found some places where game theory is alive and well: in remote villages in South America.

The key point of figure 2 is the positive correlation between ultimatum offers and the degrees of market integration and cooperation. A naïve reading of economist Adam Smith (in The Wealth of Nations) is that self-interest is sufficient to produce market allocations, because “It is not from the benevolence of the butcher, the brewer or the baker that we expect our dinner, but from their regard to their own interest.” This is sometimes interpreted to mean that Smith thought a sense of fairness or justice had nothing to do with effective operation of markets. But in his Theory of Moral Sentiments Smith uses the phrase “invisible hand” quite differently. Here he says the wealthy “are led by an invisible hand to make nearly the same distribution of the necessities of life which would have been made had the earth been divided into equal portions among all inhabitants.” (see Ashraf and others 2004)

Thus, Smith hints that even in market allocations either an implicit or explicit sense of fairness plays a role. The cross-cultural experiments show that fair sharing is correlated with participation in markets across some societies, not antithetical to it. Of course, we do not know the direction of causality. Fair sharing of surplus might enable markets to flourish, or trading with strangers might inculcate a sense of sympathy and fairness. In any case, these experiments show how something central to development—a concept of social capital in the form of widely shared norms of surplus-sharing—can be understood with experimental data in a fresh way.

Note

1. A May 2004 Los Angeles Times article reported that coalition forces were surprised at how much the often-divisive Sunni and Shiite Muslims had banded together against coalition forces. The article reported a “common saying in Iraq” that encapsulates the common enemy effect: “Me and my brother against my cousin. Me and my cousin against the stranger.”

References


