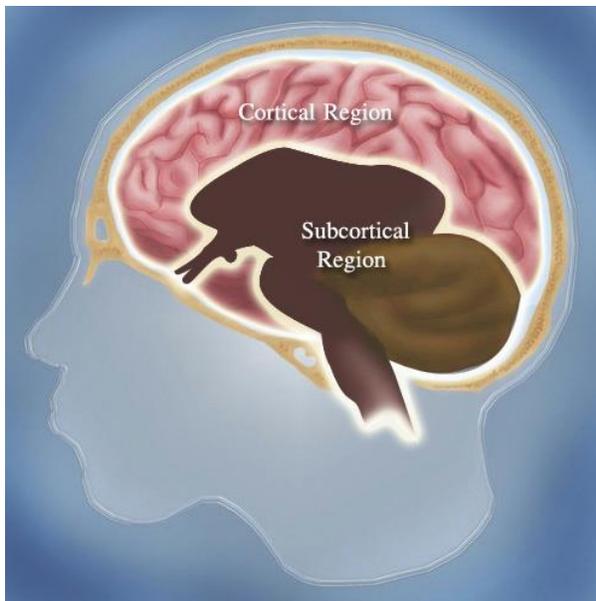




The Brain Systems Behind Controlling our Impulses and Building our Attention

Shelley Carnes

I've noticed lately that my mind has been wandering a lot, so I wanted to explore how ATTENTION works (ability to direct cognitive activity on a specific stimuli) and how to better manage our IMPULSES (the sudden strong and unreflective urge to act). It turns out *a lot of us* have wandering minds and *many of us* struggle to stay focused. In fact, research says when we're reading or listening to the radio, our minds typically wander anywhere from 20 to 40% of the time. Keeping our attention on one thing can take a lot of effort. Luckily, there are strategies to keep our bodies more regulated and our attention spans more focused. But first, we have to understand how it all works. So, let's do that together today and dig deeper into all the science behind building our attention and managing our impulses.



Spell: WANDERING Spell: BRAIN

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So, I mentioned we are talking about two things today. The brain systems behind building our attention and managing our (what)? impulses

What percent do our minds typically wander while reading? 20-40 percent

What is attention? Ability to direct focus/cognitive activity on a specific task/stimuli

What is something likely to distract you?

According to DANIEL KAHNEMAN, psychologist and author of “Thinking Fast and Slow”, our brain processing can be split into two systems, System One and System Two. SYSTEM ONE PROCESSING happens in the spinal column and SUBCORTICAL regions of the brain (below the cortex, here in brown in our first image). These are the super speedy, fast acting neurons. System One is fast, associative and emotional. And it’s all happening SUBCONSCIOUSLY (*something that comes from the part of your mind that you cannot perceive or control*). It’s the system that makes AUTOMATIC decisions for us (*actions that are done without conscious thought or intention*). System One is INSTINCTIVE and REFLEXIVE. An example is pulling our hand off of a hot burner, or when our bodies freeze when we see a big snake.

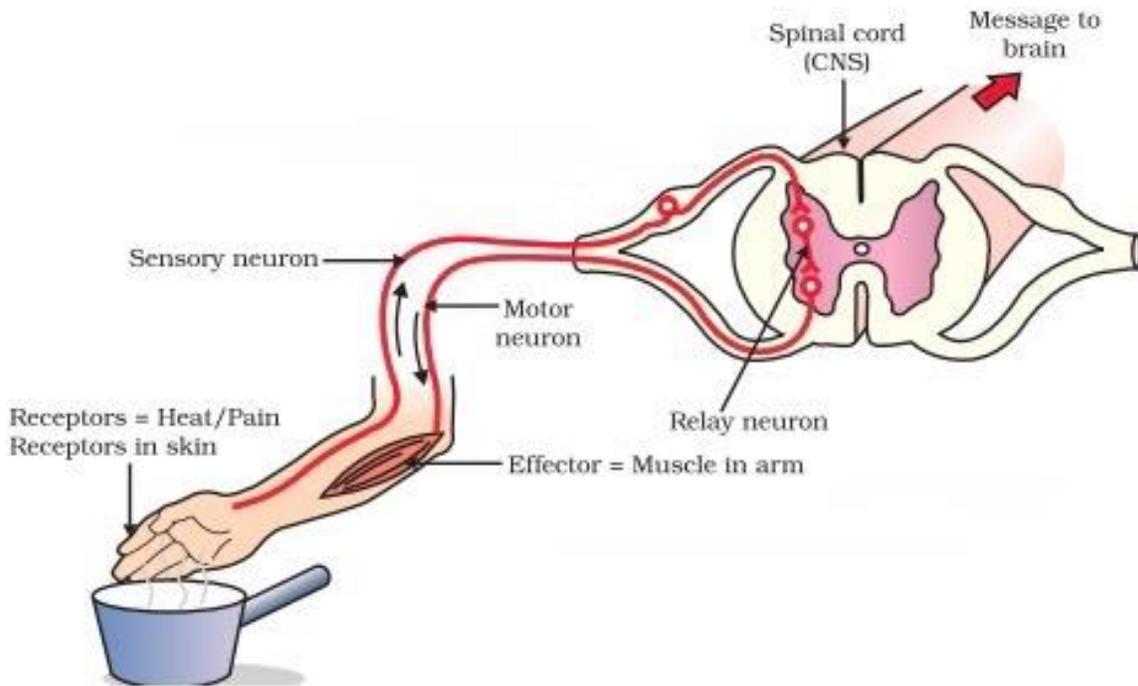
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Spell: SNAKE Spell: REFLEXIVE

How did Daniel Kahneman split brain processing? into two systems; System One and System Two

Daniel Kahneman split brain processing into two systems, what are they? System one and two

How would you explain System One processing? subconscious, fast, associative, emotional, automatic

What is one adjective given in the lesson to describe System one? speedy, fast acting, emotional, automatic, instinctive, reflexive

What's another word or synonym for reflexive? Automatic, subconscious

What kind of actions are done without intention or conscious thought? automatic

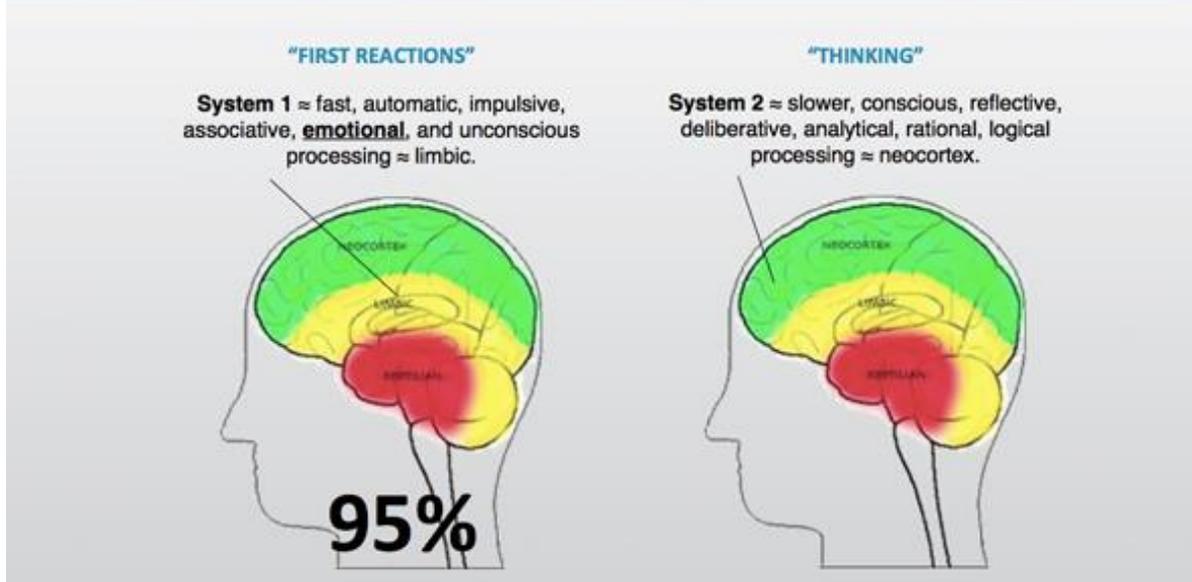
What's the opposite or antonym of subconscious? conscious, logical

What is something that might trigger a reflexive reaction from you?

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SYSTEM 1 AND SYSTEM 2 PROCESSING



SYSTEM TWO involves the VOLUNTARY parts of the brain and is here in the CORTICAL regions (shown in pink on first image). This part of the brain involves higher thought processes. It works slower, more deliberately, and with more reason and logic. System 2 is PROPOSITIONAL in nature. What this means is it is functioning on "if/then" statements. For example, let's say I looooooove hot peppers. Which I really do. And I see a big bowl in front of me, like in the picture below. My if/then process would be.... **"If** I eat this whole bowl of chili peppers in front of me, **then** my tongue will probably be on fire, therefore I will control myself and only eat one." So, we *need* System Two to control our willpower, self-control and informed decisions. And we need System One to get through our days safely and to process all of the stimuli that's in our environment.

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Spell: PROPOSITIONAL Spell: CHILI PEPPERS

What parts of the brain does system two involve? voluntary

Where can we find this in the brain? cortical region

Point to the picture that shows system one. Now system two.

How would you explain System Two processing? conscious, slow, deliberate, logical, rationale

System two processing is _____ in nature? propositional

What kinds of statements does this propositional nature prefer? if/then

How would you describe the difference between System One and System Two Process? System two is slower, more deliberate, use reason and logic. System one is faster, impulsive and subconscious

What's another word or synonym for voluntary? intentional, thoughtful

What's the antonym for rational? irrational, not logical

What do you think about hot chili peppers? this can refer to the food or the music group Red Hot Chili Peppers (haha)

Just for fun watch <https://www.youtube.com/watch?v=BfOdWSiyWoc>--Red Hot Chili Peppers—Can't Stop

The funny thing about how these systems work is that we assume a lot of the things we do are purely conscious decisions made by System Two. But in fact, almost everything we decide on is based on automatic reactions and suggestions

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fed to us by System One. The two systems are continuously giving each other information. Did you know that? I didn't. And it takes a lot for System Two to stay focused on *anything*. And that is because we are bombarded by DISTRACTIONS all the time. Distractions are what System Two is continuously fighting against and they can come in all kinds of forms. There are EXTERNAL distractions (things happening around you) and INNER distractions (our inner sensory experiences, inner dialogues, thoughts and feelings). For example, an external distraction might be a siren going off down the road, and an internal distraction might be hunger pains or a catchy tune you just can't stop hearing in your head.

Spell: DISTRACTIONS

Which system of reactions and suggestions does the brain default to most of the time? System One

System two gives suggestions, but has trouble staying focused due to _____?

Distractions

How do system one and two give each other information? continuously

What are the two types of distractions? external, inner/internal

Describe inner distractions. inner sensory experiences, inner dialogues, thoughts and feelings

What is an example of an external distraction that is happening right now? What is an example of an internal distraction that is happening right now?

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JUDY ENDOW, who is a renowned autistic author and advocate, says because of the way autistics are wired, they do not filter their external or internal stimuli easily. This makes the distractions to focus even harder. In addition, those that have MOVEMENT DIFFERENCES have an added layer of complexity. Judy says, “When movement differences play out in our bodies, we may get stuck in one position or engage in repetitive movements. Sometimes there can be difficulty in getting a body movement going. At other times, once our body is in motion, we cannot stop even if we want to. Movement differences can also play out in thoughts, speech, and emotions, areas that are not as readily observable to onlookers, yet can be daily obstacles for all of us.”

Spell: movement Spell: differences

Who is the autistic author and advocate we are talking about? Judy Endow

Judy says that autistics do not filter what easily? external or internal stimuli

What other thing adds another layer of complexity? movement differences

What is a synonym for renowned? famous, celebrated, known, prominent

How do movement differences affect attention or focus? affects motor initiation, inhibition, control, etc.

How would you define "obstacle"? hardship, barrier, hinders progress, hurdle

What are your thoughts about how Judy Endow describes movement differences?

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Now I'm going to read how HENRY FROST, also an autistic advocate, talks about his movement differences in his poem called "Loops":

My body movement speed is not average.
It is not in the mean.
My thinking speed is.
My thinking speed is faster than average.
My body takes time to agree to cooperate with my mind.
If my body chooses not to agree to cooperate, my thoughts remain my own.
More anxiety, less body cooperation.
Less body cooperation, more anxiety.
Less anxiety, more body cooperation.
More body cooperation, less anxiety.

Spell: COOPERATION

Henry wrote this in 2013 and was born in the year 2000. How old was he when he wrote this poem? $2013 - 2000 = 13$

How old is he now? Tell me the formula you used to figure this out: 2020 (or current year) - $2000 = 20$

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What is the name of Henry's poem? Loops

What speed is fastest for Henry? Thinking

When there is more anxiety, there is less _____? Cooperation

Less body cooperation leads to more _____? anxiety

What you think Henry means when he says, "My body takes time to agree to cooperate with my mind"?

What are your thoughts about Henry's poem?

Judy Endow goes on to say...

"I think of myself as being either well REGULATED or *not* well regulated. When I am well regulated, I am able to fully engage in what is going on around me. My physical movements and my thought processing are FLUID. My reaction time to spoken words of others and to EXTRANEIOUS (irrelevant) stimuli is not much different from the reaction time of NEUROTYPICALS around me. When I am *not* well regulated, I am less able to engage in what is going on around me. It takes me much longer to process my thoughts and, thus, my reaction time to the spoken words of others is much slower, and my reactions to extraneous stimuli becomes bigger, louder and lasts longer. I am told that my voice becomes louder and that I have a startle response to stimuli that normally would not cause me to startle. When I am *not* well regulated, I also have significantly more movement issues. I must bring conscious thought to my physical movements, such as walking, grasping, and chewing. It becomes difficult to engage in multiple movements at the same time, such as walking over to a person and handing him something. First, I have to walk over to the person, stop, and then execute the handing-something motion. It also becomes difficult to combine physical movement with thinking. This means that I have to stop moving in order to think any thoughts unrelated to the actual act of moving my body through space. As a result, it is nearly impossible for me to walk and talk at the same time."

Spell: MOTION

Judy said that when she is well regulated, her physical movements and thought processing are _____? fluid

What's another word for extraneous? Irrelevant

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What happens when Judy is not well regulated? less able to engage; takes longer to process thoughts; reaction time slower; reactions bigger; voice louder; startle; more movement issues.

When Judy mentioned neurotypical, who was she referring to? people who are not autistic, not neurodiverse or neurodivergent

What are your thoughts about what Judy described?



IDO KEDAR, author of Ido in Autismland and In Two Worlds describes his attention like this...

"There are times when impulses completely overcome the mind like a LIZARD BRAIN overcoming my intellect. I found cotton candy nearly impossible to resist when I was young, and I seldom got it because it was so full of sugar and food coloring. My family and I might be walking through a crowded fair, and if I spotted a kid eating cotton candy, I might quickly snatch off a piece and pop it in my mouth, if no one was fast enough to stop me. The kid would glare at me and my family would be embarrassed and apologize. I did this despite knowing right from

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wrong. The lizard urges to grab cotton candy defeated the intellectual knowledge of manners. These kinds of overwhelming urges can be hugely hindering in the life of a person with autism."

Spell: LIZARD BRAIN

Who is the advocate we are talking about now? Ido Kedar

Name one of Ido's books. Ido in Autismland; In Two Worlds

The "lizard brain" overwhelmed Ido's _____? Intellect

When Ido could not control his impulse for cotton candy, what brain system was he fighting against? System One

In what region of the brain is, what Ido describes as, the LIZARD BRAIN in?

Subcortical

What are your thoughts about what Ido described?

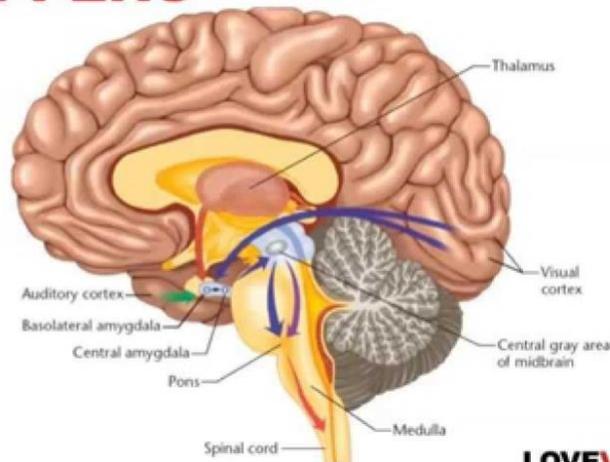
So how *does* the lizard brain take over like that? Well, DANIEL GOLEMAN, author of Emotional Intelligence, Why it can mean more than IQ explains what's happening. He says that the emotional epicenter of System One is the AMYGDALA, the most primitive survival center. It sees and hears everything and is the trigger point for the fight or flight response. If it perceives an emotional emergency or intense need (like Ido's need for cotton candy), it can take over the rest of the brain before the CORTEX (the thinking brain) has had time to analyze the signals coming in to make a more thoughtful decision. When the amygdala has decided, "Oh no, I have to have that to survive!" it can hijack (take over) the rest of the brain, tricking it as if there is an emergency. This has helped immensely in EVOLUTION (how living organisms develop and adapt over time). But it is not helpful when the situation does not warrant this extreme survival or instantaneous response. And can instead put us in awkward or even dangerous situations.

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HOW AMYGDALA HIJACKING HAPPENS

- The stimuli goes directly to thalamus and it then goes right to amygdala before a signal reaches the neocortex to process.
- This survival mechanism lets us react to things before the rational brain has time to mull things over.



LOVEVFEAR
YouTube

What is the emotional epicenter of System One? amygdala

What is another way to describe the cortex? thinking brain

What is the study of how living organisms develop and adapt over time? Evolution

What happens when the amygdala thinks the body is in danger? fight or flight; takes over cortex

What is a situation when the amygdala should be responding?

What is a situation when the amygdala should *not* be responding?

So how do people successfully override impulses and distractions? Well, the good news is that the brain is plastic throughout life-- this is called NEUROPLASTICITY. This means the brain has the ability to reorganize itself by forming new brain connections throughout life. So how does that happen? Well, COGNITIVE NEUROSCIENTISTS (scientists who study how we think) suggests that changes can be made from TOP-DOWN CONTROL. This means *our very own thinking* can override impulses and distractions. That is why understanding *why* the distractions are happening, *when* they are happening can be a powerful tool for us to change the NEURONAL (brain) connections. This process is also called

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MINDFULNESS, which is defined as a mental state achieved by focusing our awareness on the present moment, while calmly acknowledging and accepting our feelings, thoughts, bodily sensations, and helping us to pause before we take action.

Neuroplasticity is the remarkable ability of our brain to do what _____?

rewire itself, reorganize itself, form new brain connections

The type of scientist who studies how we think is called a _____ cognitive neuroscientist

The word neuronal refers to the _____? brain

What is another word for cognitive? brain, thinking, intellect

Define Top-down control.

What is another word for pause? stop, inhibit, take a break

How would you define Mindfulness?

COGNITIVE TRAINING (aka “brain fitness”), is another strategy we might use when we give ourselves commands or self-talk to control our behaviors and impulses and using the if/then statements we discussed earlier. Some examples of SELF-TALK control: *I will not eat another piece of candy; I will move my body quietly through the library; I am in control over my body and I will tell it to sit down. IF I run on this slippery floor, THEN I might slip and fall, so I will make sure to walk slowly and carefully.*

What is another way to describe “cognitive training”? Brain Fitness

What is a strategy that might help control impulses? Self talk

Define self-talk: giving ourselves commands; mental dialogue

Give me an example self-talk sentence that you might give yourself:

And, last but not least, research UNANIMOUSLY (in full agreement) agrees that strategies such as: EXERCISE, DEEP BREATHING, DIET and MEDITATION can all support our attention and body control. Parents can also play an active role in helping support these areas, too. So can active and consistent coaching from other caring adults. With awareness, practice, and constant reflection, we can all learn to improve our skills to support our body control, impulses and overall attention.

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The word that means in full agreement is _____? Unanimous

Name two tools that we just talked about that can help control impulses and build attention: Mindfulness, Cognitive training, Brain Fitness, Exercise, deep breathing, diet, meditation, brain fitness, self-talk

What is a strategy you think best supports your impulse control and focus?

Mindfulness, Cognitive training, Brain fitness, Exercise, deep breathing, diet, meditation, brain fitness, self-talk

Name someone who can help you with body control. Parents, teachers, siblings, therapists, etc

Name something you like to eat that you feel supports your body organization:

Name two exercises that you feel supports your regulation

Creative Writing:

1) Oh no!! It's the Amygdala take-over!!! Don't let her do it!! Let's pretend you are in a situation when your amygdala is overriding your thinking brain. Describe a situation when this could happen, then pick a process that we have talked about (mindfulness, if/then statement, self-talk, etc.) to help defeat the Amygdala!

2) Daniel Goleman, author of "Emotional Intelligence, Why it can mean more than IQ" said, "It's not the chatter of people around us that is the most powerful distractor, but rather the chatter of our own minds." Tell me your thoughts about this...

3) Ido says, "My skills, though far from perfect, have improved a great deal because I can type now on a letter board or iPad. Each year my motor control becomes more under my own control. It is my modality of communication and it gives me access to the world and control over my life. Since I believe my mind/body disconnect is a key to my odd movements and body apraxia, I have found that a vigorous exercise program focusing on strength, coordination and flexibility has helped me with my motor control tremendously, because the fitter I am physically, the more my body obeys my mind. Exercise also helps with my emotional equilibrium and helps to reduce the constant anxiety that so many people with autism experience. We need to work on real physical fitness early.

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We need smart fitness trainers more than swings. And finally, we need to listen to those people with autism who have broken through their silence to be able to describe their experiences. We offer insights from the inside. This is valuable because our outsiders mislead, and theories can go astray as a result.” What are your thoughts about this?

4) Meltdowns and Shutdowns at School: Read Philip Reyes’ blog post and tell me your thoughts...

5) Let’s say you could create your own powerful “A” team of people who could help you manage your impulses and support your attention. Tell me WHO would be included on your “A” team and what could they do for you?

Extra Mindfulness Video:

https://www.facebook.com/mindfulschools/?notif_t=fbpage_fan_invite¬if_id=1474536896582484



Lesson by Shelley Carnes, MS, OTR/L Shelley Carnes has over 25 years of experience in partnering with the autistic community. She is a licensed Occupational Therapist, an Expert DIR Floortime Provider and is one of the co-founders of The Hirsch Academy. She is a passionate supporter and advocate for the neurodivergent community and is a voracious learner of what more can be done to support and empower the beliefs behind neurodiversity. Shelley loves being a wife and a mom to two kids and two furry animals. She loves playing and exploring outside, playing the piano and will dance any chance she can get

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Resources

<http://ollibean.com/autism-and-the-importance-of-stabilization/>

<http://ollibean.com/autism-sensory-regulation-and-movement-fluidity/>

https://en.wikipedia.org/wiki/Thinking,_Fast_and_Slow#Rationality_and_happiness

<http://www.growthguided.com/3-methods-to-control-the-lizard-brain/>

<http://www.sentientdecisionscience.com/tapping-system-1-processing-reveals-deep-consumer-insights/>

<http://ollibean.com/loops/>

<http://www.shareguide.com/Goleman.html>

<http://www.mindful.org/five-steps-to-mindfulness/>

<http://idoinautismland.com/>

<http://conversionxl.com/reptilian-brain/>

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