



***CODING FAST
AND SLOW***



***APPLYING KAHNEMAN'S
INSIGHTS TO IMPROVE
DEVELOPMENT PRACTICES
AND EFFICIENCY***

***PROF. DANIEL
KAHNEMAN***

Mar 5, 1934 – Mar 27, 2024

***2002 NOBEL PRIZE LAURATE
IN ECONOMICS!***



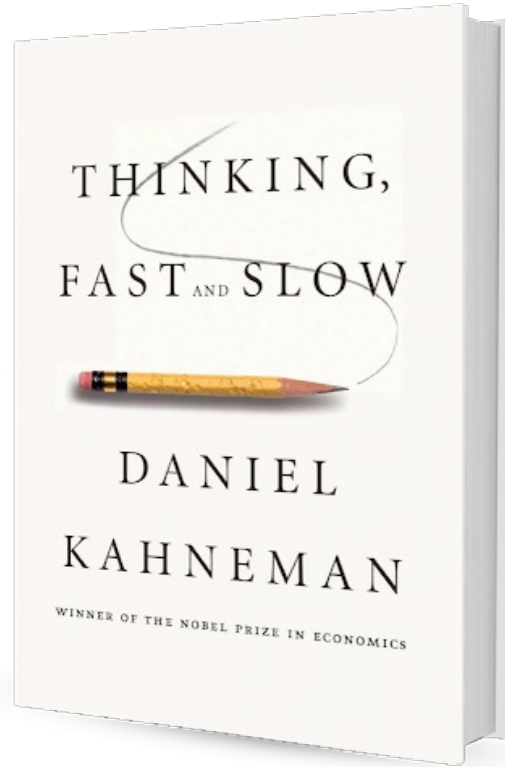
***"FOR HAVING INTEGRATED INSIGHTS
FROM PSYCHOLOGICAL RESEARCH INTO
ECONOMIC SCIENCE, ESPECIALLY
CONCERNING HUMAN JUDGMENT AND
DECISION-MAKING UNDER UNCERTAINTY"***



ECONOMICS?

- × ECON101: People are rational; that's why markets work.
- × – Nope, they aren't; here's 50 years of study.
- × – Oh, wow, they really aren't. It probably has a profound effect on economics! Here's a Nobel Prize for ya!
- × ECON101: People are rational; that's why markets work.





A BAT AND A BALL COST \$1.10 IN TOTAL.

THE BAT COSTS \$1 MORE THAN THE BALL.

HOW MUCH DOES THE BALL COST?



HOW MUCH DOES THE BALL COST?

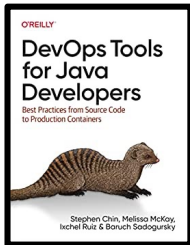
$$0.10 + (1.00 + 0.10) = 1.20$$

$$0.05 + (1.00 + 0.05) = 1.10$$



BARUCH SADOGURSKY - @JBARUCH

- × Developer Productivity Advocate
- × Gradle Inc
- × Development → DevOps → #DPE



SHOWNOTES

- × speaking.jbaru.ch
- × Slides
- × Video
- × All the links!



TWO SYSTEMS


SYSTEM ONE

- x Fast
- x Intuitive
- x Automatic
- x Emotional
- x Cheap and eager

SYSTEM TWO

- x Slow
- x Analytical
- x Controlled
- x Logical
- x Expensive and lazy





Wait, let's think
about that!

SYSTEM 2

I recognize this
pattern!

SYSTEM 1



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SPEAKING.JBARU.CH

```
class UniqueWords {
    public static void main(String[] args) throws IOException {
        if (args.length != 1) {
            throw new IllegalArgumentException("Invalid argument");
        }
        Set<String> words = new HashSet<>();
        for (String line : Files.readAllLines(Path.of(args[0]))) {
            // Ignore commented lines
            if (!line.startsWith("#") || !line.startsWith("//")) {
                Collections.addAll(words, line.split("\\W+"));
            }
        }
        System.out.println("Count of unique words: " + words.size());
    }
}
```



RED



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GREEN



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YELLOW



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BROWN



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ORANGE



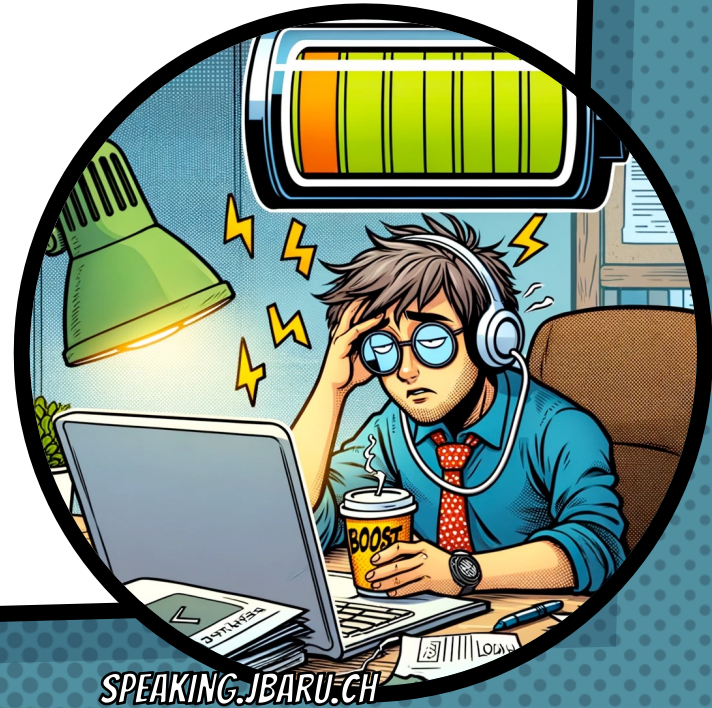
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YOU HAVE "MENTAL FUEL"



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The Journal of Neuroscience, August 26, 2020 • 40(35):6801–6811 • 6801

Behavioral/Cognitive

Attention and Capacity Limits in Perception: A Cellular Metabolism Account

 Merit Bruckmaier,¹ Ilias Tachtsidis,² Phong Phan,² and  Nilli Lavie¹

¹Institute of Cognitive Neuroscience, University College London, London WC1N 3AZ, United Kingdom, and ²Department of Medical Physics and Biomedical Engineering, University College London, London WC1E 7JE, United Kingdom



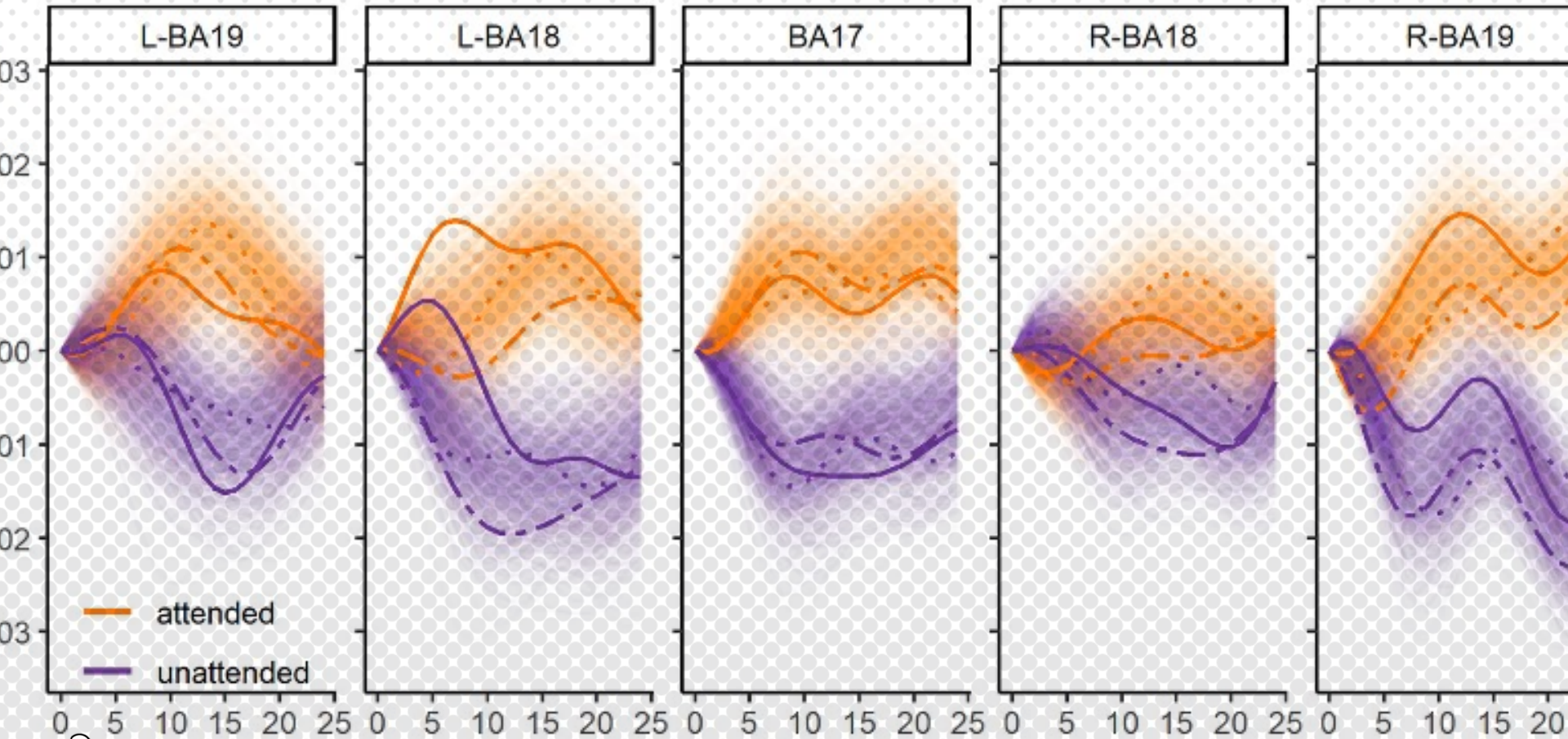
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oxCCO Time Series of Load Effects for Attended and Unattended Stimuli



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Explain the paper "Attention and Capacity Limits in Perception: A Cellular Metabolism Account" to me Barney-style in one paragraph or less.



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ATTENTION AND CAPACITY LIMITS IN PERCEPTION: A CELLULAR METABOLISM ACCOUNT

- × BNIRS and oxCCO
- × Cellular Metabolism as Mental Fuel
- × Finite Energy Supply
- × High Load Mode vs Low Load Mode



WHICH SYSTEM DO WE USE FOR CODING?

SYSTEM ONE

- x Fast
- x Intuitive
- x Automatic
- x Emotional
- x Cheap and Eager

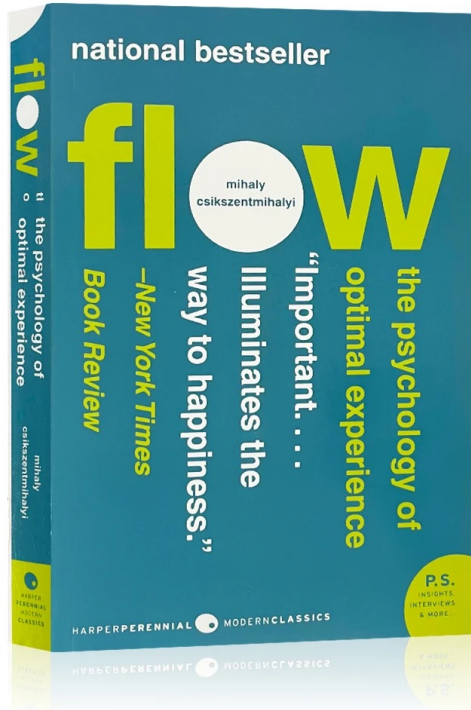
SYSTEM TWO

- x Slow
- x Analytical
- x Controlled
- x Logical
- x Expensive and Lazy

SOFTWARE

ENGINEERING





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"STATE OF **EFFORTLESS**
CONCENTRATION SO DEEP THAT
PEOPLE LOSE THEIR SENSE OF TIME,
THEMSELVES, AND THEIR
PROBLEMS"



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**ATTENTION
CONTROL IS
EXPENSIVE**

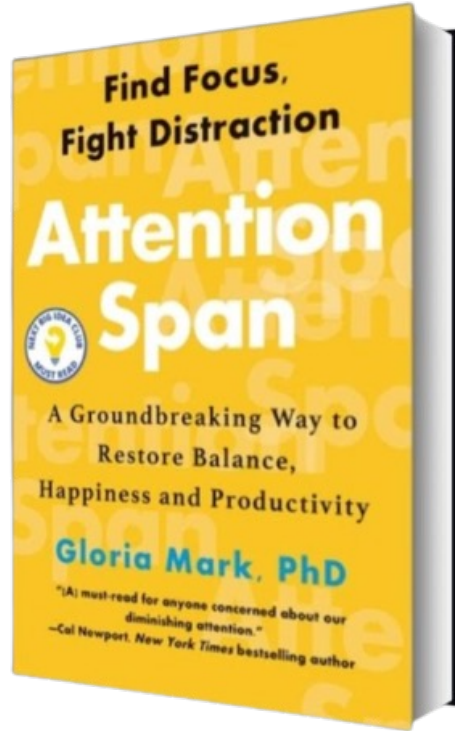


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Is **email** stealing your focus?
The average person checks their email
77 times a day.

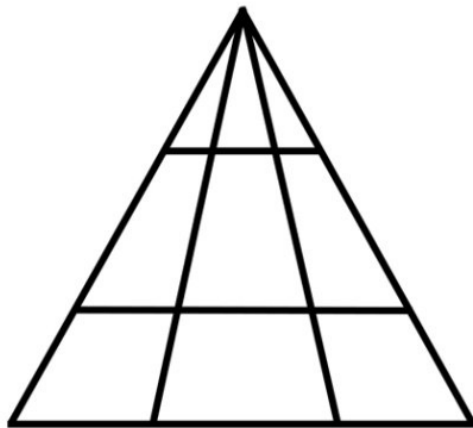
Our attention span has dwindled
to about **47 SECONDS**
on any screen.

It takes **25 minutes** to return focus
to a task after interruption.

```
public class DiscountCalculator {
    public static void main(String[] args) {
        calculateDiscount(100, 15);
    }

    public static void calculateDiscount(double price, double discount) {
        double finalPrice = price - (price * discount / 100);
        System.out.println("The final price after a " + discount + "%
discount is: " + finalPrice);
    }
}
```





HOW MANY TRIANGLES?



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```
public class TaxCalculator {  
    public static void main(String[] args) {  
        calculateTax(100, 5);  
    }  
  
    public static void calculateTax(double amount, double taxRate) {  
        double totalAmount = amount + (amount * taxRate);  
        System.out.println("The total amount with tax: " + totalAmount);  
    }  
}
```



THE PROBLEM:

- × You deplete your fuel by context-switching
- × You're not in the flow because of context-switching
- × Loose-loose: you need more fuel needed, but you have less fuel



2017 IEEE/ACM 2nd International Workshop on Emotion Awareness in Software Engineering (SEmotion)

Characterizing and Predicting Mental Fatigue during Programming Tasks

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North Carolina State University
Department of Computer Science Raleigh, NC, USA
Email: cjparnin@ncsu.edu



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WHEN WE ARE TIRED, WE PRODUCE WORSE CODE

- × "Developers are cutting corners on quality when fatigued."

(DUH)



EXPECTED OUTCOME: WE'RE TIRED AND STOP



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BUT WE DON'T KNOW WHEN TO QUIT

- × Default parole decision: deny
- × Fewer paroles when judges are tired/hungry
- × Granting parole needs System 2 thinking
- × Judges unaware of switching to System 1



REAL-LIFE OUTCOME: YOU RUN ON SYSTEM ONE

SYSTEM ONE

- x Fast
- x Intuitive
- x Automatic
- x Emotional
- x Cheap and Eager

"OK CODE"

SYSTEM TWO

- x Slow
- x Analytical
- x Controlled
- x Logical
- x Expensive and Lazy





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REAL-LIFE OUTCOME: YOU RUN ON SYSTEM ONE

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*"EXECUTE SKILLED RESPONSES AND
GENERATE SKILLED INTUITIONS
AFTER ADEQUATE TRAINING"*



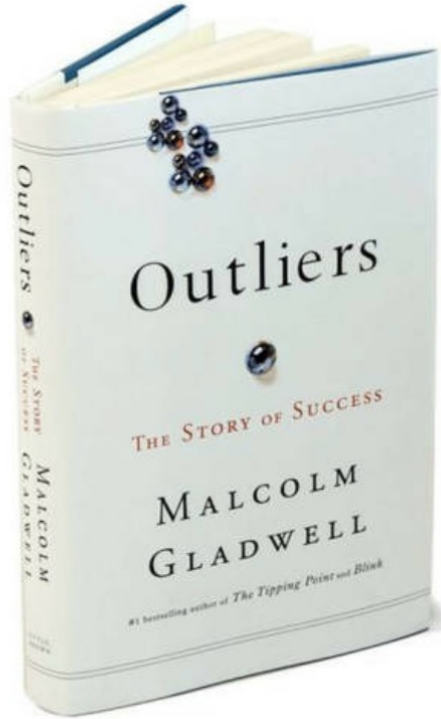
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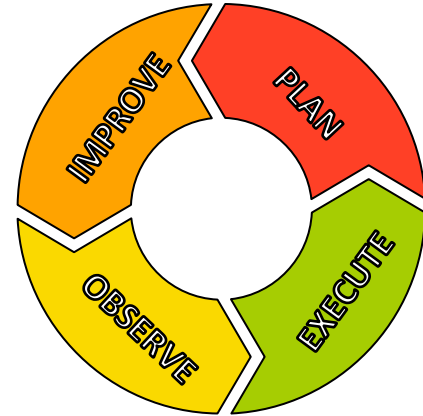
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10,000 HOURS OF PRACTICE MOVE SOME SYSTEM 2 ACTIVITIES TO SYSTEM 1

- × Driving
- × Golf
- × Tennis
- × Music playing
- × Safety drills for fire fighters





Wait, let's think
about that!

SYSTEM 2

I recognize this
pattern!

SYSTEM 1



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REAL-LIFE OUTCOME: YOU RUN ON SYSTEM ONE

SYSTEM ONE

- x Fast
- x Intuitive "OK CODE"
- x Automatic
- x Emotional
- x Cheap and Eager

SYSTEM TWO

- x Slow
- x Analytical
- x Controlled
- x Logical
- x Expensive and Lazy





NOT GREAT, NOT TERRIBLE.

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WHICH SUCKS LESS?

BAD CODE

"OK" CODE



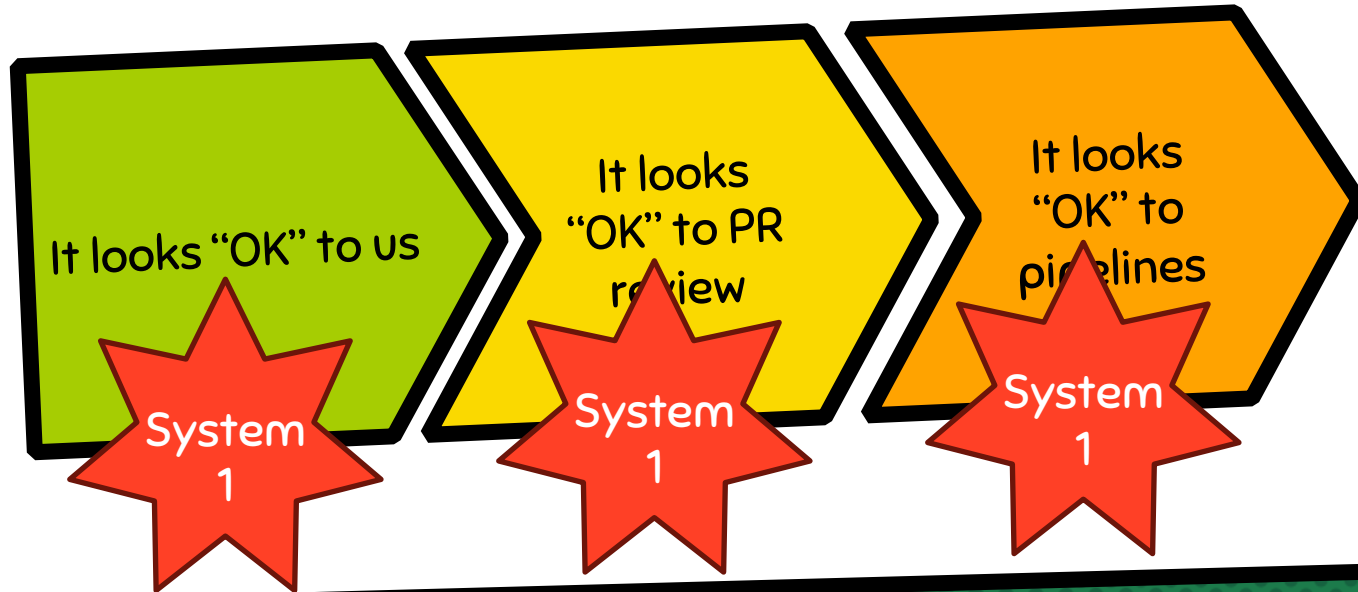
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THE PROBLEM OF "OK CODE"



***NEXT THING
YOU KNOW:
YOU HAVE AN
"OK" PRODUCT***



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INVEST IN FUEL SAVING TECHNIQUES

The goal: Have enough mental fuel to last all day



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TIME MANAGEMENT STRATEGIES

- × Time Blocking
- × Pomodoro Technique





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TIME MANAGEMENT STRATEGIES

- × Time Blocking
- × Pomodoro Technique
- × Task Batching

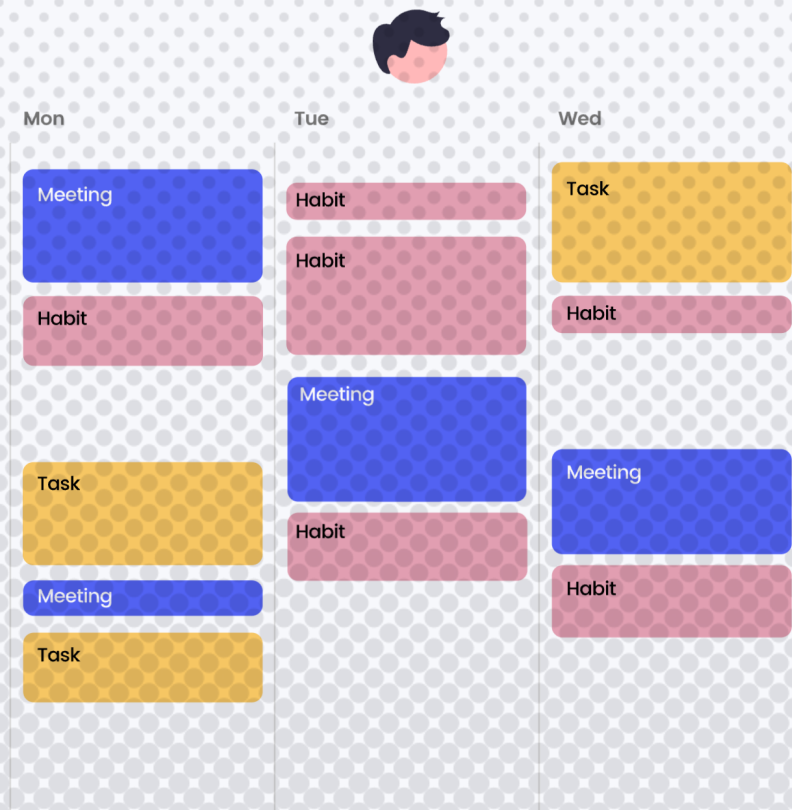


Defend focus time

Find the best time for productive heads-down work in your calendar (while keeping your schedule flexible for changes) — so you can get more done as a team every week.

[Tasks](#) [Habits](#) [Planner](#)

- × Block time
- × Batch tasks
- × Allow access



MINDFULNESS AND COGNITIVE PRACTICES

- × Mindfulness and Meditation
- × Reflective Practices
- × Single-tasking



WORKSPACE AND INTERRUPTION MANAGEMENT

- × Workspace Organization
- × Notification Management
- × Prioritization Techniques



PHYSICAL AND MENTAL WELL-BEING

- × Physical Exercise
- × Breaks and Downtime



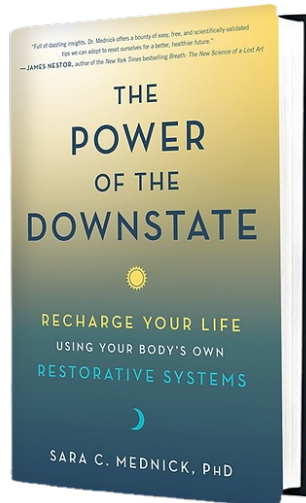
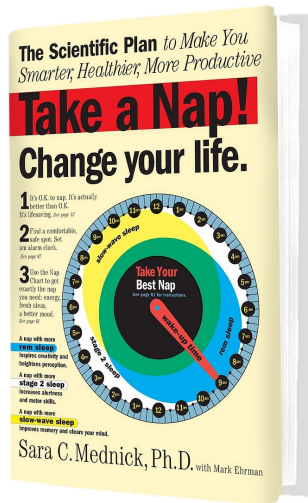


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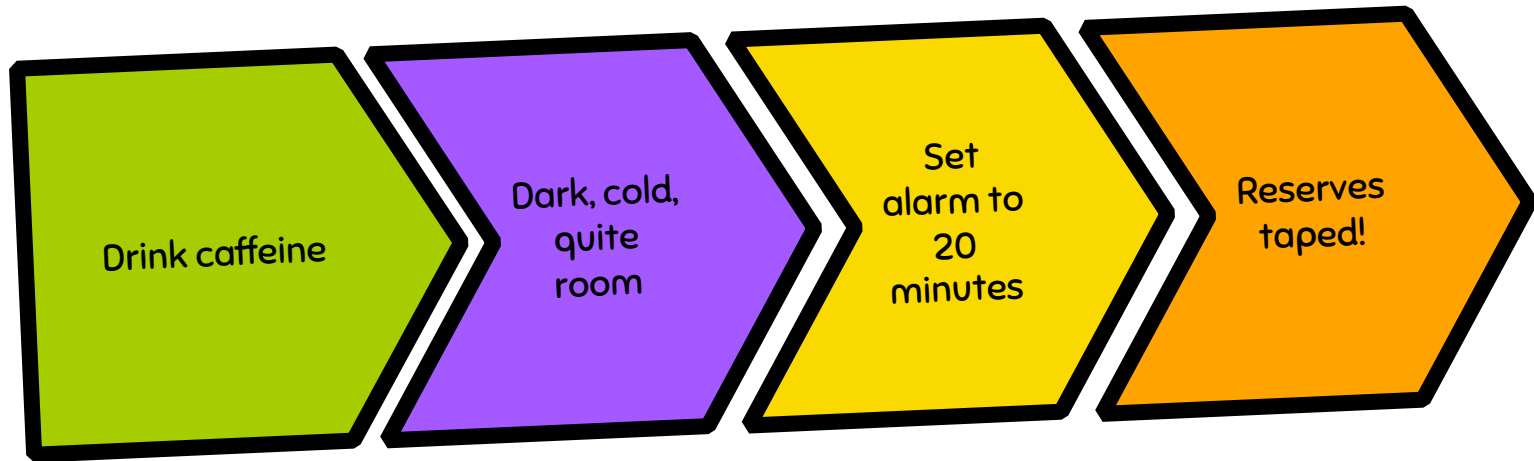
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CAFFEINE NAP



AND... DEVELOPER PRODUCTIVITY ENGINEERING!



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DEVELOPER PRODUCTIVITY ENGINEERING

Foster Faster Feedback

Collaborate through
Effective Tooling

Embrace Rigorous
Observability for
Proactive Improvement

Eliminate Toil for
Developers

Prioritize Automation
and Eliminate
Bottlenecks

Dedicated
Organizational Mindset

Outcomes Over Output

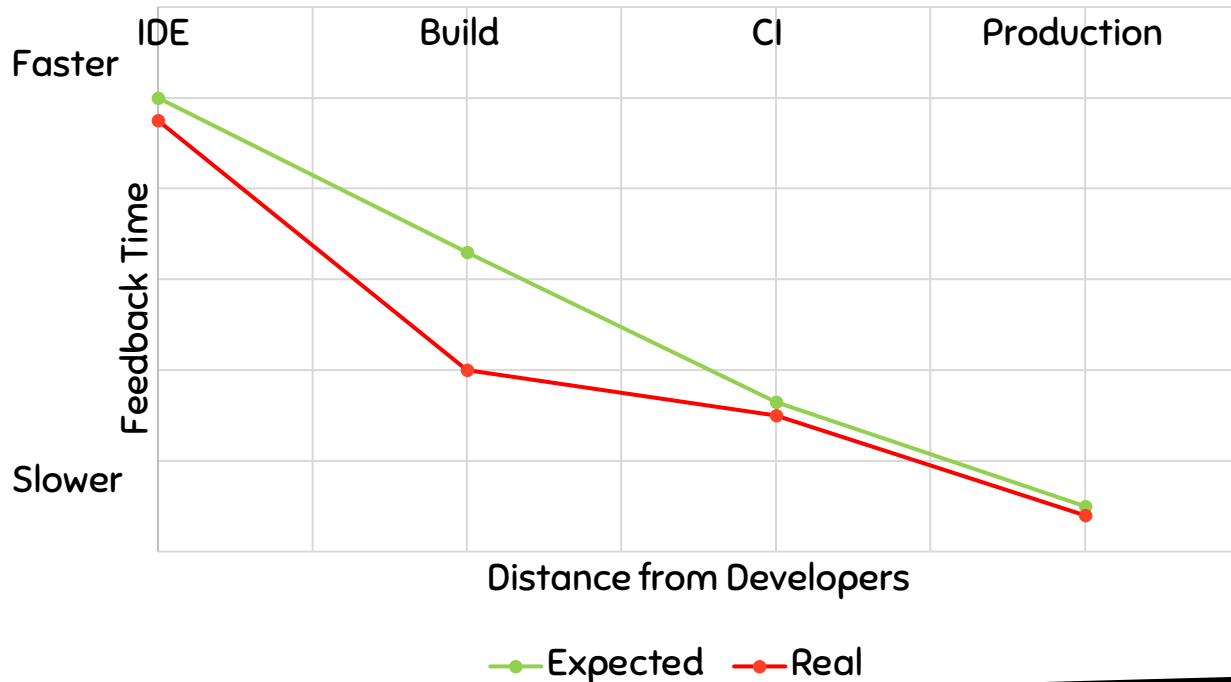


FEEDBACK EFFICIENCY

- × IDE: Sub-seconds (I type, it marks it red)
- × Build: Seconds
- × CI: Minutes
- × Production: Hours/Days



REVERSE DEPENDENCY ON DISTANCE FROM DEVELOPERS



TWO TYPES OF FEEDBACK

ASYNCHRONOUS

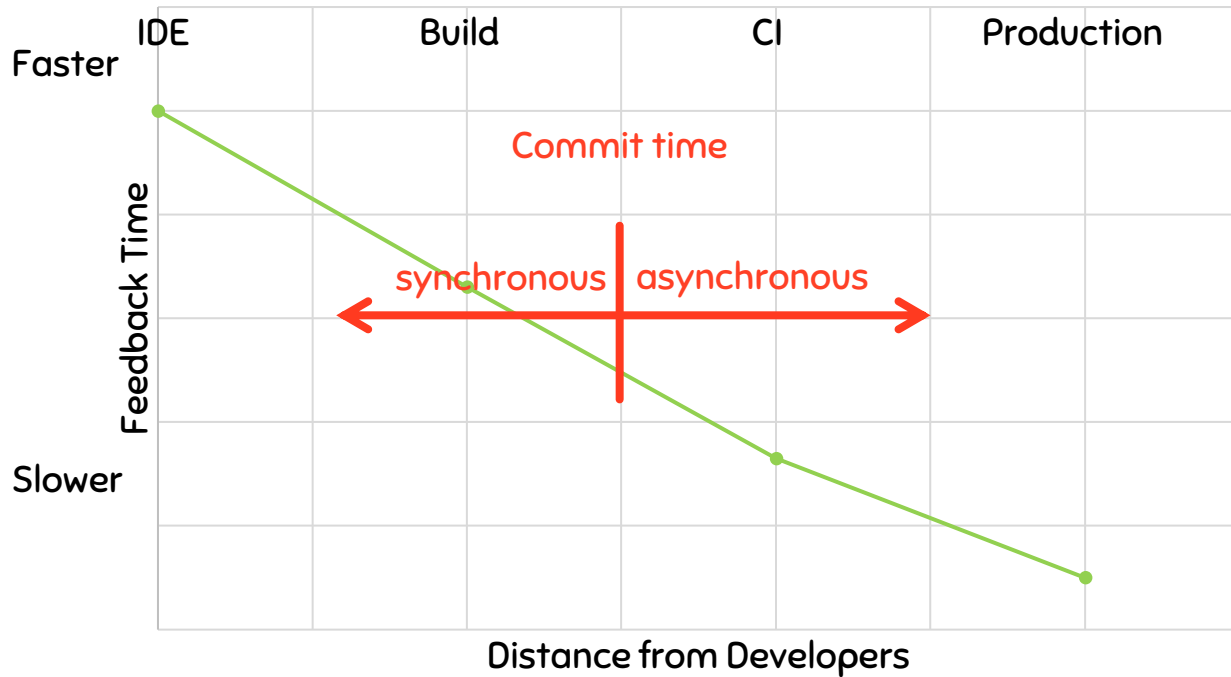
- x e.g., CI/CD
- x we never wait for it
- x results are distracting

SYNCHRONOUS

- x e.g., build
- x we'll wait for it in the flow
- x we'll be pissed off when it's slow



REVERSE DEPENDENCY ON DISTANCE FROM DEVELOPERS



"FASTER FOSTER FEEDBACK" SAVES MENTAL FUEL

Speeding up local
build minimizes
context switch

Less
context
switch
saves
mental fuel

Run on
System 2
all-day



HOW CAN WE ENGINEER LESS CONTEXT SWITCHES?

- × Measure local build times!
- × Avoid building and testing what didn't change
- × Speed up what can't be avoided
- × Fight evil flaky tests!
- × Watch your build like a hawk for degradations



WHAT YOU CAN DO TODAY (FOR FREE)

- × Parallel local
- × Local caching
- × Remote caching*
- × Build Scans
- × Win Prizes (a.k.a. speed challenge)



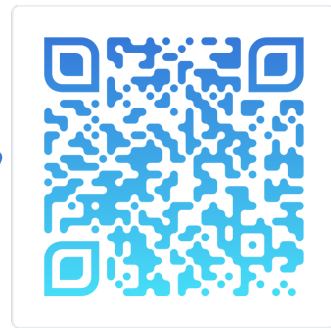
WHAT YOUR COMPANY SHOULD PAY FOR

- × All the books (see shownotes)
- × Top development hardware
- × Develocity (or similar)



LEARN MORE AND TRY IT TODAY!

- × Take the Gradle/Maven Speed Challenge
- × Be DPE Agent of Change!
- × Read the DPE Handbook
- × Watch the DPE Summit videos



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WATCH THE KEYNOTES!

2024

DPE SUMMIT

September 24-25 | The Midway | San Francisco

Discover the only event dedicated to the practice of Developer Productivity Engineering (DPE) and Developer Experience (DX). Register by August 18 to

get your **Early-Bird ticket for \$249**

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THANKS!



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