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Rewards for Students Under a Microscope

By [LISA GUERNSEY](#)

For decades, [psychologists](#) have warned against giving children prizes or money for their performance in school. “Extrinsic” rewards, they say — a stuffed animal for a 4-year-old who learns her alphabet, cash for a good report card in middle or high school — can undermine the joy of learning for its own sake and can even lead to cheating.

But many economists and businesspeople disagree, and their views often prevail in the educational marketplace. Reward programs that pay students are under way in many cities. In some places, students can bring home hundreds of dollars for, say, taking an Advanced Placement course and scoring well on the exam.

Whether such efforts work or backfire “continues to be a raging debate,” said Barbara A. Marinak, an assistant professor of education at [Penn State](#), who opposes using prizes as incentives. Among parents, the issue often stirs intense discussion. And in public education, a new focus on school reform has led researchers on both sides of the debate to intensify efforts to gather data that may provide insights on when and if rewards work.

“We have to get beyond our biases,” said Roland Fryer, an economist at [Harvard University](#) who is designing and testing several reward programs. “Fortunately, the scientific method allows us to get to most of those biases and let the data do the talking.”

What is clear is that reward programs are proliferating, especially in high-poverty areas. In New York City and Dallas, high school students are paid for doing well on [Advanced Placement tests](#). In New York, the payouts come from an education reform group called Rewarding Achievement (Reach for short), financed by the Pershing Square Foundation, a charity founded by the hedge fund manager Bill Ackman. The Dallas program is run by Advanced Placement Strategies, a Texas nonprofit group whose chairman is the philanthropist Peter O’Donnell.

Another experiment was started last fall in 14 public schools in Washington that are distributing checks for good grades, attendance and behavior. That program, Capital Gains, is being financed by a partnership with SunTrust Bank, Borders and [Ed Labs at Harvard](#), which is run by Dr. Fryer. Another program by Ed Labs is getting started in Chicago.

Other systems are about stuff more than money, and most are not evaluated scientifically. At 80 tutoring centers in eight states run by Score! Educational Centers, a national for-profit company run by [Kaplan Inc.](#), students are encouraged to rack up points for good work and redeem them for prizes like jump-ropes.

An increasing number of online educational games entice children to keep playing by giving them online currency to buy, say, virtual pets. And around the country, elementary school children get tokens to redeem at gift shops in schools when they behave well.

In the cash programs being studied, economists compare the academic performance of groups of students who are paid and students who are not. Results from the first year of the A.P. program in New York showed that test scores were flat but that more students were taking the tests, said Edward Rodriguez, the program’s executive director.

In Dallas, where teachers are also paid for students’ high A.P. scores, students who are rewarded score higher on the SAT and enroll in college at a higher rate than those who are not, according to Kirabo Jackson, an assistant professor of economics at [Cornell who has written about the program](#) for the journal Education Next.

Still, many psychologists warn that early data can be deceiving. Research suggests that rewards may work in the short term but have damaging effects in the long term.

[One of the first such studies](#) was published in 1971 by Edward L. Deci, a psychologist at the [University of Rochester](#), who reported that once the incentives stopped coming, students showed less interest in the task at hand than those who received no reward.

This kind of psychological research was popularized by the writer Alfie Kohn, whose 1993 book “Punished by Rewards: The Trouble With Gold Stars, Incentive Plans, A’s, Praise and Other Bribes” is still often cited by educators and parents. Mr. Kohn says he sees “social [amnesia](#)” in the renewed interest in incentive programs.

“If we’re using gimmicks like rewards to try to improve achievement without regard to how they affect kids’ desire to learn,” he said, “we kill the goose that laid the golden egg.”

Dr. Marinak, of Penn State, and Linda B. Gambrell, a professor of education at [Clemson University](#), published a study last year in the journal Literacy Research and Instruction showing that rewarding third graders with so-called tokens, like toys and candy, diminished the time they spent reading.

“A number of the kids who received tokens didn’t even return to reading at all,” Dr. Marinak said.

Why does motivation seem to fall away? Some researchers theorize that even at an early age, children can sense that someone is trying to control their behavior. Their reaction is to resist. “One of the central questions is to consider how children think about this,” said Mark R. Lepper, a psychologist at Stanford whose 1973 study of 50 preschool-age children came to a conclusion similar to Dr. Deci’s. “Are they

saying, ‘Oh, I see, they are just bribing me?’”

More than 100 academic studies have explored how and when rewards work on people of all ages, and researchers have offered competing analyses of what the studies, taken together, really mean.

Judith Cameron, an emeritus professor of [psychology](#) at the University of Alberta, found positive traits in some types of reward systems. But in keeping with the work of other psychologists, her studies show that some students, once reward systems are over, will choose not to do the activity if the system provides subpar performers with a smaller prize than the reward for achievers.

Many cash-based programs being tested today, however, are designed to do just that. Dr. Deci asks educators to consider the effect of monetary rewards on students with learning disabilities. When they go home with a smaller payout while seeing other students receive checks for \$500, Dr. Deci said, they may feel unfairly punished and even less excited to go to school.

“There are suggestions of students making in the thousands of dollars,” he said. “The stress of that, for kids from homes with no money, I frankly think it’s unconscionable.”

Economists, on the other hand, argue that with students who are failing, everything should be tried, including rewards. While students may be simply attracted by financial incentives at first, couldn’t that evolve into a love of learning?

“They may work a little harder and may find that they aren’t so bad at it,” said Dr. Jackson, of Cornell. “And they may learn study methods that last over time.”

In examining rewards, the trick is untangling the impact of the monetary prizes from the impact of other factors, like the strength of teaching or the growing recognition among educators of the importance of A.P. tests. Dr. Jackson said his latest analyses, not yet published, would seek to answer the questions.

He also pointed out that with children in elementary school, who typically show more motivation to learn than teenagers do, the outcomes may be different.

Questions about how rewards are administered, to whom and at what age are likely to drive future research. Can incentives — praise, grades, pizza parties, cash — be added up to show that the more, the better? Or will some of them detract from the whole?

Dr. Deci says school systems are trying to lump incentives together as if they had a simple additive effect. He emphasizes that there is a difference between being motivated by something tangible and being motivated by something that is felt or sensed. “We’ve taken motivation and put it in categories,” Dr. Deci said of his fellow psychologists. “Economics is 40 years behind with respect to that.”

Some researchers suggest tweaking reward systems to cause less harm. Dr. Lepper says that the more arbitrary the reward — like giving bubble gum for passing a test — the more likely it is to backfire. Dr. Gambrell, of Clemson, posits a “proximity hypothesis,” holding that rewards related to the activity — like getting to read more books if one book is read successfully — are less harmful. And Dr. Deci and Richard M. Ryan report that praise — which some consider a verbal reward — does not have a negative effect.

In fact, praise itself has categories. Carol Dweck, a Stanford psychologist, has found problems with praise that labels a child as having a particular quality (“You’re so smart”), while praise for actions (“You’re working hard”) is more motivating.

Psychologists have also found that it helps to isolate differences in how children perceive tasks. Are they highly interested in what they are doing? Or does it feel like drudgery? “The same reward system might have a different effect on those two types of students,” Dr. Lepper said. The higher the interest, he said, the more harmful the reward.

Meanwhile, Dr. Fryer of Ed Labs urges patience in awaiting the economists’ take on reward systems. He wants to look at what happens over many years by tracking subjects after incentives end and trying to discern whether the incentives have an impact on high school graduation rates.

With the money being used to pay for the incentive programs and research, “every dollar has value,” he said. “We either get social science or social change, and we need both.”

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40 Things To Look At Under A Microscope.

Microscopes are an awesome scientific instrument that all kids should get a chance to learn to use. Preparing samples for light microscopy depends on the kind of sample under examination. Thick tissues must be sectioned, or cut into very thin slices prior to microscopy because a thick sample will not allow light to pass through it, and it will therefore be impossible to see any detail under a compound microscope. A microscope is a gateway to a fascinating and normally invisible world. Exploring this world with a suitable microscope and correct procedures is very enjoyable. A digital microscope may be an attractive option for some people. It sends its images to a computer, where they can be viewed, edited, and saved. It's very important to examine the features of a digital microscope before buying one. Once your students realize what's possible, they'll want to examine everything under a microscope. I recommend you watch this for examples of what's possible.

Traditional vs. Digital.

Once I decided a microscope was essential for my science classes, I needed to choose either a traditional or a digital one. When I used a traditional microscope, it captured the attention of a few, however many lost interest while waiting their turn. I realized a digital microscope was the only way to capture everyone's attention at the same time. This microscope is fun for students to use. It works with nearly any operating system with standard webcam software, but it's not compatible with iOS devices. You can adjust the brightness, and the observation pad has measurement marks. When researching student microscopes, it does not imply that the microscope should resemble a toy that can barely be used to observe anything or only last for a short period of time. With the current line of brands in the market, many are likely to fall victims to purchasing poor quality microscopes, which are often aimed at younger kids. It is therefore important to not only know the intended purpose of a microscope, but also the qualities of a good microscope before making any purchase, especially when it comes to high school students given that they are starting to learn about the more comp