

Chapter 7



# COMPENSATION and COCAINE

**Switzerland's toxic conundrum.**



**The GMAT rebels.**



**The power of the pleasure center.**



**Hijacking altruism.**



**Fast times at "Commie High."**



**The anticipation factor.**

Whether they're Fortune 500 CEOs or high school principals, managers are always looking for ways to better motivate people. But is there a hidden side effect of bonuses and incentives meant to spur performance? What are the unintended consequences of offering people a financial carrot? To get a unique angle on the relationship between motivation and reward, let's travel to the University of Zurich, where researchers made some surprising findings.

Switzerland conjures up images of idyllic green pastures, snowy mountain ranges, and men in lederhosen blowing alpenhorns. The last thing that comes to mind is a mound of containers filled with toxic sludge.

In the 1940s, alarmed by the atrocities of World War II,

Switzerland's political leaders began developing a nuclear program. In typical Swiss fashion, the program priorities soon shifted to the more peaceful goal of creating nuclear power: five plants now provide about 40 percent of Switzerland's electricity. The country has a relatively clean energy program, but with any nuclear power comes nuclear waste—waste that has to go *somewhere*.

In 1993 the Swiss government identified two small towns as potential nuclear waste depositories, but they didn't know how the townspeople would react. Would they be outraged? Or, understanding the importance of the nation's nuclear energy program, would they "take one for the team"?

Two University of Zurich researchers were equally curious and decided to try to get some answers to this question. They asked the residents of the towns: "Suppose that the National Cooperative for the Storage of Radioactive Waste (NAGRA), after completing exploratory drilling, proposed to build the repository for low- and midlevel radioactive waste in your hometown. Federal experts examined this proposition, and the federal parliament decides to build the repository in your community." In a town hall meeting, the townspeople were asked whether they would accept this proposition or reject it.

Naturally, many people were frightened by the prospect of having the waste facility so close to their homes. But at the same time, whether out of social obligation, a feeling of national pride, or just a sense that it was the fair thing to do, 50.8 percent of respondents agreed to put themselves at risk

for the common good. The other half of the respondents, however—those who said they would oppose the facility—still represented a significant obstacle for the government.

To see if this problem could be resolved, the researchers tested out a seemingly rational solution to bring the nuclear waste dump opponents on board. They talked to a new group of individuals from the same community and presented them with the same scenario, but added, “Moreover, the parliament decides to compensate all residents of the host community with 5,000 francs [about \$2,175] per year and per person . . . financed by all taxpayers in Switzerland.” Once again they were asked, in a town hall meeting, would they accept this proposition or reject it?

Now, from an economic perspective, a monetary incentive should make the proposition of living close to a nuclear waste storage facility easier to swallow. Indeed, we naturally assume that the best way to get someone to do something unpleasant or difficult is to offer some kind of financial incentive. It’s why employers give bonuses when their employees take on more challenging or time-consuming work and why parents tie their children’s allowances to performance of specific chores. Along this line of reasoning, the higher the compensation, the more likely it should be that people would do what you were paying them for.

Regardless of how much money is actually offered, though, rationally speaking, *any* amount of money should be better than nothing at all. That is, the \$2,175 the Swiss researchers

proposed might not be enough to convince *all* residents, but it should win over at least some of those who were opposed.

But that's not what happened.

For some reason, when the researchers introduced financial compensation into the equation, the percentage of people who said they would accept the proposition not only didn't increase—it *fell* by half. Instead of being motivated by the financial incentive, the townspeople were swayed to reject the nuclear dump en masse: only 24.6 percent of the people who were presented with the monetary offer agreed to have the nuclear dump close to their town (compared with the 50.8 percent who agreed when no money was offered). In addition to contradicting the laws of economic theory, this response just doesn't make sense.

Even when the researchers sweetened the deal to \$4,350—and then again to \$6,525—the locals remained firm in their opposition. Only a *single* respondent, in fact, changed his mind and accepted the offer when more money was put on the table.

Managers, parents, and, of course, economists have long operated under the assumption that monetary incentives increase motivation. But psychologists are beginning to discover that the connection between the two is trickier than it first appears. To understand what was really going on in Switzerland, we need to look into a paradoxical aspect of financial compensation, one that illuminates the strange relationship between monetary incentives and two very different parts of our brain.

Our first insight into this mysterious relationship can be found at an Israeli university where forty students sat with number 2 pencils in hand, preparing to take a mock version of the Graduate Management Aptitude Test (GMAT), the entrance exam used by most business schools.

Now, these Israeli students weren't actually applying to business school; they were taking the GMAT as part of a psychological study. Though they knew a high score on the mock test wouldn't result in admission to any MBA program, the volunteers were encouraged to do their best anyway.

Next the researchers brought in a separate group of forty students and asked them to complete the same test—but they added a concrete reward: for every right answer, a student would get 2.5 cents—not exactly enough to retire on, but better than nothing—which is what the first group of students received.

Check out the list of the actual student scores, ranked from highest to lowest. See if you can spot the surprising pattern.

**Scores (out of a possible 50 points)**

<b>Students receiving no compensation</b>	<b>Students receiving 2.5 cents per correct answer</b>
49	50
48	44
48	44
45	43
42	40

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42	39
42	36
40	35
37	35
37	35
37	34
37	34
36	32
36	32
36	31
35	30
34	26
34	26
34	26
31	26
31	24
31	23
31	23
29	22
29	21
24	21
23	21
23	19
23	19
22	13
22	11
20	8
20	0

## S W A Y

18	0
7	0
3	0
0	0
0	0
0	0
0	0

At first, the two columns look pretty similar. But the most interesting numbers are found down toward the bottom. Of the forty participants who weren't paid anything, four scored a zero on the test. Because the exam was multiple choice, getting a zero by dumb luck is virtually impossible. More likely, the four students simply thumbed their noses at the researchers. You pay me nothing, these rebels must have thought while filling the Scantron sheet with mockingly artistic designs, you get nothing in return.

But the group of paid participants had twice as many zeros. Now, you'd think that the opposite would be true: payment, after all, should act as an incentive to perform better. This is where the paradox witnessed in the Swiss countryside comes in. In each situation, the money effectively seemed to serve as a *disincentive*: paid townspeople were *less* willing to host the dump, and compensated test takers *underperformed* on the exam.

When you look at the top 50 percent of performers in each group of test takers side by side, you see that the unpaid students *still* consistently beat out their paid counterparts, with

an average score of 39 to the paid students' 34.9. In fact, looking across the board at all the scores, the students who didn't get a penny performed better than their paid counterparts, with an average score of 28.4, compared to the paid test takers' average of 23.1.

Economists can debate the reasons that such financial rewards backfire. But researchers at the National Institutes of Health (NIH) have been able to pinpoint the neurophysiology behind this paradox.

The NIH researchers placed participants in a specially modified MRI machine fitted with a computer monitor and a simple joystick. Lying inside the machine, the subjects played a video game reminiscent of the Atari era. At the start of each round of the game, either a circle, a square, or a triangle would appear on the screen. Each shape held a unique meaning. A circle meant that if you succeeded in completing an upcoming task—zapping a figure as it appeared on the screen—you'd earn a monetary reward. Different circles corresponded to different rewards. An empty circle was worth twenty cents. If the circle had a line through it, it meant that \$1 was up for grabs; two lines meant a \$5 reward.

When the subjects saw a square instead of a circle, they braced themselves for potentially bad news. The object of the game would be the same—zap the figure—except that *failing* to do so would result in a penalty of twenty cents, \$1, or \$5.

If the participants saw a triangle, it meant that no money

was on the line. Regardless of whether they hit the target or not, they would neither lose nor gain any money on that round.

While the participants were playing the game, they were shown a running tab of their earnings and losses. Meanwhile, the scientists monitored their brain activity. The scientists noticed that every time a circle or a square appeared—that is, every time there was money to be gained or lost—a certain part of the brain lit up. This region, which remained dormant when a triangle was shown (and no money was on the line), is called the *nucleus accumbens*.

The nucleus accumbens is, evolutionarily speaking, one of the most primitive parts of the brain, one that has traditionally been associated with our “wild side”: it’s the area of the brain that experiences the thrill of going out on a hot date, that sparks sports fans’ exuberance when their team pulls out a last-minute victory, and that seeks out the excitement of Las Vegas. Scientists call this region the pleasure center because it is associated with the high that results from drugs, sex, and gambling.

At its most extreme, the pleasure center drives addiction. A drug like cocaine, for example, triggers the nucleus accumbens to release dopamine, which creates a feeling of contentment and ecstasy. The reason cocaine is so addictive is that the pleasure center goes into overdrive and the threshold for excitement climbs higher and higher. The MRI study surprised the researchers because it revealed that the pleasure center is also where we react to financial compensation.

And the more money there is on the line, the more the pleasure center lights up. A monetary reward is—biologically speaking—like a tiny line of cocaine.

Now, compare this reaction with our neurological reaction to altruistic behavior. In 2006, a few years after the NIH study, Duke scientists asked subjects to play a similar Atari-style video game, but instead of earning money for themselves, the participants were told that the better their score, the more money would be donated to charity.

In the MRI images, the pleasure center remained quiet throughout the game. But a completely different region of the brain, called the *posterior superior temporal sulcus*, kept lighting up. This is the same part of the brain responsible for social interactions—how we perceive others, how we relate, and how we form bonds. To make sure that the participants were reacting to altruism and not just to the act of playing a video game, they were also scanned while they watched a computer playing the game with the same charitable results. Despite the fact that the participants were just observers, the posterior superior temporal sulcus—what we'll call the "altruism center"—was hard at work.

Taken together, the findings of the Swiss nuclear depository survey and the Israeli GMAT study shed new light on the relationship between these two parts of the brain. Unlike, say, the parts of our brain that control movement and speech, the pleasure center and the altruism center cannot both function at the same time: either one or the other is in control. If the two brain centers functioned concurrently,

then in the Swiss survey you would expect a compounding effect—that is, the percentage of townspeople who agreed to host the nuclear dump would have grown in accordance with the increase of the stipend. But that didn't happen. In the first half of the study—when no money was offered—the altruism center took charge, as people weighed the danger of having a nuclear dump nearby against the opportunity to help their country. The moment money was introduced, on the other hand, the entire situation got processed differently. The pleasure center took over, and in people's minds the choice came down to the dangers of the dump on one side and making a “quick franc” on the other. But the 5,000-franc stipend was much too low to excite the pleasure center.

The same thing happened with the GMAT takers. The moment monetary incentives were introduced, the altruistic motivation (completing the task to help out the researchers) waned, and money became the reason to proceed. But with such a small reward for the pleasure center, the students were more prone to slack off.

It's as if we have two “engines” running in our brains that can't operate simultaneously. We can approach a task either altruistically or from a self-interested perspective. The two different engines run on different fuels and also need different amounts of those fuels to fire up. It doesn't take much to fuel the altruism center: all you need is the sense that you're helping someone or making a positive impact. But the pleasure center seems to need a lot more—2.5 cents per right

answer or a 5,000-franc stipend for agreeing to tolerate a nuclear dump site just isn't enough.

This intersection of economics, biology, and psychology regularly plays out in our everyday lives. Suppose a friend calls you and says he needs help moving. You might grumble a bit, but most of us would show up on a Saturday to help out. But what if your friend asked the same favor and offered to pay you \$10 for your trouble? Chances are you'd decide that that small amount of cash wasn't worth a day of back-breaking labor, and you might remind your friend about the existence of *professional* movers. Likewise, imagine facing a deadline and desperately needing a coworker to stay until ten o'clock at night to help with the project. Your coworker would be more likely to stay late and pitch in if you explained your predicament and asked for a favor, rather than offering to pay her \$15 for her time.

But it's about more than just simple favors. This finding should be of interest not only to those looking for help with an unpleasant task, but also to those running charities or holding fund-raisers. As anyone who has listened to an NPR or PBS pledge drive knows, not only are your donations rewarded with the knowledge that you're helping to keep public radio or TV in business, but you usually also score a free book, tote bag, or DVD in appreciation of your generosity. Yet the research we have been exploring suggests that this kind of payment may undermine our initial altruistic motivations.

It turns out that when the pleasure and altruism centers go head to head, the pleasure center seems to have the ability to hijack the altruism center. Let's take a look at how this neurological kidnapping plays out in a small magnet school in Michigan.

Community High School in Ann Arbor was founded in 1972 as the city's first alternative education school. The eclectic student body, combined with the school's unofficial mascot, the AntiZebra—a rainbow-colored creature who sported stars instead of stripes—earned the school the widely used nickname “Commie High.”

From its inception, Community High was a place of few rules. Those that were in place—such as the mandatory wearing of shoes—were routinely overlooked. The high school had always been rich with opportunities for intellectual and creative freedom, and students were continually encouraged to develop their own unique strengths. As for the teachers, their starting salary in 1996 was \$22,848. The disparity between a heavy workload and a low salary illustrates these professionals' dedication and commitment to helping students become well-rounded individuals. Indeed, Community High had a long waiting list to get in—new students literally had to line up for blocks in order to secure a spot in the school.

As the school's popularity soared, an opportunity arose to secure independence from the union and its regulations: a new state law allowed schools to operate more independently if they tried out new, innovative programs. And so, to gain

this independence, Community High decided to start a pilot program. Although the faculty could not easily identify an urgent problem that needed solving, the school had to launch *some* new project. So, in true Community High fashion, the teachers and administrators convened and brainstormed.

In the course of their brainstorming the teachers recognized that students basically fell into two groups: those who were highly motivated and regularly came to class and those who were less enthusiastic and took advantage of the loose rules to skip classes. The goal of the pilot project would be to reverse the trend of skipping classes, improve overall attendance, and, in the process, increase student performance (the idea being that if you're not in school, it's difficult to learn). In order to evaluate attendance, on a random day in the last week of each semester teachers whose classes had at least 80 percent of their students in attendance would be rewarded with a salary bonus that equaled roughly 12 percent of their annual salary.

Now, remember, the school had adopted the attendance incentive merely as a way of implementing a pilot project requirement. Teachers had not demanded higher compensation, and Community High's attendance problems were not beyond the norm. Still, a few years into the program, the classroom inspections had shown that course completion had improved from 51 percent to 72 percent. The pilot seemed like an obvious success.

But a closer investigation revealed that the program was not as fruitful as it first appeared. For one thing, although

the *completion* rate had gone up, the *attendance* rate had remained constant, falling just a tad from 59 percent to 58.62 percent. This means that although students were more likely to remain enrolled in a class, their attendance habits were no better than before the pilot study was launched. The most surprising finding, though, was what had happened to the average cumulative student GPA: it had taken a nosedive from 2.71 to 2.18.

During this period, academic standards at Community High hadn't changed, and the overall makeup of the student body remained the same. Moreover, GPA scores at a nearby school held steady over the same time period, indicating that the Community High figures were not simply part of a broader district trend. The decrease in average GPA pointed to a troubling conclusion: students weren't learning as much.

When researchers from the W. E. Upjohn Institute studied these figures and interviewed administrators and teachers, they gained an interesting insight. The researchers' analysis revealed that the teachers had shifted their focus. Once the pilot study was introduced, in order to secure their bonuses the teachers began concentrating their efforts on enticing students to show up who would otherwise have cut class. That is, rather than pulling a *Stand and Deliver* or a *Mr. Holland's Opus* and inspiring all students to achieve their true potential, the teachers followed a very different path.

Without anybody realizing it, the lure of a salary bonus

had pitted the teachers' pleasure centers against their altruism centers. All of a sudden the teachers had a bonus carrot dangling in front of them. Instead of focusing on teaching their students, they began chasing after the reward. To keep the students coming back to class they "included activities such as more field trips and in-class parties"—probably not what they had in mind when they entered the profession.

The Community High teachers didn't give up on their values or consciously lower their standards. It's just that the pleasure center has a way of sneaking up on us. Before we even know it, we've veered off the path we had originally planned. How does the pleasure center take over? Anton Suvorov, an economist at the University of Toulouse, has shown through an elaborate mathematical model that a reward can trigger an addictive response. Not only does our response to a monetary reward resemble our response to a drug like cocaine, but so does our drive to attain the reward. The Community High teachers exhibited the same types of behaviors as addicts seeking to get high, albeit to a much lesser extent: they became fixated on a reward and unknowingly altered their standards, goals, and conduct in the process.

Neuropsychologists have shown that activities associated with addictive substances and those associated with monetary rewards are both processed by the pleasure center. Because monetary incentives present such a strong allure to us, they distort our thinking. At Community High, what initially was created as a rational incentive program to increase

productivity yielded out-of-character behavior with counter-productive results. Slowly but surely, the pleasure center overrode its altruistic counterpart.

Now, the problem isn't with rewards per se. It's only when you dangle the *possibility* of a reward ahead of time—creating a quid pro quo situation—that these destructive effects arise. An extensive review and analysis of motivation studies found that the prospect of a reward excites the pleasure center even more than the attainment of the reward itself. Taking a kid to Disneyland because she won the science fair is one thing, but telling her ahead of time, “If you enter the fair and win it, I'll take you to Disneyland,” is another. It's that *anticipation* factor that drives the addictive behavior and suppresses the altruism center.

And it's true not just with children. Everywhere we look we see efforts to provide concrete financial incentives: from compensating star teachers whose students do well on standardized tests to giving tax credits to people who house Hurricane Katrina refugees. Of course, these individuals deserve recognition for their efforts. The problem with offering incentives, though, is that they carry a lot of baggage with them. For Swiss townspeople, Israeli students, and American high school teachers alike, throwing money into the mix diminished altruistic motivation and introduced unexpected behavior.

Chapter 8



# DISSENTING JUSTICE

**The Supreme Court conference.**



**Peer pressure and Coke-bottle glasses.**



**Ferris Bueller and the blocker.**



**“We are not focusing on the name you give to potatoes.”**



**The captain is not God.**



**Not just thinking out loud.**



**Justice has been served.**