HABIT ENGINEERING by Kevin Kohls

Chapter: Your Brain Is Not a Spreadsheet

The Broken Assumption

For decades, those of us in the Theory of Constraints (TOC) community have run into the same wall: people don't do what makes sense. Present the logic. Show the math. Reveal the clear bottleneck and the leverage point. Still—resistance. Still—excuses. Still—"we'll think about it."

The natural reaction? Blame leadership. Blame culture. Blame weak discipline. But what if none of those are the real root cause?

What if the fundamental problem isn't in the organization—but in the assumption that humans behave like logical processors?

We have assumed people act like rational actors in an Excel sheet, optimizing for constraints with objective clarity. But over and over, that fails. If people were spreadsheets, the mere clarity of a buffer report or the simplicity of Throughput Accounting would be enough.

Yet it's not. And that forces us to ask: what else is going on?

The Real Brain: A Drenched Computer

The brain is not a computer. It's a **biological organ bathed in chemicals**. Those chemicals—neurotransmitters—don't simply color our experience. They **drive behavior**.

In software terms, neurotransmitters are like **subroutines**. When conditions trigger them, they activate with specific instructions. You don't control when they run. Most of the time, you don't even notice they're active. But they change everything about how you think, what you value, and whether you'll act.

And this is exactly why logic often fails.

Why Logic Fails: The Invisible Subroutines

Let's say you walk into a plant and show the operations manager exactly how TIP can double their throughput with minimal investment. You think they'll say "of course!"

Instead, they freeze. Or nod politely. Or ignore you.

Why?

Because when you triggered change, you didn't just trigger logic—you triggered **cortisol**, the stress and uncertainty neurotransmitter. You may also have challenged their identity (lowering **serotonin**) or created social fear (blocking **oxytocin**). Meanwhile, the **dopamine** they get from "doing things the old way" is still active.

This is what we mean by invisible subroutines. The resistance isn't intellectual. It's chemical.

And if we want to sell or sustain TOC, we have to stop ignoring this system.

Meet the Core Neurochemical Functions

There are dozens of neurotransmitters in the brain. But five of them have **outsized impact** on how behavior is formed and sustained:

- **Dopamine** – Drives motivation, reward-seeking, and the repetition of behavior. Critical for habit formation.
- **Cortisol** – Triggered by fear, urgency, and stress. Can prompt action but also freeze or avoidance.
- **Norepinephrine (NE)** – Heightens focus, awareness, and problem-solving. Associated with System 2 thinking.
- **Serotonin** – Stabilizes mood, status, and group identity. Creates the feeling of "this is who we are."
- Oxytocin – Social bonding chemical. Reinforces trust, belonging, and coordinated group action.

Category	Neurotransmitter	Primary Function	Role in Habit Engineering
Core Behavior Drivers	**Dopamine**	**Craving, reward prediction**	Drives pursuit, habit loops, system motivation
	NE (Norepinephrine)	**Focus, urgency, mental energy**	Enables System 2 activation, effort, and task attention
	Serotonin	**Confidence, status, belief, safety**	Governs trust in change, belief formation, emotional security
	Cortisol	**Fear, stress, withdrawal**	Suppresses behavior under threat; blocks change; increases
Group Behavior Reinforcemer	Oxytocin	Social bonding, trust, emotional safety	Locks in team cohesion, trust-based rituals, shared celebration
Learning & Habit Installation	Acetylcholine (ACh)	Attention, memory encoding, learning speed	Enables training and learning of new behaviors; primes the habit
Peripheral / Contextual Roles	Endorphins	Physical pleasure, pain relief	Provide a sense of relief after effort; support social bonding through joy
	Testosterone	Dominance, assertiveness	May impact competitive or status behavior; limited relevance to habit systems
	Estrogen	Mood, empathy, emotional balance	Influences affect regulation; less targeted in habit design
	Glutamate	General excitation (main signal booster)	Necessary for all brain activity, but too diffuse for behavior targeting
	GABA	General inhibition (calming effect)	Balances glutamate; not behaviorally actionable in this

Think of these five as the core programming languages of human behavior.

- To start change, you need cortisol to create urgency.
- To engage the process, you need norepinephrine to focus.
- To make progress addictive, you need dopamine.
- To make it stick, you need serotonin.
- To spread it as culture, you need oxytocin.

Selling TOC: It's Not a Pitch, It's a Sequence

Most CI consultants sell like this:

1. Present logic

2. Show case study
3. Wait for agreement

What actually happens in the brain:

1. Cortisol spike: "This is different. I'm under threat."
2. Status fear: "What if I'm wrong? What will my team think?"
3. Social avoidance: "Let's wait. Let's do more analysis."

Instead, selling TOC must follow a neurochemical path:

1. Trigger cortisol carefully – Don't overwhelm. Introduce just enough urgency (e.g., missed goals, eroding profit) to open the loop.
2. Activate NE with curiosity – Ask questions. Don't pitch—engage: "What's blocking throughput right now?"
3. Inject dopamine with fast wins – Use simulations, dice games, or quick pilots. Create visible progress fast.
4. Reinforce serotonin – Publicly praise the team. Position TOC as something that makes *them* the hero.
5. Enable **oxytocin** – Let teams bond over shared success. Storytelling, team workshops, and cross-functional meetings matter.

Sustaining TOC: Why the Loop Dies

Even when TOC is implemented well, it often **fades**. Not because it stopped working—but because the chemical loop was **never maintained**.

Here's what usually happens:

- Dopamine reward hits hard early (first throughput gains)
- Serotonin identity starts to form ("we're a CI plant")
- But then… plateau.
- No new goal. No new game. Dopamine fades.
- Without new novelty, NE drops. Engagement fades.
- The loop goes dormant.

This is why the **Reward Ladder** concept is so important.

A Reward Ladder is a **periodic thinking step** that asks:

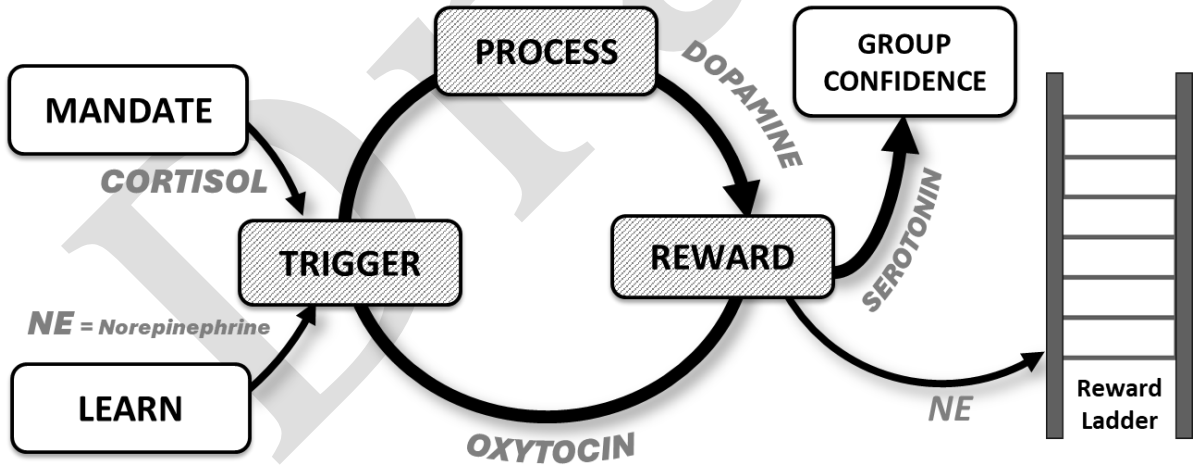
“Are we ready for the next level of improvement?”

For example:

- Rung 1: Throughput (TIP)
- Rung 2: Inventory (DDMRP)
- Rung 3: Planning synchronization
- Rung 4: Financial leverage (Throughput Accounting)
- Rung 5: Cultural automation

Each new rung reinvigorates the loop:

- Cortisol: "We’re not done."
- NE: “What’s the next constraint?”
- Dopamine: “Let’s go again.”



Logical Thinkers Must Think Biologically

The TOC community loves logic. We build Trees. We test assumptions. We look for root causes. And that’s good.

But we have failed to apply that same logic to **human behavior**.

If we were consistent, we would look at the UDEs of CI failure:

- Great start, then stalls

- Resistance to obvious improvements
- Lack of sustainment without mandates

And we'd ask: What's the real cause?

It's not stupidity. It's not poor leadership. It's not lack of tools.

It's the **subroutines we never see**, but always feel.

The logic isn't failing. The logic is incomplete.

The Real Habit Loop: Subroutines in Action

Let's revisit the TOC habit loop with this lens:

1. **Trigger (Cortisol)**: "This must change."
2. **Thinking (NE)**: "What's the bottleneck?"
3. **Action (Dopamine)**: "Let's fix it."
4. **Reward (Serotonin)**: "That worked."
5. **Stabilization**: "We are a team that improves."
6. **Group Lock (Oxytocin)**: "We do this together."

Now you see why just installing a visual management board or launching a Kaizen blitz isn't enough. You didn't touch the chemicals. You didn't build the loop.

Closing Thought: You're Not a Spreadsheet—But You Can Still Run Code

We're not saying logic doesn't matter. We're saying **logic alone doesn't explain behavior**.

To sell TOC, you need to know how to trigger the right chemistry.
To sustain TOC, you need to install a loop that feeds itself.

And to change a culture, you need to understand that no habit survives without reward—and no group sustains improvement without a shared identity.

So no, your brain isn't a spreadsheet.

But with the right chemistry, you can still write a program that runs.

Let's build it.