

THE CRAVING MIND

FROM CIGARETTES TO
SMARTPHONES TO LOVE—WHY
WE GET HOOKED AND HOW
WE CAN BREAK BAD HABITS



JUDSON BREWER

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On Flow

Your me is in the way.

—*attributed to Hui Hai*

My mom put a lock on our television set when I was growing up. She installed a kill switch on our TV's power supply, to which only she had the key. My dad left when I was six, and my mother was at work a lot, raising four children on her own. After school and during the summers, without nudges in another direction, we could have easily been drawn in by the mesmerizing glow of cartoons or adventure shows. It was easy to be triggered simply by walking by the TV and then get rewarded with a pleasant-feeling dullness—a mental escape into the fantasies and lives portrayed by others in front of a camera. She didn't want us to grow up watching the "boob tube," as she put it, becoming addicted to television. She wanted us to find other, more interesting, less mindless (and addictive) things to do. Since the average American watches four hours of television *each* day, I thank her for what she did.

My mom's padlock forced me outdoors, where I learned to entertain myself. There I found the bicycle. In junior high school, my friend Charlie and I spent endless hours either riding or fixing up our BMX bikes. We spent our paper route money on new parts, and we

washed our bikes anytime they had even a little dirt on them. Not too far from our neighborhood, a wooded expanse had dirt trails with ramps and the more challenging double jumps, an up and a down ramp. On the double jumps, our speed and timing had to be perfect. If we didn't get enough speed, we would crash into the lip of the down ramp. If we had too much speed, we would overshoot the mark. We rode those trails as much as we could, endlessly racing each other and practicing our jumps.

Growing up in Indianapolis, Charlie and I were lucky enough to be near the Major Taylor Velodrome. The velodrome was an open-air circular track where grown-ups could race fixed-gear track bikes. Next to the track was a bona fide BMX dirt track that we got to use. It had banked turns (dirt, of course) as well as huge ramps, "tabletop" jumps, and even triple jumps! Our mothers would take us there to race on weekends in the summer.

When I went off to college, mountain bikes were coming on the scene. I bought one during my freshman year and rode it everywhere—on campus and on the local mountain bike trails with friends. In medical school, I bought my first bike with front suspension, which allowed me to ride on more challenging terrain. There were excellent trails within an hour of St. Louis, and each medical school class had enthusiasts that I could link up with (school was challenging, but we would always find time to get out for a ride). In the summers, I started traveling with friends to places that had "real" mountain biking, like Colorado and Wyoming. We rode huge descents in Durango and long stretches of single track in Alaska's Kenai Peninsula. On these big trips, we judged our rides by how "epic" they were.

And that was when I started tripping into flow. Flow is at the opposite end of the spectrum from habit. Mindlessly watching TV or automatically saying, "I'm fine; how are you?" when someone greets

us are examples of responses that are triggered by a stimulus, yet are disengaged. We can feel as if we are on autopilot, almost floating somewhere (but don't know where), with a daydreamy, spaced-out quality of awareness. In contrast, awareness during flow experiences is vivid, bright, and engaged. We are *here*: so close to the camera, so engaged with the action, that we forget we are separate from it. I didn't have a language for it at the time, but that feeling of completely losing myself in a mountain bike ride was directly related to how epic I judged it to be afterward. Although I had experienced transcendent moments while making music in college, I had chalked it up to what happened when my quartet or orchestra played well together. But on the bike, I was having these flow moments more and more regularly.

Getting Our Flow On

The psychologist Mihály Csikszentmihályi coined the term “flow” in the 1970s while studying why people were willing to give up material goods for “the elusive experience of performing enjoyable acts” such as rock climbing.¹ It became his life's work to define how we conceptualize “being in the zone.” In an interview with *Wired* magazine, he described flow as “being completely involved in an activity for its own sake.” When that happens, wonderful things occur: “The ego falls away. Time flies. Every action, movement, and thought follows inevitably from the previous one, like playing jazz.”²

Elements of flow include the following:

- Concentration being focused and grounded in the present moment
- The merging of action and awareness
- A loss of reflective self-consciousness (for example, self-evaluation)

- A sense that one can deal with whatever arises in a given situation because one's "practice" has become a form of implicit embodied knowledge
- One's subjective experience of time becoming altered so that the "present" is continuously unfolding
- An experience of the activity as intrinsically rewarding³

At times when I was mountain biking, I would sometimes lose all sense of myself, the bike, and the environment. It wasn't zoning out; it was more like zoning in. Everything would simply merge into this amazing fusion of awareness and action. I wasn't there, yet there I was, in some of the most awesome experiences of my life. The best way I can describe moments like this is that they were delicious.

We all have experienced flow at one point or another. We get absorbed in something that we are doing—playing a sport, playing or listening to music, working on a project. When we look up from what we have been doing, it is five hours later and dark outside, and our bladder is about to explode—we were so focused we didn't notice. It would be great if we could produce this experience on demand.

The more often I experienced flow, the more I could recognize afterward the conditions that had increased the likelihood of it arising during that ride. After a year or so of being able to access flow, I started to put on my scientific hat and look at my experiences to identify these conditions and see whether I could reproduce them.

Book after book (for example, Steven Kotler's *The Rise of Superman*, published in 2014) has described the epic adventures of "flow junkies," extreme sportsmen and sportswomen who risk life and limb to chase the perfect high—yes, flow too can be addictive. Many authors have tried to find the secret ingredients, often pumping athletes and other flow junkies for information. In 2014, Dean Potter, a

record-setting extreme sports athlete who had often spoken of flow, was interviewed by the documentary filmmaker Jimmy Chin:

JIMMY: You enjoy a variety of pretty intense activities: BASE-jumping, slacklining, free-soloing. What's the common thread here, besides the adrenaline piece?

DEAN: The common thread in my 3-Arts is pushing into fear, exhaustion, beauty and the unknown. I willingly expose myself to death-consequence situations in order to predictably enter heightened awareness. In times when I'm going to die if I mess up, my senses peak in order to survive, and I see, hear, feel, intuit in vast detail, beyond my normal, day-to-day consciousness. This pursuit of heightened awareness is why I put myself in harm's way.

In addition, while doing my arts, I empty myself and function within a meditative state where I focus on nothing but my breathing. This manifests emptiness. This void needs to be filled, and somehow it draws in and makes me recognize the roots of my most meaningful ponderings and often leads to a feeling of connectivity with everything.⁴

Tragically, Potter died in 2015 while performing one of his arts: BASE jumping from a cliff in Yosemite.

What Potter observed is that certain predictable conditions create flow. One of them seems to be extreme danger. When we are in a dangerous situation, we don't have time to think about ourselves. We focus on keeping "us" alive; afterward, the self comes back online and freaks out like a concerned parent—*that was really dangerous, you could have gotten hurt, don't ever do that again*. I can clearly remember once when this happened to me. On a backcountry skiing trip, I had to traverse a very steep and crumbly snowbank just above a raging river (which flowed right into a frozen lake). I was wearing a heavy

mountaineering backpack with a week's worth of food and gear in it. Not being a good skier, I took off my Telemark skis and used them as anchors to help support my weight as I kick-stepped across the traverse. Kick, plant. Kick, plant. Kick, plant. When I had safely made it across, I looked around and started summing up the scene. A huge rush of adrenaline hit me, along with a voice screaming in my head, "You could have died!" Focus first. Worry later.

Although researchers have debated for decades about what it takes to get into a flow experience and stay there, there is no consensus on how to reliably reproduce this state in controlled environments, or on what brain activation (or deactivation) and neurotransmitters are involved in it. Near-death experiences are not conditions that we want to test in the lab.

Are there other clues about (less dangerous) conditions that support flow? Csikszentmihályi emphasized that a balance must be struck between the difficulty of the task and the skill of the performer. What was he getting at? Pondering this question of balance after mountain bike rides, I started to understand what it meant. When I rode on flat, unchallenging terrain, my mind was likely to chatter away. If I tried to do something that was too technical for me at the time, I would fall or stop frequently (and get frustrated with myself). Yet when the conditions were perfect—riding on terrain that was challenging enough not to be boring, yet not too challenging—I was much more likely to pop into flow.

From a brain perspective, this idea of balance fits with what we currently know about self-referential networks. The default mode network gets quiet when someone concentrates on a task, but lights up in circumstances that promote boredom. In addition, it is activated during self-evaluation and other types of self-reference. And of course, the DMN gets really quiet during meditation. DMN deacti-

vation may correspond to the “loss of reflective self-consciousness” that Csíkszentmihályi referred to.

Relatedly, many of the other elements of flow sound surprisingly similar to aspects of meditation: Concentration focused and grounded in the present moment. Subjective experience of a continuously unfolding “present” moment. Intrinsic reward. As we have explored throughout this book, these descriptors apply to mindfulness, too, whether we are in formal meditation or just being mindful as we go about the day. When we get out of our own way and into the momentary flow of life, it feels pretty good. Not surprisingly, Csíkszentmihályi even mentioned meditation as a way to train flow.

What about joy and flow? In the last chapter, we saw that joy can arise as a result of being generous, another manifestation of moving away from a focus on ourselves. What about other sources of joy? Is there a joyous condition that supports flow? Michael Jordan, the Hall of Fame basketball player who spent most of his career with the Chicago Bulls, may be a good example of this. During his professional career, he scored more than forty points in 172 games! And what was one of his most memorable moves? He stuck his tongue out when he was “in the zone,” as sports enthusiasts refer to flow. It may have indicated being in a relaxed, even joyful state as he cruised past his defenders, tallying up points. When we know that we are *on fire*, we can relax and enjoy the ride as we burn up the competition.

Phil Jackson was Jordan’s coach when the Bulls won three consecutive championships. He was well known for encouraging his athletes to meditate, bringing in George Mumford, a sports psychologist and meditation teacher, to Chicago to train his players. A few years later, Jackson had Mumford train Kobe Bryant and the Los Angeles Lakers. Soon thereafter, the Lakers also won three championships in a row. Pregame meditation sessions were aimed at helping the players

relax and let go of hopes of winning, or fears of losing, and to instead focus on the conditions of the moment. Jackson wrote in his book *Eleven Rings: The Soul of Success*: “The most we can hope for is to create the best possible conditions for success, then let go of the outcome. The ride is a lot more fun that way.”⁵

The Secret Sauce

In the Pali Canon, joy is described as an explicit condition for concentration during meditation. As noted in chapter 7, it is the fourth factor of awakening leading to tranquility, which then sets up the conditions for concentration. Like curiosity, it has an expansive rather than a contracted quality to it. On the “anger” retreat described in chapter 8, I was practicing setting up the conditions for one-pointed concentration. For this type of meditation, the “recipe” that I had learned included five “ingredients.” According to the cookbook, mix the following together and concentration will arise:

- Bringing the mind to the object (arousing, applying)
- Keeping the mind with the object (sustaining, stretching)
- Finding, having interest in the object (joy)
- Being happy and content with the object (happiness)
- Unifying the mind with the object (fixing)⁶

I repeatedly brought these conditions together and developed longer and longer periods of one-pointedness during the retreat. My concentration kept rising. In one instance, however, I thought that I had brought everything together, yet something was missing. The concentration state wouldn’t arise. I sat there puzzled. These steps had worked before. What ingredient was I missing? Then I checked in with my state of mind and realized that I wasn’t joyful. That seemed

funny to me, and the resultant internal chuckle in my mind was enough to pop me right into the meditative state again. All the other ingredients were already mixed together, waiting for the final one. It simply needed to be added.

Use the Force

As I had done while mountain biking or meditating on retreat, being able to repeatedly reproduce conditions that led to concentration focused in the present moment, the absence of self-evaluation, and an intrinsically joyful experience supported Csíkszentmihályi's assertion that meditation can be a way to get into a flow state. In *Finding Flow: The Psychology of Engagement with Everyday Life* he writes: "In principle any skill or discipline one can master on one's own will serve: meditation and prayer if one is so inclined." Yet as part of establishing the conditions for flow, he emphasized one's attitude or motivation for partaking in the activity: "The important thing, however, is the attitude toward these disciplines. If one prays in order to be holy, or exercises to develop strong pectoral muscles, or learns to be knowledgeable, then a great deal of the benefit is lost. The important thing is to enjoy the activity for its own sake, and to know that what matters is not the result, but the control one is acquiring over one's attention."⁷

One way of interpreting Csíkszentmihályi's focus on attitude is how it affects the elements of flow. For example, if we meditate in order to reach some fantastic state or to "be holy," there is an implicit self-reference in the equation. As the self contracts or grabs onto an experience, "we" become separated from "our" experience. The two can't be merged at that point. In other words, "I" am riding "my" bike. I can't describe some self-transcendent experience unfolding in the now because I am not in it. In other words, the more we work to

achieve flow, the more the contraction of excitement may be holding us back from reaching it. Our “me” is in the way.

Another way to look at attitude and its effects on flow is to see how it might engender worry or self-doubt. If we worry that we might crash on a mountain bike descent, the more likely we are to crash. In the movie *Star Wars: The Empire Strikes Back*, Yoda points this out to Luke during his Jedi knight training. Luke has crashed his X-wing fighter into a swamp. As part of his training, he tries to use the “force” to lift it out. Luke works harder and harder, yet the more he tries to lift the fighter, the deeper it sinks. As Luke whines to Yoda that he can’t do it, Yoda suggests an alternative to using brute effort.

YODA: “You must unlearn what you have learned.”

LUKE: “All right, I’ll give it a try”

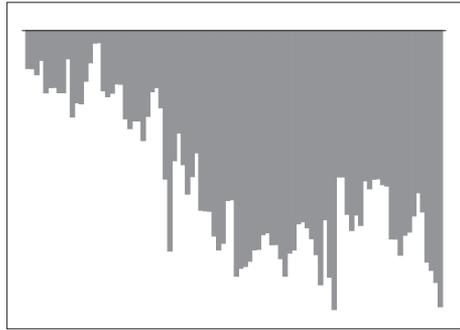
YODA: “No! Try not! Do, or do not. There is no try.”

Yoda is pointing out that self-defeating attitudes such as worry or doubt can get in the way—they are still self-referential, after all. If we stop wondering or worrying whether we can do a task, as long as it is within our skill set, it gets done. The self is optional.

Some biological data back up this idea. During our real-time fMRI neurofeedback study, one of our experienced meditators reported spontaneously dropping into a flow state. After one of her runs, she said, “There was a sense of flow, being with the breath . . . Flow deepened in the middle.” The corresponding activity in her PCC, the region of the default mode network most linked with the grab of self, showed a corresponding and notable drop in activity. We had caught flow on film!

Although this is anecdotal evidence, and by no means definitive, it is a nice demonstration linking PCC deactivation to flow. Other brain regions and networks are likely involved in flow—we just don’t

An experienced meditator getting into flow during an fMRI scan. The graph shows a significant decrease in PCC activity corresponding to her subjective report of getting into flow (middle of graph). Each bar indicates a two-second measurement. Laboratory archives of Judson Brewer.



have a good idea (yet) of what they are. Though other brain regions have been investigated in conditions that support flow, such as jazz improvisation and freestyle rap, the PCC is thus far the only area that has been consistently linked with flow.⁸ Given the centrality of the lack of self in flow, the PCC may be a marker of one of the necessary conditions for flow to arise.

Musical Flow

Playing music can be one of the best experiences for creating flow, whether performing in a small string or jazz ensemble or large orchestra. Looking back, I had probably been getting into flow as early as high school while playing in a quartet. In college, the entire Princeton Orchestra had a transcendent experience onstage. While on tour in England, we were playing the second movement of Rachmaninoff's Second symphony at the Royal Academy of Music. A little way into it, everything and everyone merged. Time stopped, yet we kept moving. As T. S. Eliot wrote in his magnum opus poem, *Four Quartets*:

At the still point of the turning world. Neither flesh nor flesh-
 less;
 Neither from nor towards; at the still point, there the
 dance is,
 But neither arrest nor movement. And do not call it
 fixity,
 Where past and future are gathered. Neither movement
 from nor towards,
 Neither ascent nor decline. Except for the point, the still
 point,
 There would be no dance, and there is only the dance.
 I can only say, *there* we have been: but I cannot say
 where.
 And I cannot say, how long, for that is to place it in time.⁹

After the concert was over, we all pointed to that movement. Something magical had happened. It may have been a perfect confluence of long practice and unity of purpose culminating in a performance in a famous concert hall. Who knows? Regardless, for the next few days, everyone in the orchestra seemed to be glowing.

During my medical and graduate school years, I continued to delight in “the elusive experience of performing enjoyable acts,” as Csikszentmihályi put it, by playing in a semiprofessional quartet. Named the Forza Quartet—after the Italian word for “go!”—we were all musicians who didn’t rely on music to pay the bills. We loved to practice and perform just for the sake of playing.

Learning the skills—in this case, practicing music to the point of proficiency—is important for flow to arise. You have to learn the piece. And how we practice may be critical to learning. To give an extreme example: if I lackadaisically practice scales on my violin, even

playing some notes out of tune, doing so will be worse than not practicing at all. Why? Because I will be learning to play out of tune. Just like bringing together the right ingredients for meditation or a cake recipe, the quality of musical practice makes a big difference in whether we will get into flow when performing. If the quality of the practice is good, the odds that the results will be good increase dramatically. In a paper entitled “The Psychological Benefits from Reconceptualizing Music Making as Mindfulness Practice,” my colleague Matt Steinfeld (who trained at Juilliard before becoming a psychologist and meditator) and I described some of these conditions.¹⁰ The following are a few of the highlights as they relate to flow and reward-based learning, which can be applied beyond music to anything we are learning:

- Don't beat yourself up. Not surprisingly, as any musician can attest, we can become our own worst enemies: berating ourselves when rehearsing, getting performance anxiety, or beating ourselves up for flubbing a performance. The more we fall into these habit loops, the more we practice failure instead of success.
- Take it slow. Focusing and carefully learning how to play new pieces from the beginning can feel tedious at first, yet we must make sure to learn the proper technique and mechanics of the music. Rushing to play an entire movement of a piece without first mastering all its parts can be a sign of restlessness or laziness.
- Don't take it personally when you mess up. Learning to drop the errors as soon as they come up helps us not compound them. Analyzing what we did or wondering whether anyone noticed are forms of self-consciousness. Ignoring such potential distractions prevents a slipup from becoming a major trip up (or worse).

- Quality over quantity. Learning to stop when we are tired or not focused is key. Our ego often says to keep going so that we can boast to ourselves and our fellow musicians that we practiced six hours that day. This suggestion likewise applies to not feeling guilty if we are “supposed” to practice a certain number of hours.

If we practice without paying attention, bad habits slip in more easily. As the famous football coach Vince Lombardi said, “Practice doesn’t make perfect. *Perfect* practice makes perfect.” The nice thing about music is that it adds a magical ingredient that helps us transcend everyday experience centered on ourselves. When we play music for music’s sake, the elements can come together to the point that the music starts singing an uplifting, joyful “hallelujah” unto itself. Perfect practice sets us up to flow.

Dean Potter seems to have lived a happy, though foreshortened, life. He found conditions that he could reproduce to get into a flow state—yet ultimately at a large price. Potter was described in *The Rise of Superman* as preferring flying to sitting in meditation, as favoring “cheating the process” to find flow. “I take the easy way,” he said, “I can sit on my ass for two hours to get a fifteen-second glimpse of this state. Or I can risk my life and get there instantly—and it lasts for hours.”¹¹

Interestingly, over time, I have found the opposite when it comes to meditation. As I have learned to bring the proper ingredients together, my meditation practice has deepened over the years. With it, so has my ability to get into and stay in flow while mountain biking, playing music, and doing other activities. Is it possible that finding the right conditions and practicing them carefully helps our brains reinforce the neural pathways that support flow? It is not

surprising that once we identify conditions that trigger intrinsically rewarding behaviors (such as mountain biking, meditation, music, and others), our brains will learn this “behavior,” just as it might with anything else. Ironically, instead of getting lulled into mindless habits that leave us disengaged from the world, such as watching television, drinking alcohol, or getting high, we can tap into the same reward-based-learning brain pathways to become more engaged with the world.