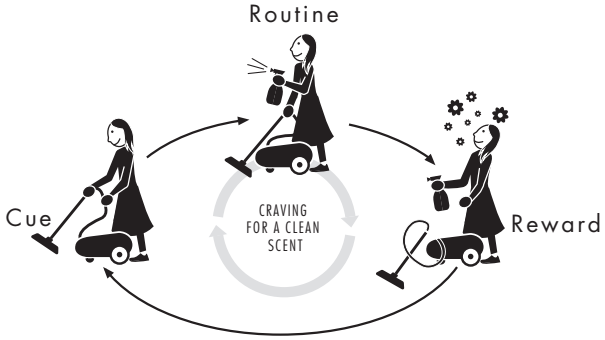
I don't smell something nice at the end, it doesn't really seem clean now," she told them.

"The park ranger with the skunk problem sent us in the wrong direction," Stimson told me. "She made us think that Febreze would succeed by providing a solution to a problem. But who wants to admit their house stinks?

"We were looking at it all wrong. No one craves scentlessness. On the other hand, lots of people crave a nice smell after they've spent thirty minutes cleaning."



THE FEBREZE HABIT LOOP

The Febreze relaunch took place in the summer of 1998. Within two months, sales doubled. Within a year, customers had spent more than $230 million on the product. Since then, Febreze has spawned dozens of spin-offs—air fresheners, candles, laundry detergents, and kitchen sprays—that, all told, now account for sales of more than $1 billion per year. Eventually, P&G began mentioning to customers that, in addition to smelling good, Febreze can also kill bad odors.

Stimson was promoted and his team received their bonuses. The formula had worked. They had found simple and obvious cues. They had clearly defined the reward.

But only once they created a sense of craving—the desire to make everything smell as nice as it looked—did Febreze become a hit. That craving is an essential part of the formula for creating new habits that Claude Hopkins, the Pepsodent ad man, never recognized.

V.

In his final years of life, Hopkins took to the lecture circuit. His talks on the "Laws of Scientific Advertising" attracted thousands of people. From stages, he often compared himself to Thomas Edison and George Washington and spun out wild forecasts about the future (flying automobiles featured prominently). But he never mentioned cravings or the neurological roots of the habit loop. After all, it would be another seventy years before the MIT scientists and Wolfram Schultz conducted their experiments.

So how did Hopkins manage to build such a powerful toothbrushing habit without the benefit of those insights?

Well, it turns out that he actually *did* take advantage of the principles eventually discovered at MIT and inside Schultz's laboratory, even if nobody knew it at the time.

Hopkins's experiences with Pepsodent weren't quite as straightforward as he portrays them in his memoirs. Though he boasted that he discovered an amazing cue in tooth film, and bragged that he was the first to offer consumers the clear reward of beautiful teeth, it turns out that Hopkins wasn't the originator of those tactics. Not by a long shot. Consider, for instance, some of the advertisements for other toothpastes that filled magazines and newspapers even before Hopkins knew that Pepsodent existed.

"The ingredients of this preparation are especially intended to prevent deposits of *tartar* from accumulating around the necks of the teeth," read an ad for Dr. Sheffield's Crème Dentifrice that predated Pepsodent. "Clean that dirty layer!"

"Your white enamel is only *hidden* by a coating of film," read an advertisement that appeared while Hopkins was looking through his dental textbooks. "Sanitol Tooth Paste quickly restores the original whiteness by removing film."

"The charm of a lovely smile depends upon the beauty of your teeth," proclaimed a third ad. "Beautiful, satin smooth teeth are

often the secret of a pretty girl's attractiveness. Use S.S. White Toothpaste!"

Dozens of other advertising men had used the same language as Pepsodent years before Hopkins jumped in the game. All of their ads had promised to remove tooth film and had offered the reward of beautiful, white teeth. None of them had worked.

But once Hopkins launched his campaign, sales of Pepsodent exploded. Why was Pepsodent different?

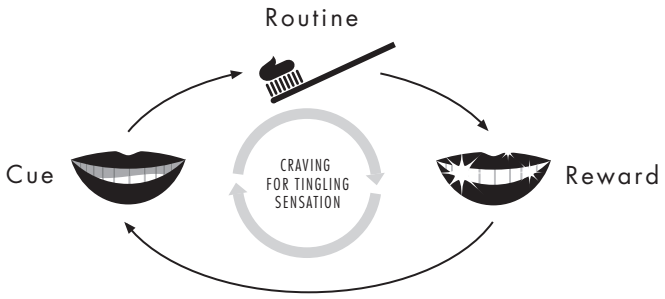
Because Hopkins's success was driven by the same factors that caused Julio the monkey to touch the lever and housewives to spray Febreze on freshly made beds. Pepsodent created a craving.

Hopkins doesn't spend any of his autobiography discussing the ingredients in Pepsodent, but the recipe listed on the toothpaste's patent application and company records reveals something interesting: Unlike other pastes of the period, Pepsodent contained citric acid, as well as doses of mint oil and other chemicals. Pepsodent's inventor used those ingredients to make the toothpaste taste fresh, but they had another, unanticipated effect as well. They're irritants that create a cool, tingling sensation on the tongue and gums.

After Pepsodent started dominating the marketplace, researchers at competing companies scrambled to figure out why. What they found was that customers said that if they forgot to use Pepsodent, they realized their mistake because they missed that cool, tingling sensation in their mouths. They expected—they *craved*—that slight irritation. If it wasn't there, their mouths didn't feel clean.

Claude Hopkins wasn't selling beautiful teeth. He was selling a sensation. Once people craved that cool tingling—once they equated it with cleanliness—brushing became a habit.

When other companies discovered what Hopkins was really selling, they started imitating him. Within a few decades, almost every toothpaste contained oils and chemicals that caused gums to tingle. Soon, Pepsodent started getting outsold. Even today, almost all



THE REAL PEPSODENT HABIT LOOP

toothpastes contain additives with the sole job of making your mouth tingle after you brush.

"Consumers need some kind of signal that a product is working," Tracy Sinclair, who was a brand manager for Oral-B and Crest Kids Toothpaste, told me. "We can make toothpaste taste like anything—blueberries, green tea—and as long as it has a cool tingle, people feel like their mouth is clean. The tingling doesn't make the toothpaste work any better. It just convinces people it's doing the job."

Anyone can use this basic formula to create habits of her or his own. Want to exercise more? Choose a cue, such as going to the gym as soon as you wake up, and a reward, such as a smoothie after each workout. Then think about that smoothie, or about the endorphin rush you'll feel. Allow yourself to anticipate the reward. Eventually, that craving will make it easier to push through the gym doors every day.

Want to craft a new eating habit? When researchers affiliated with the National Weight Control Registry—a project involving more than six thousand people who have lost more than thirty pounds—looked at the habits of successful dieters, they found that 78 percent of them ate breakfast every morning, a meal cued by a time of day. But most of the successful dieters *also* envisioned a specific reward for sticking with their diet—a bikini they wanted to wear or the sense of pride they felt when they stepped on the scale each day—something they chose carefully and really wanted. They focused on the craving for that reward when temptations arose, cul-

tivated the craving into a mild obsession. And their cravings for that reward, researchers found, crowded out the temptation to drop the diet. The craving drove the habit loop.

For companies, understanding the science of cravings is revolutionary. There are dozens of daily rituals we *ought* to perform each day that never become habits. We should watch our salt and drink more water. We should eat more vegetables and fewer fats. We should take vitamins and apply sunscreen. The facts could not be more clear on this last front: Dabbing a bit of sunscreen on your face each morning significantly lowers the odds of skin cancer. Yet, while everyone brushes their teeth, fewer than 10 percent of Americans apply sunscreen each day. Why?

Because there's no craving that has made sunscreen into a daily habit. Some companies are trying to fix that by giving sunscreens a tingling sensation or something that lets people know they've applied it to their skin. They're hoping it will cue an expectation the same way the craving for a tingling mouth reminds us to brush our teeth. They've already used similar tactics in hundreds of other products.

"Foaming is a huge reward," said Sinclair, the brand manager. "Shampoo doesn't have to foam, but we add foaming chemicals because people expect it each time they wash their hair. Same thing with laundry detergent. And toothpaste—now every company adds sodium laureth sulfate to make toothpaste foam more. There's no cleaning benefit, but people feel better when there's a bunch of suds around their mouth. Once the customer starts expecting that foam, the habit starts growing."

Cravings are what drive habits. And figuring out how to create a craving makes creating a new habit easier. It's as true now as it was almost a century ago. Every night, millions of people scrub their teeth in order to get a tingling feeling; every morning, millions put on their jogging shoes to capture an endorphin rush they've learned to crave.

And when they get home, after they clean the kitchen or tidy their bedrooms, some of them will spray a bit of Febreze.

3

THE GOLDEN RULE OF HABIT CHANGE

Why Transformation Occurs

I.

The game clock at the far end of the field says there are eight minutes and nineteen seconds left when Tony Dungy, the new head coach of the Tampa Bay Buccaneers—one of the worst teams in the National Football League, not to mention the history of professional football—starts to feel a tiny glimmer of hope.

It's late on a Sunday afternoon, November 17, 1996. The Buccaneers are playing in San Diego against the Chargers, a team that appeared in the Super Bowl the previous year. The Bucs are losing, 17 to 16. They've been losing all game. They've been losing all season. They've been losing all decade. The Buccaneers have not won a game on the West Coast in sixteen years, and many of the team's current players were in grade school the last time the Bucs had a victorious season. So far this year, their record is 2–8. In one of those games, the Detroit Lions—a team so bad it would later be described as putting the "less" in "hopeless"—beat the Bucs 21 to 6, and then, three weeks later, beat them again, 27 to 0. One newspaper colum-

nist has started referring to the Bucs as "America's Orange Doormat." ESPN is predicting that Dungy, who got his job only in January, could be fired before the year is done.

On the sidelines, however, as Dungy watches his team arrange itself for the next play, it feels like the sun has finally broken through the clouds. He doesn't smile. He never lets his emotions show during a game. But something is taking place on the field, something he's been working toward for years. As the jeers from the hostile crowd of fifty thousand rain down upon him, Tony Dungy sees something that no one else does. He sees proof that his plan is starting to work.

• • •

Tony Dungy had waited an eternity for this job. For seventeen years, he prowled the sidelines as an assistant coach, first at the University of Minnesota, then with the Pittsburgh Steelers, then the Kansas City Chiefs, and then back to Minnesota with the Vikings. Four times in the past decade, he had been invited to interview for head coaching positions with NFL teams.

All four times, the interviews hadn't gone well.

Part of the problem was Dungy's coaching philosophy. In his job interviews, he would patiently explain his belief that the key to winning was changing players' habits. He wanted to get players to stop making so many decisions during a game, he said. He wanted them to react automatically, habitually. If he could instill the right habits, his team would win. Period.

"Champions don't do extraordinary things," Dungy would explain. "They do ordinary things, but they do them without thinking, too fast for the other team to react. They follow the habits they've learned."

How, the owners would ask, are you going to create those new habits?

Oh, no, he wasn't going to create *new* habits, Dungy would answer. Players spent their lives building the habits that got them to the NFL. No athlete is going to abandon those patterns simply because some new coach says to.

So rather than creating new habits, Dungy was going to *change* players' old ones. And the secret to changing old habits was using what was already inside players' heads. Habits are a three-step loop—the cue, the routine, and the reward—and Dungy only wanted to attack the middle step, the routine. He knew from experience that it was easier to convince someone to adopt a new behavior if there was something familiar at the beginning and end.

His coaching strategy embodied an axiom, a Golden Rule of habit change that study after study has shown is among the most powerful tools for creating change. Dungy recognized that you can never truly extinguish bad habits.

Rather, to change a habit, you must keep the old cue, and deliver the old reward, but insert a new routine.

That's the rule: If you use the same cue, and provide the same reward, you can shift the routine and change the habit. Almost any behavior can be transformed if the cue and reward stay the same.

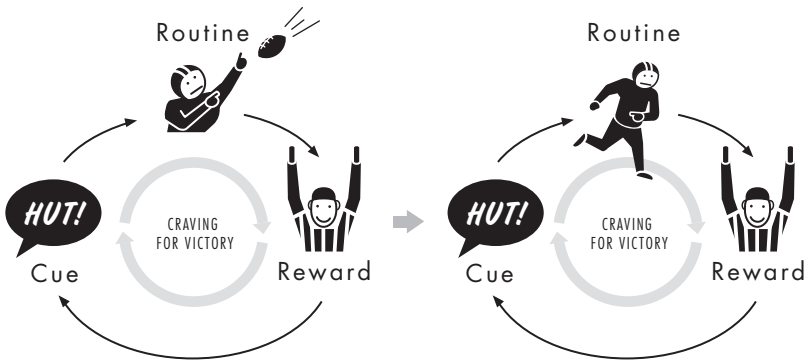
The Golden Rule has influenced treatments for alcoholism, obesity, obsessive-compulsive disorders, and hundreds of other destructive behaviors, and understanding it can help anyone change their own habits. (Attempts to give up snacking, for instance, will often fail unless there's a new routine to satisfy old cues and reward urges. A smoker usually can't quit unless she finds some activity to replace cigarettes when her nicotine craving is triggered.)

Four times Dungy explained his habit-based philosophy to team owners. Four times they listened politely, thanked him for his time, and then hired someone else.

Then, in 1996, the woeful Buccaneers called. Dungy flew to Tampa Bay and, once again, laid out his plan for how they could win. The day after the final interview, they offered him the job.

THE GOLDEN RULE OF HABIT CHANGE

You Can't Extinguish a Bad Habit,
You Can Only Change It.



HOW IT WORKS:
USE THE SAME CUE.
PROVIDE THE SAME REWARD.
CHANGE THE ROUTINE.

Dungy's system would eventually turn the Bucs into one of the league's winningest teams. He would become the only coach in NFL history to reach the play-offs in ten consecutive years, the first African American coach to win a Super Bowl, and one of the most respected figures in professional athletics. His coaching techniques would spread throughout the league and all of sports. His approach would help illuminate how to remake the habits in anyone's life.

But all of that would come later. Today, in San Diego, Dungy just wanted to win.

●●●

From the sidelines, Dungy looks up at the clock: 8:19 remaining. The Bucs have been behind all game and have squandered opportunity after opportunity, in typical fashion. If their defense doesn't make something happen right now, this game will effectively be over. San Diego has the ball on their own twenty-yard line, and the

Chargers' quarterback, Stan Humphries, is preparing to lead a drive that, he hopes, will put the game away. The play clock begins, and Humphries is poised to take the snap.

But Dungy isn't looking at Humphries. Instead, he's watching his own players align into a formation they have spent months perfecting. Traditionally, football is a game of feints and counterfeints, trick plays and misdirection. Coaches with the thickest playbooks and most complicated schemes usually win. Dungy, however, has taken the opposite approach. He isn't interested in complication or obfuscation. When Dungy's defensive players line up, it is obvious to everyone exactly which play they are going to use.

Dungy has opted for this approach because, in theory, he doesn't need misdirection. He simply needs his team to be faster than everyone else. In football, milliseconds matter. So instead of teaching his players hundreds of formations, he has taught them only a handful, but they have practiced over and over until the behaviors are automatic. When his strategy works, his players can move with a speed that is impossible to overcome.

But only when it works. If his players think too much or hesitate or second-guess their instincts, the system falls apart. And so far, Dungy's players have been a mess.

This time, however, as the Bucs line up on the twenty-yard line, something is different. Take Regan Upshaw, a Buccaneer defensive end who has settled into a three-point stance on the scrimmage line. Instead of looking up and down the line, trying to absorb as much information as possible, Upshaw is looking only at the cues that Dungy taught him to focus on. First, he glances at the outside foot of the opposite lineman (his toes are back, which means he is preparing to block while the quarterback passes); next, Upshaw looks at the lineman's shoulders (rotated slightly inward), and the space between him and the next player (a fraction narrower than expected).

Upshaw has practiced how to react to each of these cues so many

times that, at this point, he doesn't have to think about what to do. He just follows his habits.

San Diego's quarterback approaches the line of scrimmage and glances right, then left, barks the count and takes the ball. He drops back five steps and stands tall, swiveling his head, looking for an open receiver. Three seconds have passed since the play started. The stadium's eyes and the television cameras are on him.

So most observers fail to see what's happening among the Buccaneers. As soon as Humphries took the snap, Upshaw sprang into action. Within the first second of the play, he darted right, across the line of scrimmage, so fast the offensive lineman couldn't block him. Within the next second, Upshaw ran four more paces downfield, his steps a blur. In the next second, Upshaw moved three strides closer to the quarterback, his path impossible for the offensive lineman to predict.

As the play moves into its fourth second, Humphries, the San Diego quarterback, is suddenly exposed. He hesitates, sees Upshaw from the corner of his eye. And that's when Humphries makes his mistake. He starts *thinking*.

Humphries spots a teammate, a rookie tight end named Brian Roche, twenty yards downfield. There's another San Diego receiver much closer, waving his arms, calling for the ball. The short pass is the safe choice. Instead, Humphries, under pressure, performs a split-second analysis, cocks his arm, and heaves to Roche.

That hurried decision is precisely what Dungy was hoping for. As soon as the ball is in the air, a Buccaneer safety named John Lynch starts moving. Lynch's job was straightforward: When the play started, he ran to a particular point on the field and waited for his cue. There's enormous pressure to improvise in this situation. But Dungy has drilled Lynch until his routine is automatic. And as a result, when the ball leaves the quarterback's hands, Lynch is standing ten yards from Roche, waiting.

As the ball spins through the air, Lynch reads his cues—the di-

rection of the quarterback's face mask and hands, the spacing of the receivers—and starts moving before it's clear where the ball will land. Roche, the San Diego receiver, springs forward, but Lynch cuts around him and intercepts the pass. Before Roche can react, Lynch takes off down the field toward the Chargers' end zone. The other Buccaneers are perfectly positioned to clear his route. Lynch runs 10, then 15, then 20, then almost 25 yards before he is finally pushed out of bounds. The entire play has taken less than ten seconds.

Two minutes later, the Bucs score a touchdown, taking the lead for the first time all game. Five minutes later, they kick a field goal. In between, Dungy's defense shuts down each of San Diego's comeback attempts. The Buccaneers win, 25 to 17, one of the biggest upsets of the season.

At the end of the game, Lynch and Dungy exit the field together.

"It feels like something was different out there," Lynch says as they walk into the tunnel.

"We're starting to believe," Dungy replies.

II.

To understand how a coach's focus on changing habits could remake a team, it's necessary to look outside the world of sports. Way outside, to a dingy basement on the Lower East Side of New York City in 1934, where one of the largest and most successful attempts at wide-scale habit change was born.

Sitting in the basement was a thirty-nine-year-old alcoholic named Bill Wilson. Years earlier, Wilson had taken his first drink during officers' training camp in New Bedford, Massachusetts, where he was learning to fire machine guns before getting shipped to France and World War I. Prominent families who lived near the base often invited officers to dinner, and one Sunday night, Wilson attended a party where he was served rarebit and beer. He was twenty-two years old and had never had alcohol before. The only

polite thing, it seemed, was to drink the glass served to him. A few weeks later, Wilson was invited to another elegant affair. Men were in tuxedos, women were flirting. A butler came by and put a Bronx cocktail—a combination of gin, dry and sweet vermouth, and orange juice—into Wilson's hand. He took a sip and felt, he later said, as if he had found "the elixir of life."

By the mid-1930s, back from Europe, his marriage falling apart and a fortune from selling stocks vaporized, Wilson was consuming three bottles of booze a day. On a cold November afternoon, while he was sitting in the gloom, an old drinking buddy called. Wilson invited him over and mixed a pitcher of pineapple juice and gin. He poured his friend a glass.

His friend handed it back. He'd been sober for two months, he said.

Wilson was astonished. He started describing his own struggles with alcohol, including the fight he'd gotten into at a country club that had cost him his job. He had tried to quit, he said, but couldn't manage it. He'd been to detox and had taken pills. He'd made promises to his wife and joined abstinence groups. None of it worked. How, Wilson asked, had his friend done it?

"I got religion," the friend said. He talked about hell and temptation, sin and the devil. "Realize you are licked, admit it, and get willing to turn your life over to God."

Wilson thought the guy was nuts. "Last summer an alcoholic crackpot; now, I suspected, a little cracked about religion," he later wrote. When his friend left, Wilson polished off the booze and went to bed.

A month later, in December 1934, Wilson checked into the Charles B. Towns Hospital for Drug and Alcohol Addictions, an upscale Manhattan detox center. A physician started hourly infusions of a hallucinogenic drug called belladonna, then in vogue for the treatment of alcoholism. Wilson floated in and out of consciousness on a bed in a small room.

Then, in an episode that has been described at millions of meetings in cafeterias, union halls, and church basements, Wilson began writhing in agony. For days, he hallucinated. The withdrawal pains made it feel as if insects were crawling across his skin. He was so nauseous he could hardly move, but the pain was too intense to stay still. "If there is a God, let Him show Himself!" Wilson yelled to his empty room. "I am ready to do anything. Anything!" At that moment, he later wrote, a white light filled his room, the pain ceased, and he felt as if he were on a mountaintop, "and that a wind not of air but of spirit was blowing. And then it burst upon me that I was a free man. Slowly the ecstasy subsided. I lay on the bed, but now for a time I was in another world, a new world of consciousness."

Bill Wilson would never have another drink. For the next thirty-six years, until he died of emphysema in 1971, he would devote himself to founding, building, and spreading Alcoholics Anonymous, until it became the largest, most well-known and successful habit-changing organization in the world.

An estimated 2.1 million people seek help from AA each year, and as many as 10 million alcoholics may have achieved sobriety through the group. AA doesn't work for everyone—success rates are difficult to measure, because of participants' anonymity—but millions credit the program with saving their lives. AA's foundational credo, the famous twelve steps, have become cultural lodestones incorporated into treatment programs for overeating, gambling, debt, sex, drugs, hoarding, self-mutilation, smoking, video game addictions, emotional dependency, and dozens of other destructive behaviors. The group's techniques offer, in many respects, one of the most powerful formulas for change.

All of which is somewhat unexpected, because AA has almost no grounding in science or most accepted therapeutic methods.

Alcoholism, of course, is more than a habit. It's a physical addiction with psychological and perhaps genetic roots. What's interesting about AA, however, is that the program doesn't directly attack

many of the psychiatric or biochemical issues that researchers say are often at the core of why alcoholics drink. In fact, AA's methods seem to sidestep scientific and medical findings altogether, as well as the types of intervention many psychiatrists say alcoholics really need.*

What AA provides instead is a method for attacking the *habits* that surround alcohol use. AA, in essence, is a giant machine for changing habit loops. And though the habits associated with alcoholism are extreme, the lessons AA provides demonstrate how almost any habit—even the most obstinate—can be changed.

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Bill Wilson didn't read academic journals or consult many doctors before founding AA. A few years after he achieved sobriety, he wrote the now-famous twelve steps in a rush one night while sitting in bed. He chose the number twelve because there were twelve apos-

* The line separating habits and addictions is often difficult to measure. For instance, the American Society of Addiction Medicine defines addiction as "a primary, chronic disease of brain reward, motivation, memory and related circuitry. . . . Addiction is characterized by impairment in behavioral control, craving, inability to consistently abstain, and diminished relationships."

By that definition, some researchers note, it is difficult to determine why spending fifty dollars a week on cocaine is bad, but fifty dollars a week on coffee is okay. Someone who craves a latte every afternoon may seem clinically addicted to an observer who thinks five dollars for coffee demonstrates an "impairment in behavioral control." Is someone who would prefer running to having breakfast with his kids addicted to exercise?

In general, say many researchers, while addiction is complicated and still poorly understood, many of the behaviors that we associate with it are often driven by habit. Some substances, such as drugs, cigarettes, or alcohol, can create physical dependencies. But these physical cravings often fade quickly after use is discontinued. A physical addiction to nicotine, for instance, lasts only as long as the chemical is in a smoker's bloodstream—about one hundred hours after the last cigarette. Many of the lingering urges that we think of as nicotine's addictive twinges are really behavioral habits asserting themselves—we crave a cigarette at breakfast a month later not because we physically need it, but because we remember so fondly the rush it once provided each morning. Attacking the behaviors we think of as addictions by modifying the habits surrounding them has been shown, in clinical studies, to be one of the most effective modes of treatment. (Though it is worth noting that some chemicals, such as opiates, can cause prolonged physical addictions, and some studies indicate that a small group of people seem predisposed to seek out addictive chemicals, regardless of behavioral interventions. The number of chemicals that cause long-term physical addictions, however, is relatively small, and the number of predisposed addicts is estimated to be much less than the number of alcoholics and addicts seeking help.)

tles. And some aspects of the program are not just unscientific, they can seem downright strange.

Take, for instance, AA's insistence that alcoholics attend "ninety meetings in ninety days"—a stretch of time, it appears, chosen at random. Or the program's intense focus on spirituality, as articulated in step three, which says that alcoholics can achieve sobriety by making "a decision to turn our will and our lives over to the care of God as we understand him." Seven of the twelve steps mention God or spirituality, which seems odd for a program founded by a onetime agnostic who, throughout his life, was openly hostile toward organized religion. AA meetings don't have a prescribed schedule or curriculum. Rather, they usually begin with a member telling his or her story, after which other people can chime in. There are no professionals who guide conversations and few rules about how meetings are supposed to function. In the past five decades, as almost every aspect of psychiatry and addiction research has been revolutionized by discoveries in behavioral sciences, pharmacology, and our understanding of the brain, AA has remained frozen in time.

Because of the program's lack of rigor, academics and researchers have often criticized it. AA's emphasis on spirituality, some claimed, made it more like a cult than a treatment. In the past fifteen years, however, a reevaluation has begun. Researchers now say the program's methods offer valuable lessons. Faculty at Harvard, Yale, the University of Chicago, the University of New Mexico, and dozens of other research centers have found a kind of science within AA that is similar to the one Tony Dungy used on the football field. Their findings endorse the Golden Rule of habit change: AA succeeds because it helps alcoholics use the same cues, and get the same reward, but it shifts the routine.

Researchers say that AA works because the program forces people to identify the cues and rewards that encourage their alcoholic habits, and then helps them find new behaviors. When Claude Hopkins was selling Pepsodent, he found a way to create a new habit by

triggering a new craving. But to change an old habit, you must address an old craving. You have to keep the same cues and rewards as before, and feed the craving by inserting a new routine.

Take steps four (to make "a searching and fearless inventory of ourselves") and five (to admit "to God, to ourselves, and to another human being the exact nature of our wrongs").

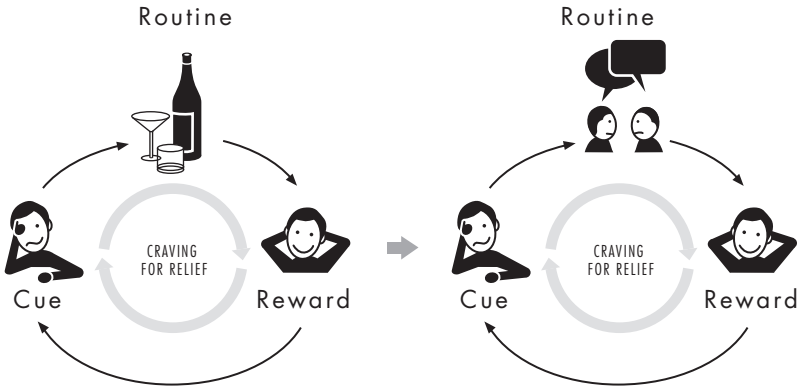
"It's not obvious from the way they're written, but to complete those steps, someone has to create a list of all the triggers for their alcoholic urges," said J. Scott Tonigan, a researcher at the University of New Mexico who has studied AA for more than a decade. "When you make a self-inventory, you're figuring out all the things that make you drink. And admitting to someone else all the bad things you've done is a pretty good way of figuring out the moments where everything spiraled out of control."

Then, AA asks alcoholics to search for the rewards they get from alcohol. What cravings, the program asks, are driving your habit loop? Often, intoxication itself doesn't make the list. Alcoholics crave a drink because it offers escape, relaxation, companionship, the blunting of anxieties, and an opportunity for emotional release. They might crave a cocktail to forget their worries. But they don't necessarily crave feeling drunk. The physical effects of alcohol are often one of the least rewarding parts of drinking for addicts.

"There is a hedonistic element to alcohol," said Ulf Mueller, a German neurologist who has studied brain activity among alcoholics. "But people also use alcohol because they want to forget something or to satisfy other cravings, and these relief cravings occur in totally different parts of the brain than the craving for physical pleasure."

In order to offer alcoholics the same rewards they get at a bar, AA has built a system of meetings and companionship—the "sponsor" each member works with—that strives to offer as much escape, distraction, and catharsis as a Friday night bender. If someone needs relief, they can get it from talking to their sponsor or attending a group gathering, rather than toasting a drinking buddy.

"AA forces you to create new routines for what to do each night instead of drinking," said Tonigan. "You can relax and talk through your anxieties at the meetings. The triggers and payoffs stay the same, it's just the behavior that changes."



KEEP THE CUE,
PROVIDE THE SAME REWARD,
INSERT A NEW ROUTINE

One particularly dramatic demonstration of how alcoholics' cues and rewards can be transferred to new routines occurred in 2007, when Mueller, the German neurologist, and his colleagues at the University of Magdeburg implanted small electrical devices inside the brains of five alcoholics who had repeatedly tried to give up booze. The alcoholics in the study had each spent at least six months in rehab without success. One of them had been through detox more than sixty times.

The devices implanted in the men's heads were positioned inside their basal ganglia—the same part of the brain where the MIT researchers found the habit loop—and they emitted an electrical charge that interrupted the neurological reward that triggers habitual cravings. After the men recovered from the operations, they were exposed to cues that had once triggered alcoholic urges, such as photos of beer or trips to a bar. Normally, it would have been impossible for

them to resist a drink. But the devices inside their brains "overrode" each man's neurological cravings. They didn't touch a drop.

"One of them told me the craving disappeared as soon as we turned the electricity on," Mueller said. "Then, we turned it off, and the craving came back immediately."

Eradicating the alcoholics' neurological cravings, however, wasn't enough to stop their drinking habits. Four of them relapsed soon after the surgery, usually after a stressful event. They picked up a bottle because that's how they automatically dealt with anxiety. However, once they learned alternate routines for dealing with stress, the drinking stopped for good. One patient, for instance, attended AA meetings. Others went to therapy. And once they incorporated those new routines for coping with stress and anxiety into their lives, the successes were dramatic. The man who had gone to detox sixty times never had another drink. Two other patients had started drinking at twelve, were alcoholics by eighteen, drank every day, and now have been sober for four years.

Notice how closely this study hews to the Golden Rule of habit change: Even when alcoholics' brains were changed through surgery, it wasn't enough. The old cues and cravings for rewards were still there, waiting to pounce. The alcoholics only permanently changed once they learned new routines that drew on the old triggers and provided a familiar relief. "Some brains are so addicted to alcohol that only surgery can stop it," said Mueller. "But those people also need new ways for dealing with life."

AA provides a similar, though less invasive, system for inserting new routines into old habit loops. As scientists have begun understanding how AA works, they've started applying the program's methods to other habits, such as two-year-olds' tantrums, sex addictions, and even minor behavioral tics. As AA's methods have spread, they've been refined into therapies that can be used to disrupt almost any pattern.

In the summer of 2006, a twenty-four-year-old graduate student named Mandy walked into the counseling center at Mississippi State University. For most of her life, Mandy had bitten her nails, gnawing them until they bled. Lots of people bite their nails. For chronic nail biters, however, it's a problem of a different scale. Mandy would often bite until her nails pulled away from the skin underneath. Her fingertips were covered with tiny scabs. The end of her fingers had become blunted without nails to protect them and sometimes they tingled or itched, a sign of nerve injury. The biting habit had damaged her social life. She was so embarrassed around her friends that she kept her hands in her pockets and, on dates, would become preoccupied with balling her fingers into fists. She had tried to stop by painting her nails with foul-tasting polishes or promising herself, starting *right now,* that she would muster the willpower to quit. But as soon as she began doing homework or watching television, her fingers ended up in her mouth.

The counseling center referred Mandy to a doctoral psychology student who was studying a treatment known as "habit reversal training." The psychologist was well acquainted with the Golden Rule of habit change. He knew that changing Mandy's nail biting habit required inserting a new routine into her life.

"What do you feel right before you bring your hand up to your mouth to bite your nails?" he asked her.

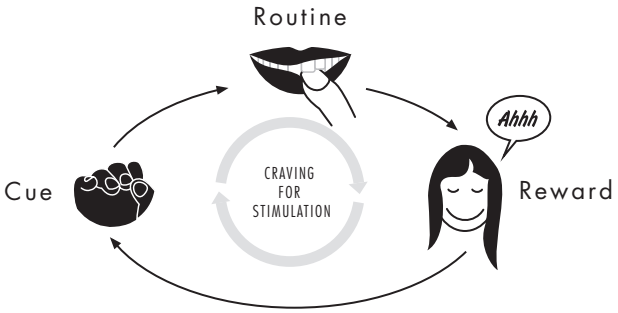
"There's a little bit of tension in my fingers," Mandy said. "It hurts a little bit here, at the edge of the nail. Sometimes I'll run my thumb along, looking for hangnails, and when I feel something catch, I'll bring it up to my mouth then. I'll go finger by finger, biting all the rough edges. Once I start, it feels like I have to do all of them."

Asking patients to describe what triggers their habitual behavior is called awareness training, and like AA's insistence on forcing alcoholics to recognize their cues, it's the first step in habit reversal

training. The tension that Mandy felt in her nails cued her nail biting habit.

"Most people's habits have occurred for so long they don't pay attention to what causes it anymore," said Brad Dufrene, who treated Mandy. "I've had stutterers come in, and I'll ask them which words or situations trigger their stuttering, and they won't know because they stopped noticing so long ago."

Next, the therapist asked Mandy to describe why she bit her nails. At first, she had trouble coming up with reasons. As they talked, though, it became clearer that she bit when she was bored. The therapist put her in some typical situations, such as watching television and doing homework, and she started nibbling. When she had worked through all of the nails, she felt a brief sense of completeness, she said. That was the habit's reward: a physical stimulation she had come to crave.



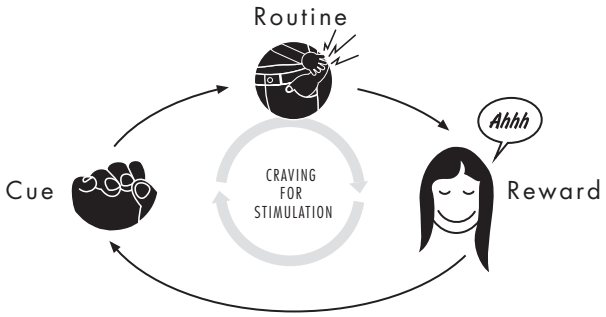
MANDY'S HABIT LOOP

At the end of their first session, the therapist sent Mandy home with an assignment: Carry around an index card, and each time you feel the cue—a tension in your fingertips—make a check mark on the card. She came back a week later with twenty-eight checks. She was, by that point, acutely aware of the sensations that preceded her habit. She knew how many times it occurred during class or while watching television.

Then the therapist taught Mandy what is known as a "competing

response." Whenever she felt that tension in her fingertips, he told her, she should immediately put her hands in her pockets or under her legs, or grip a pencil or something else that made it impossible to put her fingers in her mouth. Then Mandy was to search for something that would provide a quick physical stimulation—such as rubbing her arm or rapping her knuckles on a desk—anything that would produce a physical response.

The cues and rewards stayed the same. Only the routine changed.



MANDY'S NEW HABIT LOOP

They practiced in the therapist's office for about thirty minutes and Mandy was sent home with a new assignment: Continue with the index card, but make a check when you feel the tension in your fingertips and a hash mark when you successfully override the habit.

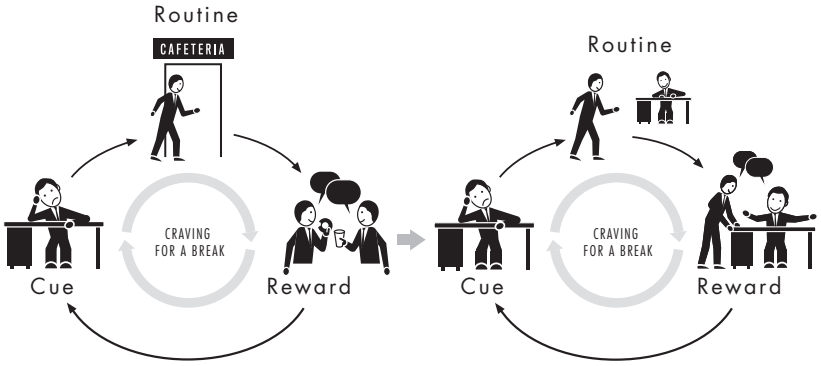
A week later, Mandy had bitten her nails only three times and had used the competing response seven times. She rewarded herself with a manicure, but kept using the note cards. After a month, the nail-biting habit was gone. The competing routines had become automatic. One habit had replaced another.

"It seems ridiculously simple, but once you're aware of how your habit works, once you recognize the cues and rewards, you're halfway to changing it," Nathan Azrin, one of the developers of habit reversal training, told me. "It seems like it should be more complex.

The truth is, the brain can be reprogrammed. You just have to be deliberate about it."*

Today, habit reversal therapy is used to treat verbal and physical tics, depression, smoking, gambling problems, anxiety, bedwetting, procrastination, obsessive-compulsive disorders, and other behavioral problems. And its techniques lay bare one of the fundamental principles of habits: Often, we don't really understand the cravings driving our behaviors until we look for them. Mandy never realized that a craving for physical stimulation was causing her nail biting, but once she dissected the habit, it became easy to find a new routine that provided the same reward.

Say you want to stop snacking at work. Is the reward you're seeking to satisfy your hunger? Or is it to interrupt boredom? If you snack for a brief release, you can easily find another routine—such as taking

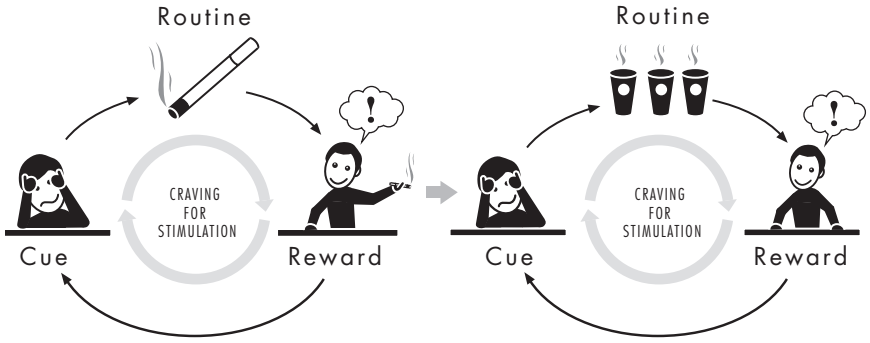


* It is important to note that though the process of habit change is easily described, it does not necessarily follow that it is easily accomplished. It is facile to imply that smoking, alcoholism, overeating, or other ingrained patterns can be upended without real effort. Genuine change requires work and self-understanding of the cravings driving behaviors. Changing any habit requires determination. No one will quit smoking cigarettes simply because they sketch a habit loop.

However, by understanding habits' mechanisms, we gain insights that make new behaviors easier to grasp. Anyone struggling with addiction or destructive behaviors can benefit from help from many quarters, including trained therapists, physicians, social workers, and clergy. Even professionals in those fields, though, agree that most alcoholics, smokers, and other people struggling with problematic behaviors quit on their own, away from formal treatment settings. Much of the time, those changes are accomplished because people examine the cues, cravings, and rewards that drive their behaviors and then find ways to replace their self-destructive routines with healthier alternatives, even if they aren't fully aware of what they are doing at the time. Understanding the cues and cravings driving your habits won't make them suddenly disappear—but it will give you a way to plan how to change the pattern.

a quick walk, or giving yourself three minutes on the Internet—that provides the same interruption without adding to your waistline.

If you want to stop smoking, ask yourself, do you do it because you love nicotine, or because it provides a burst of stimulation, a structure to your day, a way to socialize? If you smoke because you need stimulation, studies indicate that some caffeine in the afternoon can increase the odds you'll quit. More than three dozen studies of former smokers have found that identifying the cues and rewards they associate with cigarettes, and then choosing new routines that provide similar payoffs—a piece of Nicorette, a quick series of push-ups, or simply taking a few minutes to stretch and relax—makes it more likely they will quit.



If you identify the cues and rewards, you can change the routine.

At least, most of the time. For some habits, however, there's one other ingredient that's necessary: belief.

III.

"Here are the six reasons everyone thinks we can't win," Dungy told his Buccaneers after becoming head coach in 1996. It was months before the season started and everyone was sitting in the locker room. Dungy started listing the theories they had all read in the newspapers or heard on the radio: The team's management was

messed up. Their new coach was untested. The players were spoiled. The city didn't care. Key players were injured. They didn't have the talent they needed.

"Those are the supposed reasons," Dungy said. "Now here is a fact: Nobody is going to outwork us."

Dungy's strategy, he explained, was to shift the team's behaviors until their performances were automatic. He didn't believe the Buccaneers needed the thickest playbook. He didn't think they had to memorize hundreds of formations. They just had to learn a few key moves and get them right every time.

However, perfection is hard to achieve in football. "Every play in football—every play—someone messes up," said Herm Edwards, one of Dungy's assistant coaches in Tampa Bay. "Most of the time, it's not physical. It's mental." Players mess up when they start thinking too much or second-guessing their plays. What Dungy wanted was to take all that decision making out of their game.

And to do that, he needed them to recognize their existing habits and accept new routines.

He started by watching how his team already played.

"Let's work on the Under Defense," Dungy shouted at a morning practice one day. "Number fifty-five, what's your read?"

"I'm watching the running back and guard," said Derrick Brooks, an outside linebacker.

"What precisely are you *looking* at? Where are your eyes?"

"I'm looking at the movement of the guard," said Brooks. "I'm watching the QB's legs and hips after he gets the ball. And I'm looking for gaps in the line, to see if they're gonna pass and if the QB is going to throw to my side or away."

In football, these visual cues are known as "keys," and they're critical to every play. Dungy's innovation was to use these keys as cues for reworked habits. He knew that, sometimes, Brooks hesitated a moment too long at the start of a play. There were so many things for him to think about—is the guard stepping out of forma-