

## **THE FLOW STATE**

The Flow State is a non-ordinary, altered state of consciousness that can be found in psychedelic, athletic and creative experiences.

If you've had experiences when engaged in an activity where everything is just clicking - you are in the flow state. You may be skiing, writing, cooking, playing, engaged at work, but you're in the zone and effortlessly crushing it. That's the Flow State.

One description of flow goes "being completely involved in an activity for its own sake. The ego falls away. Time flies. Every action, movement, and thought follows inevitably from the previous one, like playing jazz. Your whole being is involved, and you're using your skills to the utmost."

Within the Flow state human performance and human experience can be enhanced and optimized.

## **TERMINOLOGY**

### **Autotelic**

Flow is often described as an *autotelic* experience. An autotelic experience quite simply describes an activity that's pleasant, enjoyable, and intrinsically motivating. An *autotelic* personality may have an easier time getting to a flow state because they more easily enjoy an activity for its own sake rather than an external reward or goal.

### **Transient Hypofrontality (the quieting of doubt)**

Transient Hypofrontality refers to the activity of the prefrontal cortex (PFC) during Flow. Hypo (meaning slow) being the opposite of hyper (i.e., fast). In the Flow state, the activity in the pre-frontal cortex slows down considerably.

The PFC is the heart of our higher cognitive abilities. It's the place we collect data, problem solve, plan ahead, assess risk, evaluate rewards, analyze thoughts, suppress urges, learn from experience, make moral decisions, and give rise to our normal sense of self.

In flow, parts of the PFC are temporarily deactivating. It's an efficiency exchange. We're trading energy usually used for higher cognitive functions for heightened attention and awareness." The technical term for this exchange is transient hypofrontality, In flow, which parts of the brain become hypofrontal determines the nature of the experience—with a quick rule of thumb being: the greater the deactivation of neuronal structures, the more profound (and bizarre) the experience.

Simultaneously, transient hypofrontality removes our sense of self. With parts of the prefrontal cortex deactivated, there's no risk assessor, future predictor, or inner critic around to monitor the situation. The normal safety measures kept in place by the conscious mind are no longer. This is another reason why flow states significantly enhance performance: when the "self" disappears, it takes many of our limits along for the ride.

The disappearance of self, the distortion of time, and that "psychic connection" to the universe—are among flow's more famous qualities, also its most peculiar. While these phenomena are included in most standard descriptions of the zone, they are also the reason William James described the state as "mystical" and Maslow borrowed quasi-Buddhist terms like self-actualization for its long-term effects. Not surprisingly, trying to understand how the brain produces this peculiarity has been a longtime goal of flow researchers. Unfortunately, until recently, there have been issues.

## **NEUROSCIENCE AND FLOW**

### **Areas of the brain suppressed during flow**

#### ***Prefrontal cortex-suppressed***

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#### ***dorsolateral prefrontal cortex -suppressed***

Another breakthrough occurred in 2008, when Johns Hopkins neuroscientist Charles Limb began using fMRI to examine the brains of improv jazz musicians and freestyle rappers immersed in flow. He found the dorsolateral prefrontal cortex is also deactivated in the state. The dorsolateral prefrontal cortex is an area of the brain best known for self-monitoring and impulse control—both of which are important here. Self-monitoring is the voice of doubt and disparagement, that defeatist nag, our inner critic. Since flow is a fluid state—where problem solving is nearly automatic—second-guessing can only slow that process. When the dorsolateral prefrontal cortex goes quiet, those guesses are cut off at the source. The result is liberation. We act without hesitation. Creativity becomes more free-flowing, risk taking becomes less frightening. In fact, without this structure deactivated, there would have been no way for Potter to “follow the Voice, no questions asked.” The job of the dorsolateral prefrontal cortex is to ask those questions, to start the process of second-guessing. It is the enemy of flow junkies everywhere.

## **The superior frontal gyrus -*suppressed***

The superior frontal gyrus helps produce our sense of self, that introspective feeling of self-awareness, which, as the study's lead researcher, Ilan Goldberg, told New Scientist, is not always useful: "If there is a sudden danger, such as the appearance of a snake, it's helpful not to stand around wondering how one feels about the situation."

## **superior parietal lobe - suppressed**

The superior parietal lobe, a portion of the brain that Newberg and D'Aquili dubbed the orientation association area (OAA) because it helps us orient in space.

When functioning normally, the OAA is a navigation system. It judges angles and distances, maps course trajectories, and keeps track of our body's exact location. But to do this last part, the superior parietal lobe must also produce a boundary line: the border of self, the division between finite "us" and the infinite "not us" that is the rest of the universe.

"When the OAA deactivates, we can no longer draw a line and say this is where the self ends and this is where the rest of the world begins, so the brain concludes, it has to conclude, that at this moment you are one with everything."

## **Areas of the Brain Activated**

### **medial prefrontal cortex**

Flow activates the medial prefrontal cortex, a part of the brain that governs creative self-expression. This is the reason that people in the zone still have

individual styles. Even though Sonny Rollins and John Coltrane both experience flow as an automatic process, their sax solos don't sound the same. Instead, a hyperactive medial prefrontal cortex ensures that even with self-awareness out of the way, our personal preferences still leak through.

## **NEUROCHEMICALS**

“Never underestimate the power of a hormone!” - Woo

There are dozens of neurochemical systems involved in flow. Some are still unknown, some irrelevant to this discussion. Our focus here is on a quintet of star performers, the substances that—to reprise our original description—help set flow apart from all other states of consciousness, altered or otherwise. Flow's two defining characteristics are its feel-good nature (flow is always a positive experience) and its function as a performance enhancer. The chemicals described herein are among the strongest mood-boosters and performance-enhancers the body can produce.

At a very simple level, neurochemicals are “information molecules” used by the brain to transmit messages. Mostly, these messages are either excitatory or inhibitory: Do more of what you're doing or Do less of what you're doing. But these small signals add up quickly, changing emotions, altering thoughts, fine-tuning reactions—essentially shaping our response to external events.

Flow is an extremely potent response to external events and requires an extraordinary set of signals.

## **Dopamine**

The process includes dopamine, which does more than tune signal-to-noise ratios. Emotionally, we feel dopamine as engagement, excitement, creativity, and a desire to investigate and make meaning out of the world. Evolutionarily, it serves a similar function. Human beings are hardwired for exploration, hardwired to push the envelope: dopamine is largely responsible for that wiring. This neurochemical is released whenever we take a risk or encounter something novel. It rewards exploratory behavior. It also helps us survive that behavior. By increasing attention, information flow, and pattern recognition in the brain, and heart rate, blood pressure, and muscle firing timing in the body, dopamine serves as a formidable skill-booster as well.

## **Norepinephrine**

Norepinephrine provides another boost. In the body, it speeds up heart rate, muscle tension, and respiration, and triggers glucose release so we have more energy. In the brain, norepinephrine increases arousal, attention, neural efficiency, and emotional control.

In flow, it keeps us locked on target, holding distractions at bay. And as a pleasure-inducer, if dopamine's drug analog is cocaine, norepinephrine's is speed, which means this enhancement comes with a hell of a high.

## **Endorphins**

Endorphins, our third flow conspirator, also come with a hell of a high. These natural "endogenous" (meaning naturally internal to the body) opiates relieve pain and produce pleasure much like "exogenous" (externally added to the body) opiates like heroin. Potent too. The most

commonly produced endorphin is 100 times more powerful than medical morphine.

## **anandamide**

The next neurotransmitter is anandamide, which takes its name from the Sanskrit word for “bliss”—and for good reason. Anandamide is an endogenous cannabinoid, and similarly feels like the psychoactive effect found in marijuana. Known to show up in exercise-induced flow states (and suspected in other kinds), this chemical elevates mood, relieves pain, dilates blood vessels and bronchial tubes (aiding respiration), and amplifies lateral thinking (our ability to link disparate ideas together).

More critically, anandamide also inhibits our ability to feel fear, even, possibly, according to research done at Duke, facilitates the extinction of long-term fear memories.

## **serotonin**

Lastly, at the tail end of a flow state, it also appears (more research needs to be done) that the brain releases serotonin, the neurochemical now associated with SSRIs like Prozac. “It’s a molecule involved in helping people cope with adversity,” Oxford University’s Philip Cowen told the New York Times, “to not lose it, to keep going and try to sort everything out.”

In flow, serotonin is partly responsible for the afterglow effect, and thus the cause of some confusion. “A lot of people associate serotonin directly with flow,” says high performance psychologist Michael Gervais, “but that’s backward. By the time the serotonin has arrived the state has already happened. It’s a signal things are coming to an end, not just beginning.” These five chemicals are flow’s mighty cocktail. Alone, each packs a punch, together a wallop. Consider the chain of events that takes us from pattern

recognition through future prediction. Norepinephrine tightens focus (data acquisition); dopamine jacks pattern recognition (data processing); anandamide accelerates lateral thinking (widens the database searched by the pattern recognition system). The results, as basketball legend Bill Russell explains in his biography *Second Wind*, really do feel psychic:

To this end, flow's neurochemistry performs an added function: it accelerates social bonding. Ever fall in love? That high—the sleeplessness, giddiness, hyperactivity, loss of appetite, etc.—that's dopamine and norepinephrine at work. These are the neurochemicals that reinforce romantic love. Endorphins serve a similar function, only showing up in maternal love (in infants) and general attachment (in adults). Serotonin, as well, further reinforces love and attachment (alongside oxytocin). And anandamide, as any pot smoker will attest, makes one feel open, expansive, and empathetic—all of which further improves connection.

### **Time Dilation (time slows down or speeds up)**

In the zone, after self-awareness starts to fade, temporal awareness tends to follow. In *Flow*, Csikszentmihalyi explains further: “One of the most common descriptions of optimal experience is that time no longer seems to pass the way it ordinarily does.

Why this happens, as Baylor neuroscientist David Eagleman discovered, also comes down to hypofrontality. The same events that erase our sense of self also distort our sense of time. In a series of elegant fMRI experiments, Eagleman found that temporal awareness is not centralized in any one location in the brain; rather, it is calculated by multiple areas working together. This means that time, much like self, is a summary judgment, a democratic conclusion reached by a vast prefrontal caucus. But this also makes temporal awareness vulnerable to interruption.



“Because flow deactivates large parts of the neocortex,” says Eagleman, “a number of these areas are offline—thus distorting our ability to compute time.” Underlying this loss of time is another efficiency exchange. As focus tightens, the brain stops multitasking. Energy normally used for temporal processing is reallocated for attention and awareness. Instead of keeping time, we are taking in more data per second, processing it more completely, and, perhaps—though great debate rages around this point—processing more of it per second.

## **Union and Oneness**

“It was like I reached a place where clarity and intuition and effort and focus all came together to bring me to a higher level of consciousness,” says professional kayaker Sam Drevo, “a level where I was no longer me; I was part of the river.”

Jefferson University neuroscientist Andrew Newberg and University of Pennsylvania neuropsychologist Eugene D’Aquili, gave us our first real insight into this experience. Back in 1991, they were investigating a different version of oneness—the kind produced by meditation. In deep contemplative states, Tibetan Buddhists report “absolute unitary being,” or the feeling of becoming one with everything, while Franciscan nuns experience *unia mystica*, or oneness with God’s love. So Newberg and D’Aquili put both Buddhists and nuns inside a single photon emission computed tomography (SPECT) scanner to try to figure out if there was biology beneath this spirituality. The SPECT scan revealed biology all right, and hypofrontality to be exact.

In moments of intense concentration, the same efficiency exchange that erases our sense of self and distorts our sense of time begins to impact our

relationship to space. Instead of taking place in the prefrontal lobes, this hypofrontality occurs farther back in the cortex, in the superior parietal lobe, a portion of the brain that Newberg and D'Aquili dubbed the orientation association area (OAA) because it helps us orient in space.

When functioning normally, the OAA is a navigation system. It judges angles and distances, maps course trajectories, and keeps track of our body's exact location. But to do this last part, the superior parietal lobe must also produce a boundary line: the border of self, the division between finite "us" and the infinite "not us" that is the rest of the universe.

Obviously, drawing this border is no simple task. So the OAA depends on a constant stream of incoming messages. All of our senses send data here. Incredible calculations occur. But all of this takes a lot of energy. When that energy is needed elsewhere—like during moments of intense focus—the OAA stops performing those calculations because it stops receiving those signals. Without this data stream, this part of the brain is temporarily blinded—it too becomes hypofrontal—and to incredible result.

"Once this happens," says Newberg, "we can no longer draw a line and say this is where the self ends and this is where the rest of the world begins, so the brain concludes, it has to conclude, that at this moment you are one with everything." This is a somewhat startling reversal.

Ever since Aldous Huxley told the world about his experiments with mescaline, the idea has been that the doors of perception needed to be opened for cosmic unity to be revealed. Newberg and D'Aquili discovered the inverse. With hypofrontality, attention is narrowing. Parts of the brain are shutting down.

Oneness is the result of the narrowing of the doors of perception, not throwing them wide open. Huxley had it exactly backward. Surfers with

their attention entirely on a wave become one with the wave. Meditating Franciscan nuns had God's love in mind so their experience was oneness with God's love. And Dean Potter, at the bottom of the Cellar of Swallows, had his attention entirely upon a dying bird so he did, in fact, become that dying bird.

This also explains why oneness keeps showing up in action and adventure sports. Focus is focus. There's little difference between the amount of concentration needed by a meditator to achieve "ecstasy" and the amount required by a BASE jumper leaping into a cave. Danger heightens attention. Thus the big mountains and big waves allow us to cheat this process, a fact Potter openly acknowledges: "I take the easy way," he says. "I can sit on my ass and meditate 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."

## **THE VOICE (to be heard in the flow)**

### **Fear and Fear of Death**

Since flow is a fluid action state, making better decisions isn't enough: we also have to act on those decisions. The problem is fear, which stands between us and all actions. Yet our fears are grounded in self, time, and space. With our sense of self out of the way we are liberated from doubt and insecurity. With time gone, there is no yesterday to regret or tomorrow to worry about.

And when our sense of space disappears, so do physical consequences. But when all three vanish at once, something far more incredible occurs: our fear of death—that most fundamental of all fears—can no longer exist. Simply put: if you're infinite and atemporal, you cannot die.

This is also why the Voice comes through so clearly in a flow state. With self, time, and space erased from the picture, all that complexity that Dietrich mentioned is edited out. It's not that the Voice is turned up louder in the zone, it's that everything that stands between us and the message is removed from the picture.

## **CHARACTERISTICS OF THE FLOW STATE**

Nakamura & Csikszentmihalyi (2001) postulated that the flow state experience was comprised of eight key dimensions, these dimensions are broken down into the optimal conditions for entering flow and the characteristics of being in a flow state. So that we can better understand the factors associated with flow – and make this mental state more accessible – let's look at these in more detail.

The optimal conditions for entering flow:

### **1. Challenge-skills balance**

Flow state requires a balance between one's skills and the challenge at hand: if the challenge is too demanding, we become disheartened and can experience negative emotions such as anxiety. Conversely, if a task is too easy, we become disinterested and indifferent – when we experience flow we are actively engaged but not overwhelmed by a challenge.

Csikszentmihalyi and Csikszentmihalyi (1988) suggested this dimension occurs when the skills of an individual are at just the right level to manage the situational demands. The challenge–skills balance is a powerful contributor to flow, this ultimate sense of competence results in a state of

engagement whereby a task is enjoyed through enthusiasm for the task itself (Eliasa, Mustafa, Roslan & Noahb, 2010).

## **2. Clear Goals & Unambiguous Feedback**

To enter a flow state we must repudiate the sometimes conflicting demands of a task and focus on the next step. Having clear, well-defined goals fosters an understanding of what actions need to be taken to accomplish the activity at hand.

Mitchels (2015) found positive correlations between flow state and performance goals within both academic and athletic contexts. Receiving unambiguous feedback (often from the activity itself) allows us to constantly adjust our responses to meet the required demands.

While positive feedback can come from a variety of sources, the meaning is the same, i.e. information that one is succeeding in one's goal (Csikszentmihalyi & Csikszentmihalyi, 1988).

Under these two conditions an individual can enter into the subjective state of flow, often exhibiting the following characteristics:

### **i. Action-awareness merging**

In a flow state, we are completely absorbed in the here and now to the extent that involvement in an activity is so absolute, it becomes second nature – almost automatic.

Jackson (1992) analyzed the flow descriptions of athletes, finding that there was no real awareness of being separate from the action being performed, with some describing flow state as being “in the zone” or “in the groove”.

## **ii. Concentration on the task at hand**

Total concentration or immersion is one of the most frequently mentioned flow dimensions. Focusing on the present moment allows us to better enter into a state of flow by directing our attention and enables us to circumvent superfluous distractions. In a flow state, we are fully engaged with an activity – only aware of what is relevant and dismissing unrelated factors.

## **iii. Sense of control**

In flow, a sense of control is present without being consciously exerted. Rather than being 'in control', Csikszentmihalyi (1993, p. 181) suggested this dimension is more of a 'sense of control' where individuals feel like they are unstoppable or feel like they can achieve anything.

The sense of exercising control in difficult situations is central to the flow experience; Keller & Blomann (2008) found that individuals with stronger control characteristics were more likely to experience flow, whereas individuals with weaker internal levels of control often failed to achieve a flow state.

## **3. Loss of self-consciousness**

We can spend an abundance of time and energy monitoring how we appear to others, however, during flow any concerns for the self dissipate as we become one with the activity.

Put simply, in a flow state we are too involved in the moment to be concerned with protecting our ego – when freed from self-consciousness we can do things intuitively and with aplomb.

The absence of self-preoccupation allows us to shift our focus to the task at hand while rejecting extraneous and egocentric distractions.

#### **4. Transformation of time**

Have you ever been so immersed in something that you lose track of time? The experience of flow state can perceptibly distort our sense of the ordinary passage of time as we are completely absorbed in the moment. A transcendence of time can occur when one is deeply involved in an activity, we can experience time as slowing down, speeding up, or in some cases, it becomes completely irrelevant (Hanin, 2000).

#### **5. Autotelic experience**

Autotelic experiences (endeavors carried out for their own sake, with no expectation of a future benefit, from the ancient Greek 'autós 'meaning 'self 'and 'télos 'meaning 'result/outcome/end') are some of the most rewarding.

Csikszentmihalyi & Robinson (1990) examined receptive aesthetic experiences within museums; their findings suggested the consequences of deep and autotelic involvement are characterized by feelings of personal wholeness, a sense of discovery, and a sense of human connectedness.

Within this setting, the intense involvement of attention in response to a visual stimulus was for no other reason than to sustain the experience. This dimension is described by Csikszentmihalyi (1990) as the end result of being in a flow state, with potentially entropic experiences being transposed into flow

## **Recommended books and articles**

### ***Flow - The Psychology of Optimal Experience***

By Mihály Csíkszentmihályi (pronounced: Mee-High-Lee Chick-Sent-Me-High)

Psychologist Mihály Csíkszentmihályi, popularized the term, Flow, in his 1990 book. One of the ways he described the flow state is as an “optimal state of consciousness where we feel our best and perform our best.”

### ***The Rise of Superman - Decoding the Science of Ultimate Human Performance***

By Steven Kotler

### ***Stealing Fire - How Silicon Valley, the Navy SEALs, and maverick scientists Are revolutionizing the way we live and work***

By Steven Kotler and Jamie Wheal

### ***Flow State, Explained. By Tony Butt, Surfer***

Great article on the Flow State that covers most of the essentials in a short read.

<https://www.patagonia.com/stories/flow/story-18147.html>

### ***11 Activities and Exercises to Induce a Flow State (+ 6 Examples).***

By Elaine Houston B.Sc.

<https://positivepsychology.com/flow-activities/>