Università di Genova

Pattern Recognition and Applications Lab

University of Cagliari, Italy

Effective habits and soft skills for successful young scientists

Fabio Roli

Within 10 years, I want to be one of the top 10 scientists in the world

Which skills should I learn?

Which skills should I learn?

- Security Incident Handling & Response
- SIEM (Security Information and Event Management)
- Data Analytics & Artificial Intelligence
- Firewall/IDS/IPS
- Advanced Malware Prevention
- Identity & Access Management…..
- …..
- …..
- …..

Hard skills

- Skills in the previous slide are called «hard skills»

Teachable abilities that are easy to quantify, that you can learn in the classroom, through books or other training materials, or on the job.

https://www.oxfordreference.com

Hard skills

Hard skills are very important

They are your “power”

Necessary, but not sufficient to become one of the top 10 cybersecurity experts in the world…

Take-home message

Power is nothing without control

(A famous marketing slogan of Pirelli company)

Hard skills without good **habits** and **soft skills** are power without control

Your intellectual ”power” is nothing, or is not enough, if you don’t control it and channel it properly

I personally know a lot of persons who are much more intelligent than others, but the latter are successful scientists while the former are not…

Soft skills

Desirable qualities for certain forms of employment that do not depend on acquired knowledge: they include common sense, the ability to deal with people, and a positive flexible attitude

(The Collins English Dictionary)

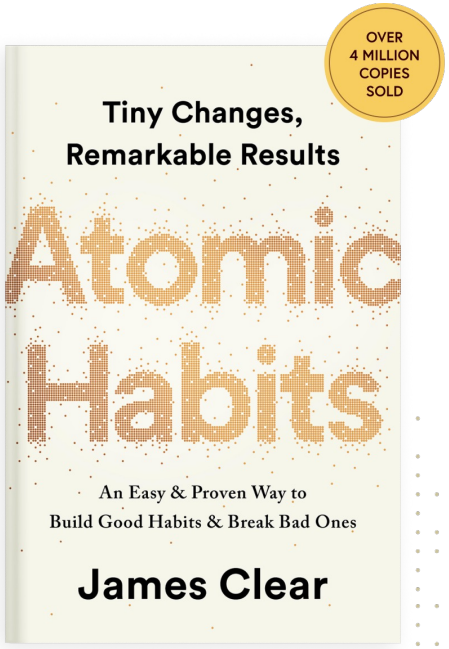
Communication skill
Writing skill
Leadership
Team Player Attitude
Growth Mindset
Openness to Feedback
Adaptability
Resilience
……
……

Habits

Habits are the small decisions you make and actions you perform every day. Habits account for about 40 percent of our behaviors on any given day.

Your life today is essentially the sum of your habits. How in shape or out of shape you are? A result of your habits. How happy or unhappy you are? A result of your habits. How successful or unsuccessful you are? A result of your habits.

https://jamesclear.com/habits



What is the relationship between habits and soft skills?

We are what we repeatedly do. Excellence, therefore, is not an act, but a habit

[Will Durant, The Story of Philosophy, 1926]

What is the relationship between habits and soft skills?

We are what we repeatedly do. Excellence, therefore, is not an act, but a habit

[Will Durant, The Story of Philosophy, 1926]

✓ Quote often (mis)attributed to Aristotle…

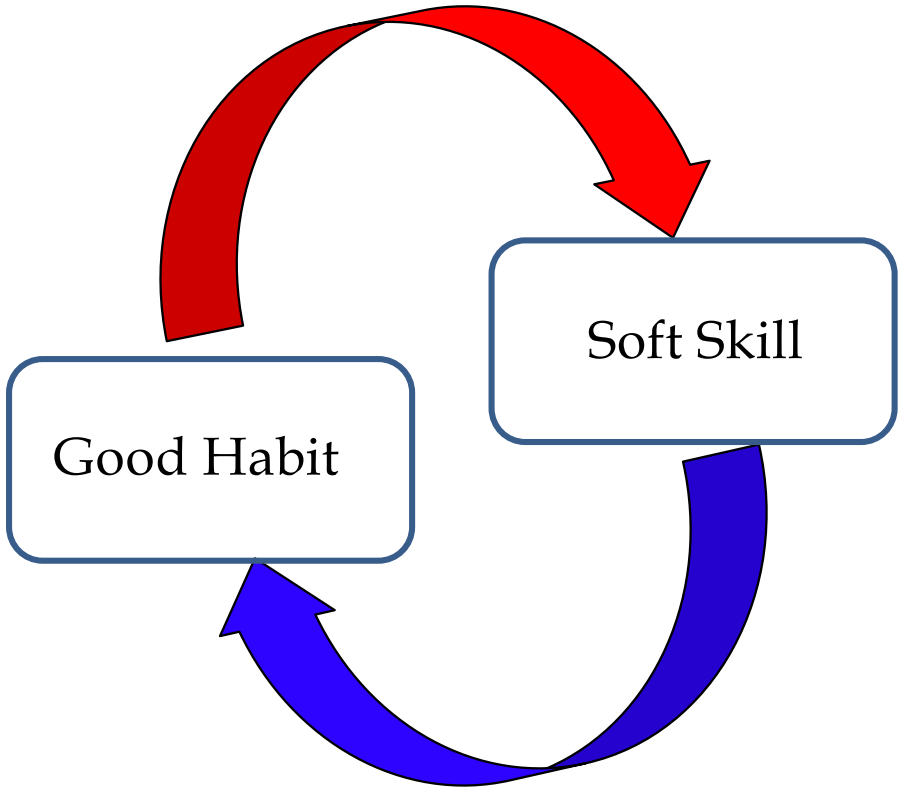
…As it is not one swallow or a one day that makes a spring, so it is not one day or a short time that makes a man blessed and happy… these virtues are formed in man by his doing the right actions…

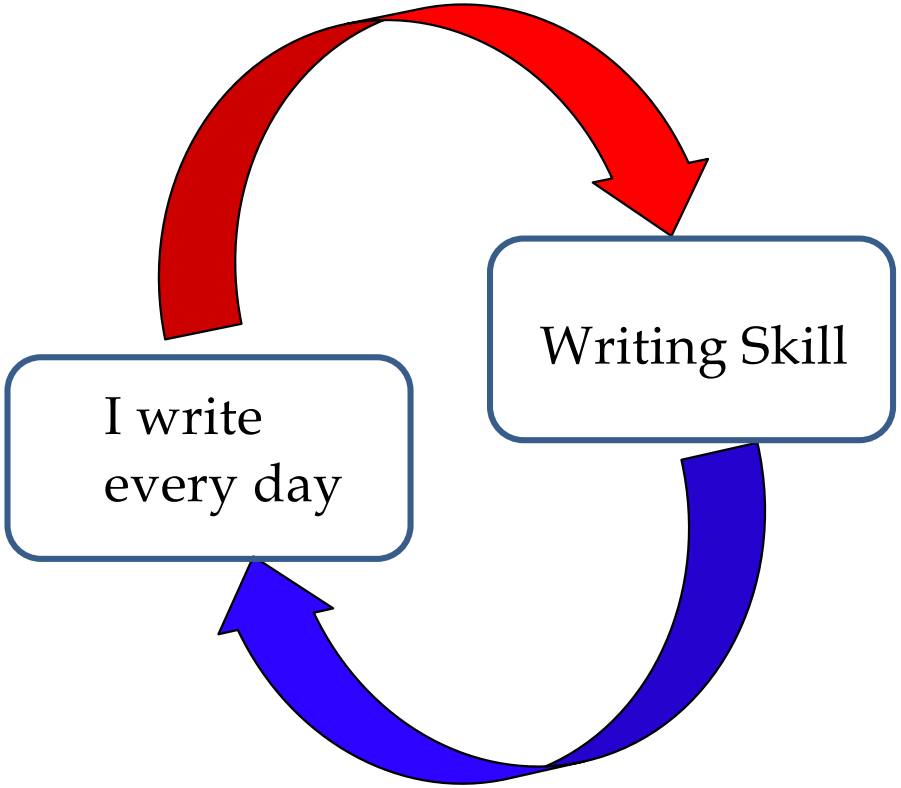
[Nicomachean Ethics, Aristotle]

https://medium.com/the-mission/my-favourite-quote-of-all-time-is-a-misattribution-66356f22843d

What is the relationship between habits and soft skills?

We are what we repeatedly do. Excellence, therefore, is not an act, but a habit

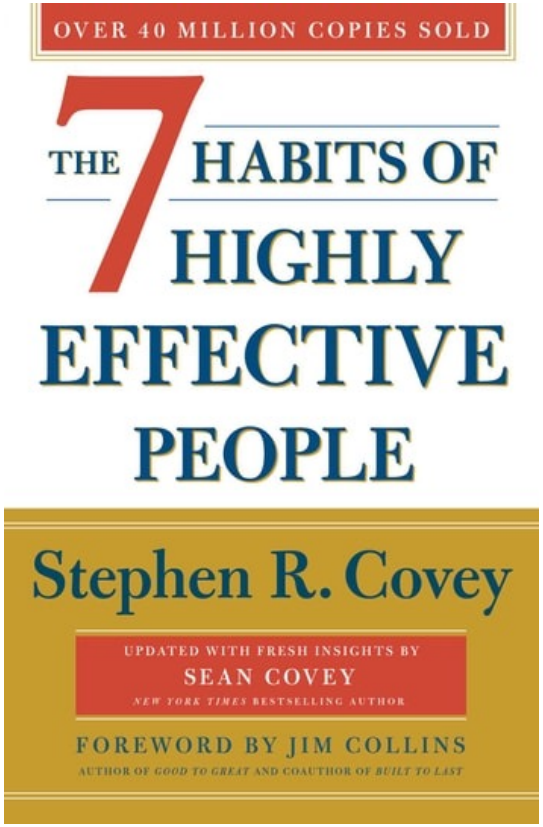




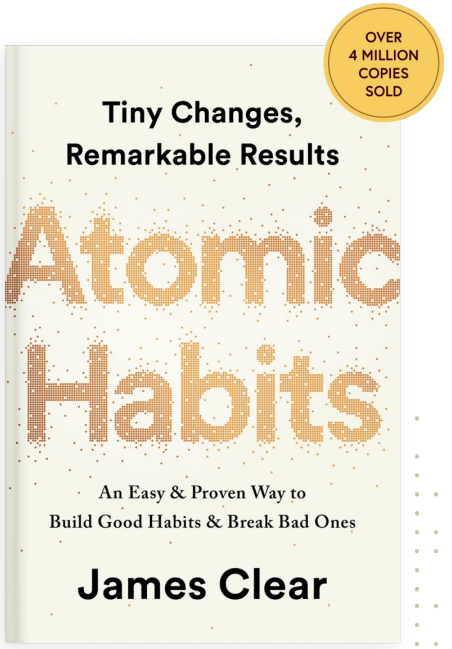
Habits and soft skills

In the following, I often use the equation **good habit = soft skill**

What you do repeatedly becomes one of your soft skills
If it's a good habit, of course



Fundamental Concepts on Habits



What are habits?

- A habit is a behavior that has been **repeated** enough to become **automatic**

- Habit formation is a trial and error process
  - When you encounter a new situation/problem/feeling, your brain has to make a decision
  - First time, your decision making is **conscious**, **slow** and **exhausting**
  - Occasionally, you find a solution and get a **reward=satisfaction**

- If you address the same problem/situation/feeling repeatedly, your brain begins to automate the process of solving/facing it

Habits are, simply, realiable solutions to recurring problems in our environment [Jason Hreha, 2018]

- Habits are mental **shorcuts** learned from experience to reduce **cognitive load**
  - They can be good and useful. But also bad…

What is the difference between good and bad habits?

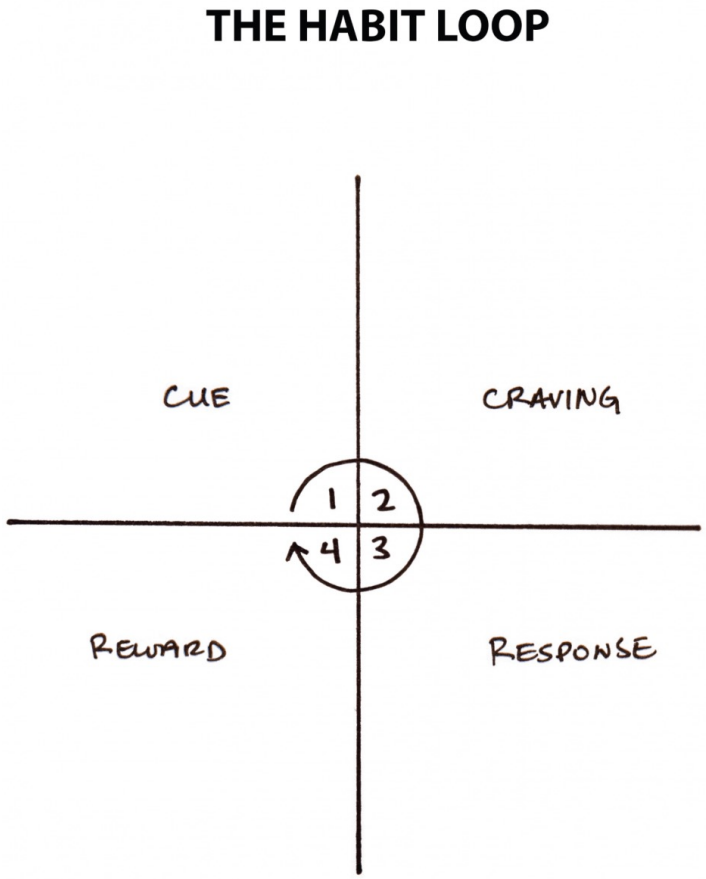
- If your habit is good or bad really depends on the **environment** where you have to live and survive…

- For our ancestors in the preistoric times, eating all the food you could was a good habit, as well as having high blood pressure…

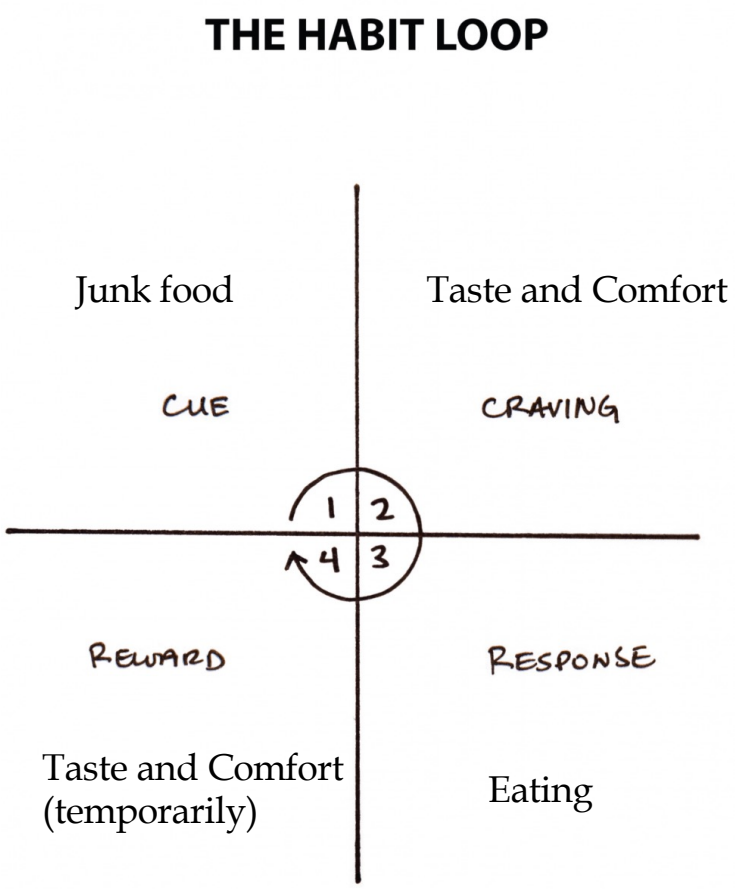
- To make simple something that is quite complicated…

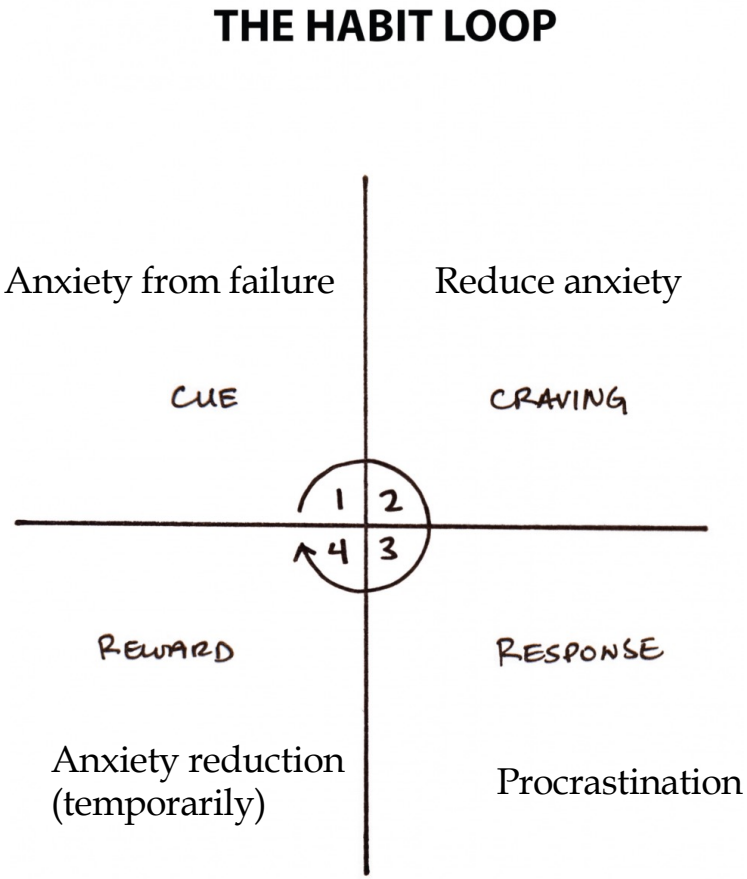
Good habits are those repetitive actions or behaviors that have positive physical, emotional, or psychological consequences, for you, and/or for other people, and/or for the society

The habit loop

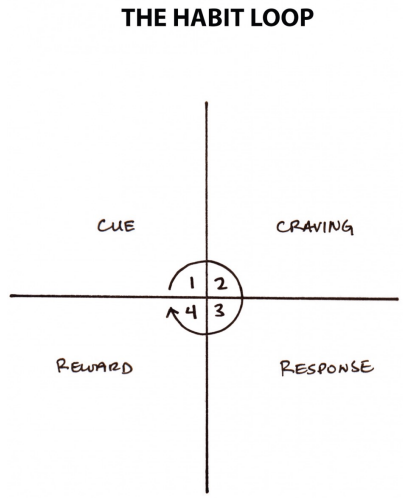


The habit loop

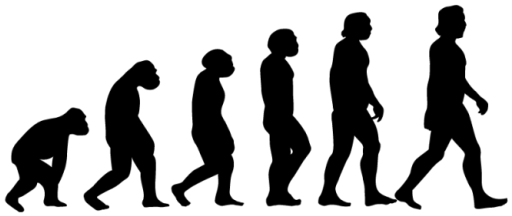




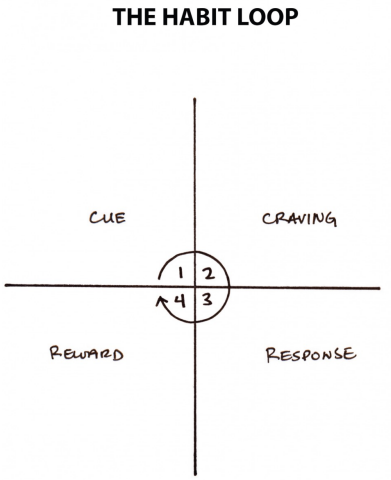
How can create good habits or break the loop of bad habits?



The four laws of behavior change



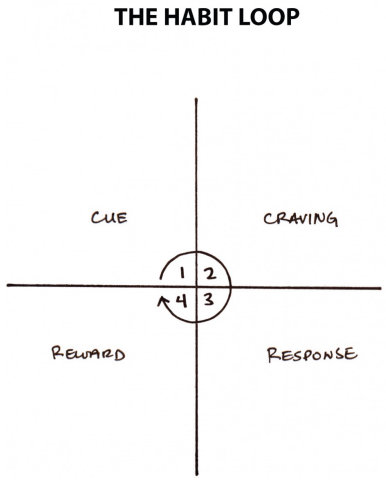
How to create a good habit



	How to Create a Good Habit
The 1st law (Cue)	Make it obvious.
The 2nd law (Craving)	Make it attractive.
The 3rd law (Response)	Make it easy.
The 4th law (Reward)	Make it satisfying.

[James Clear, Atomic Habits]

How to break a bad habit



	How to Break a Bad Habit
Inversion of the 1st law (Cue)	Make it invisible.
Inversion of the 2nd law (Craving)	Make it unattractive.
Inversion of the 3rd law (Response)	Make it difficult.
Inversion of the 4th law (Reward)	Make it unsatisfying.

[James Clear, Atomic Habits]

1st Law: Make it obvious/invisible

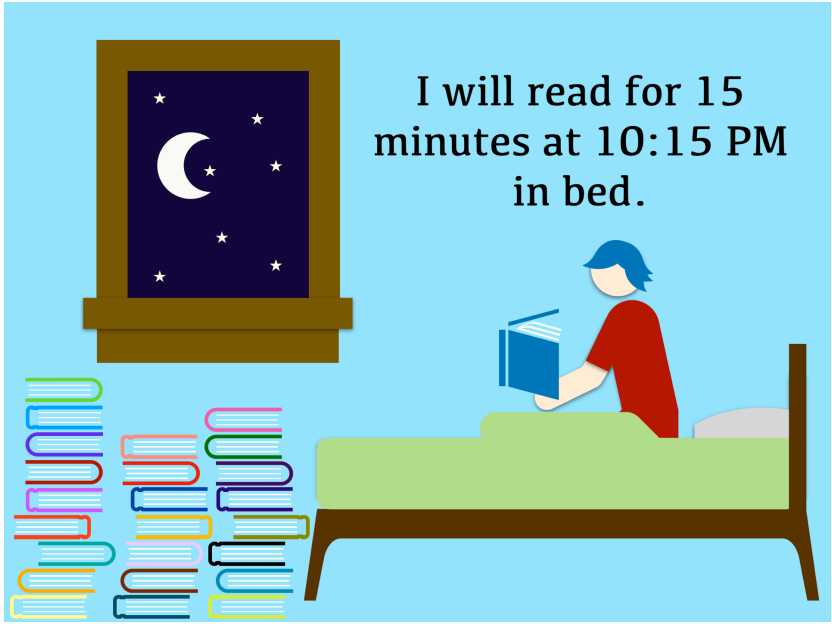
1)Design your environment

- Make the cues of good habits obvious and visible
- Reduce/remove the cues of bad habits

1st Law: Make it obvious

3)Use implementation intentions

- I will [BEHAVIOR] at [TIME] in [LOCATION]



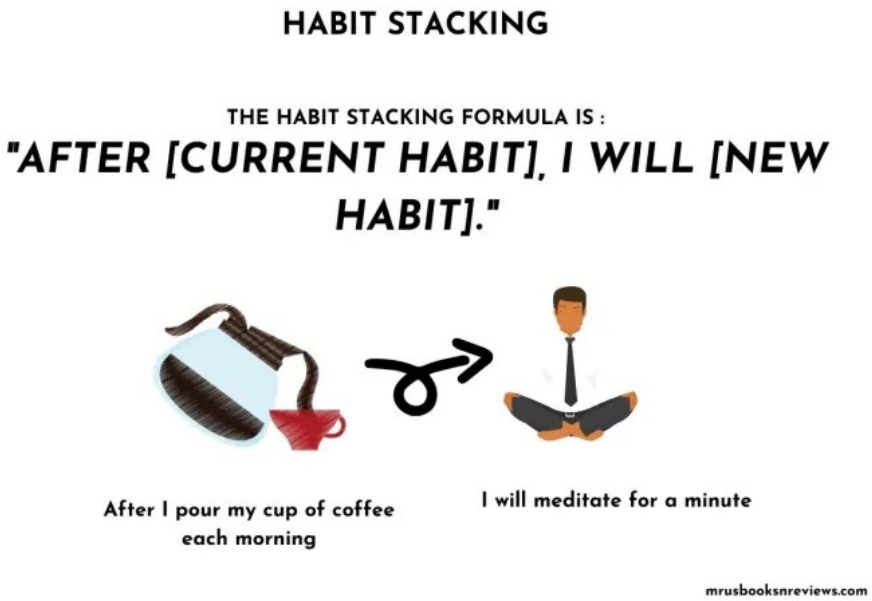
1st Law: Make it obvious

4)Use habit staking

- After [CURRENT HABIT], I will [NEW HABIT]

After [SHAVING EVERY MORNING],
I will [LEARN 1 CHINESE WORD]

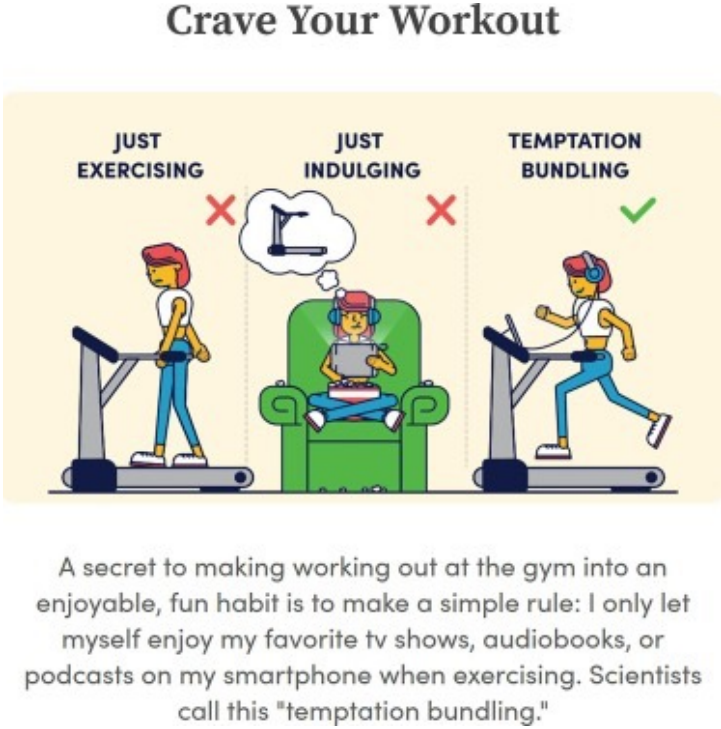
After [SHAVING EVERY MORNING],
I will [DO 20 PUSH-UPS]



2nd Law: Make it attractive

Temptation bundling

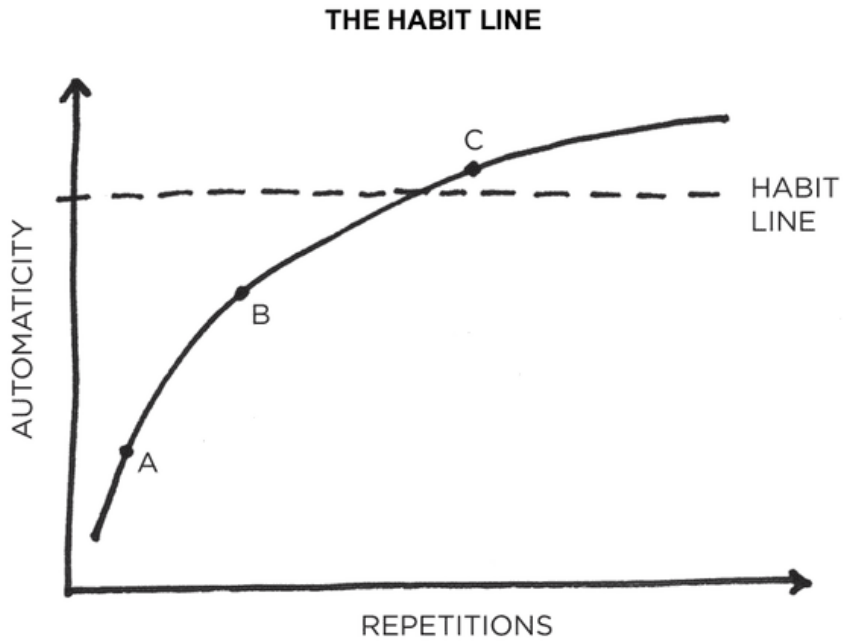
- ✓ Is one way to make your good habits more attractive
- ✓ The strategy is to pair an action that you want to do with an action that you need to do



3rd Law: Make it easy

- Developing good habits is not a matter of perfection!

The key is to start and repeat!



3rd Law: Make it easy

How to start and repeat?

Make it easy!

Reduce the **friction** associated with good behaviors

- Plan the first task to do the night before
- Set out your workout clothes the night before

Increase the **friction** associated with bad behaviors

- Leave your phone in a different room and on silent mode
- No ice cream in your refrigerator

3rd Law: Make it easy

Start Small !

The two minute rule

When you start a new habit, it should take less than two minutes to do

- Start to read every day becomes «read one page each night»
- Start my new research task on X becomes «read Abstract and Conlusions of the most relevant article»
- Run 5 km becomes «run 5 minutes»

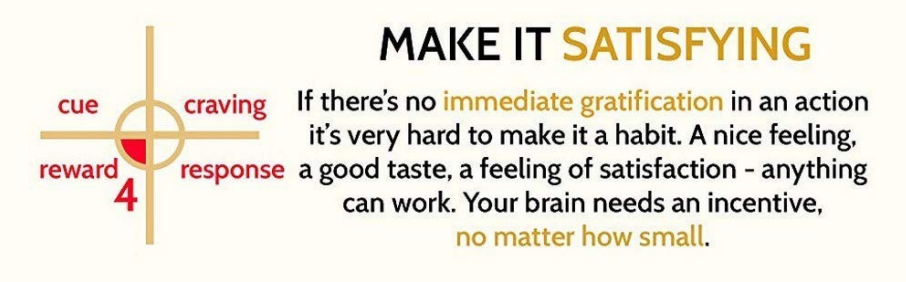
4th Law: Make it satisfying

It's not easy to make good habits satisfying…

The kickoff of good habits is (often) all sacrifice…
And our brain evolved to prioritize immediate rewards over delayed rewards…

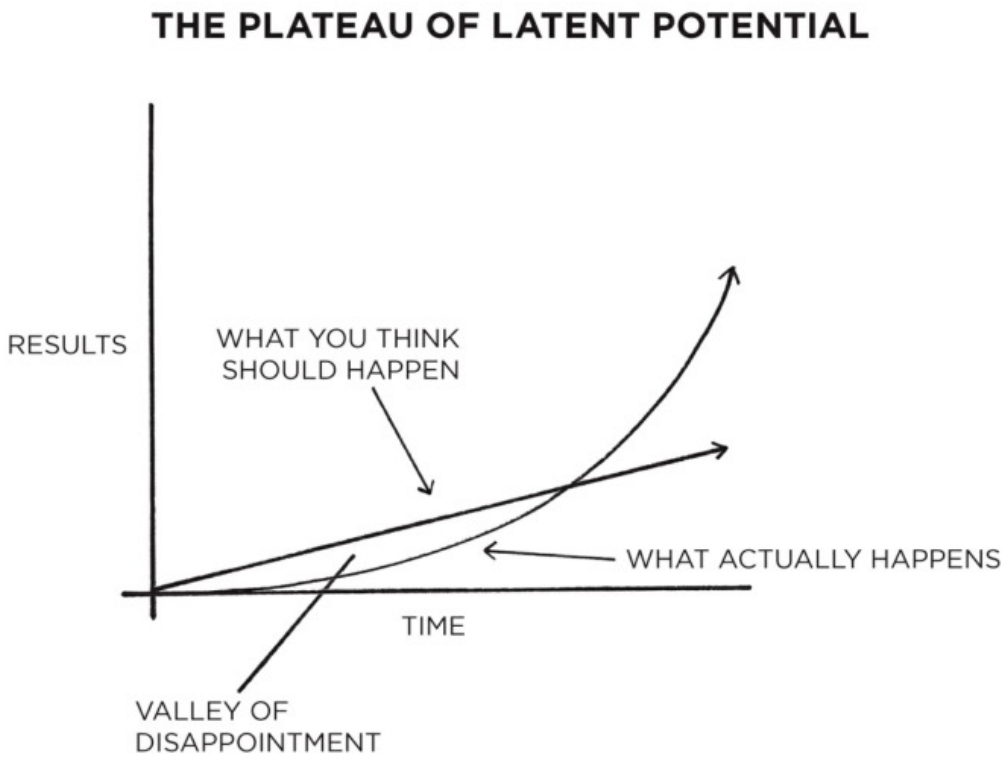
Therefore, to create a new habit you need a small reward!

- ✓ A shower after running
- ✓ Writing with a pen that you love
- ✓ ….



Why the «theory» of habits should be useful for cybersecurity experts?

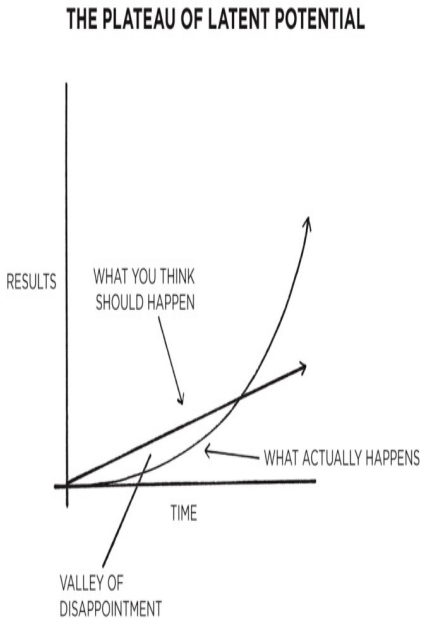
Mastery requires patience!



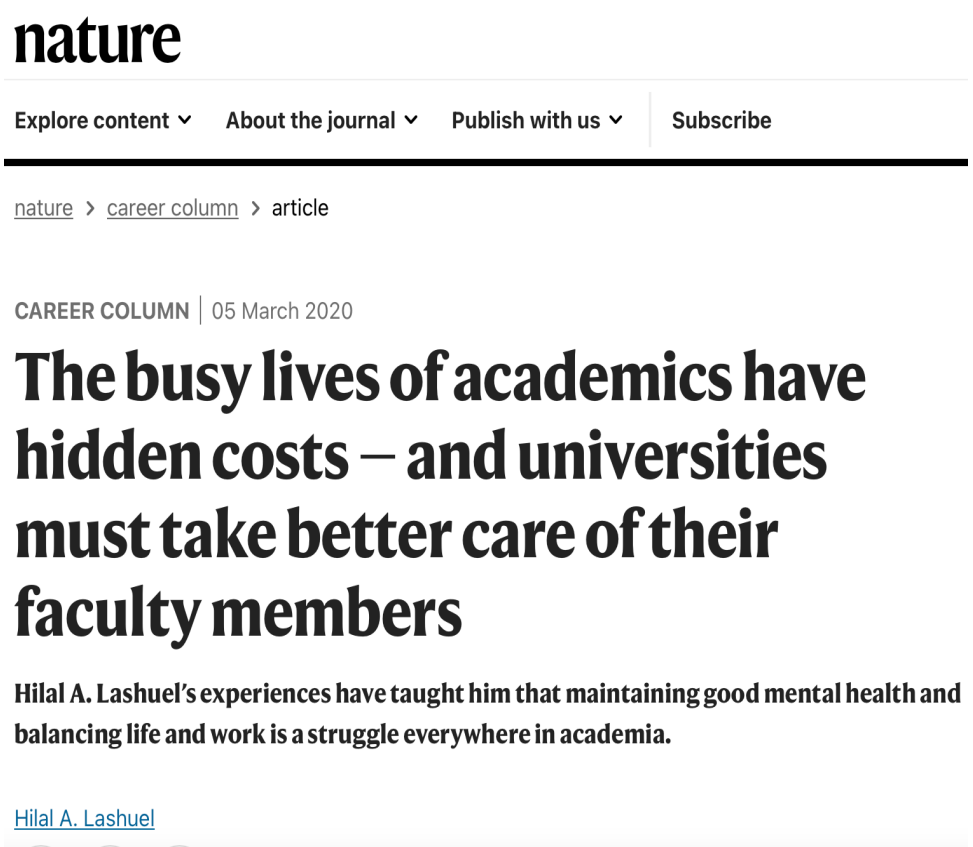
Mastery requires patience!

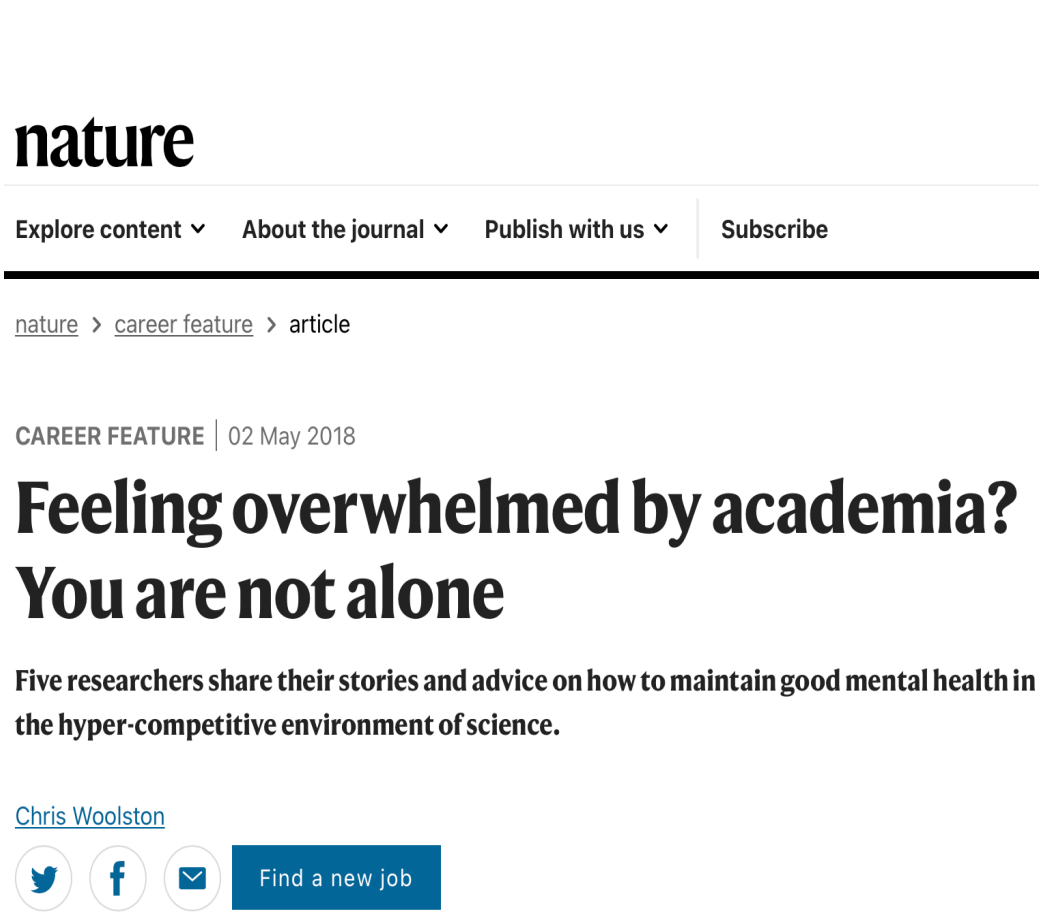
- Achieving top research results requires «mastery» of many things, and mastery requires patience!
- Similarly, developing good habits require «mastery» and, therefore, patience
- Both in research and in the development of «good habits», people often make a few small changes, fail to see a tangible result, and decide to stop
  - you need to persist long enough to break the «Plauteau of Latent Potential»

This is the basic reason because the «theory» of habits, and developing good habits, is important for successful scientists



Scientific research can be a stressful job…





Scientific research can be a stressful job…

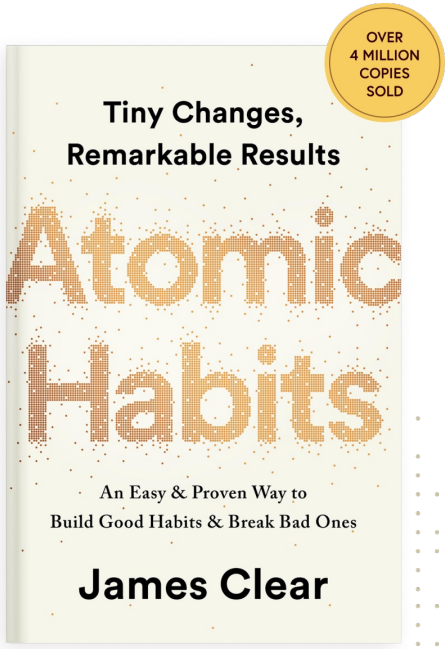
- Top research requires a mental immersion of a special type
- It demands a huge and persistent investment of mental energy
- It's hard to leave an unsolved problem at the office
- One night, Eureka! You've finally solved the problem, the next morning you find an error…
- You have to survive in an environment full of failures….

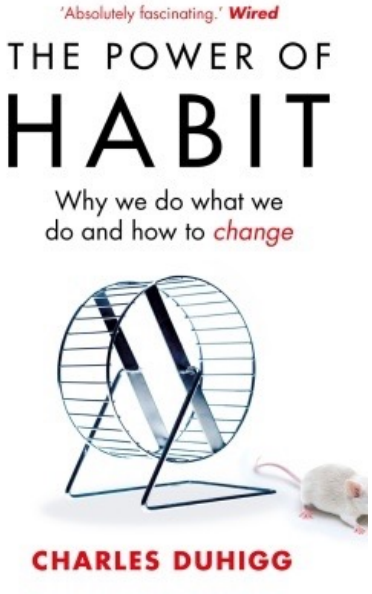
Anxiety → Procrastination

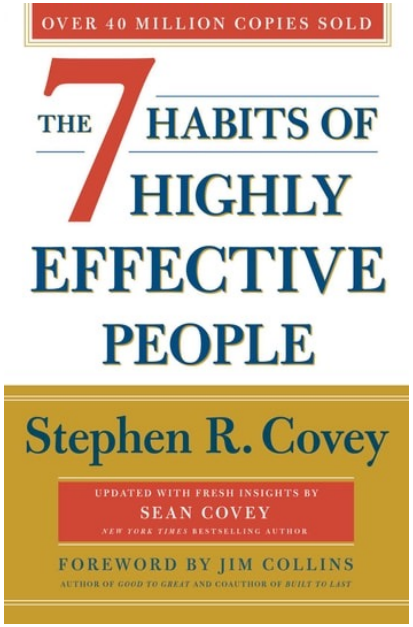
Anxiety → Bad Habits (unhealthy food, lack of physical exercise, bad work-life balance, …)

This is the basic reason because the «theory» of habits and developing good habits is important for successful scientists

Recommended readings on the «theory» of habits

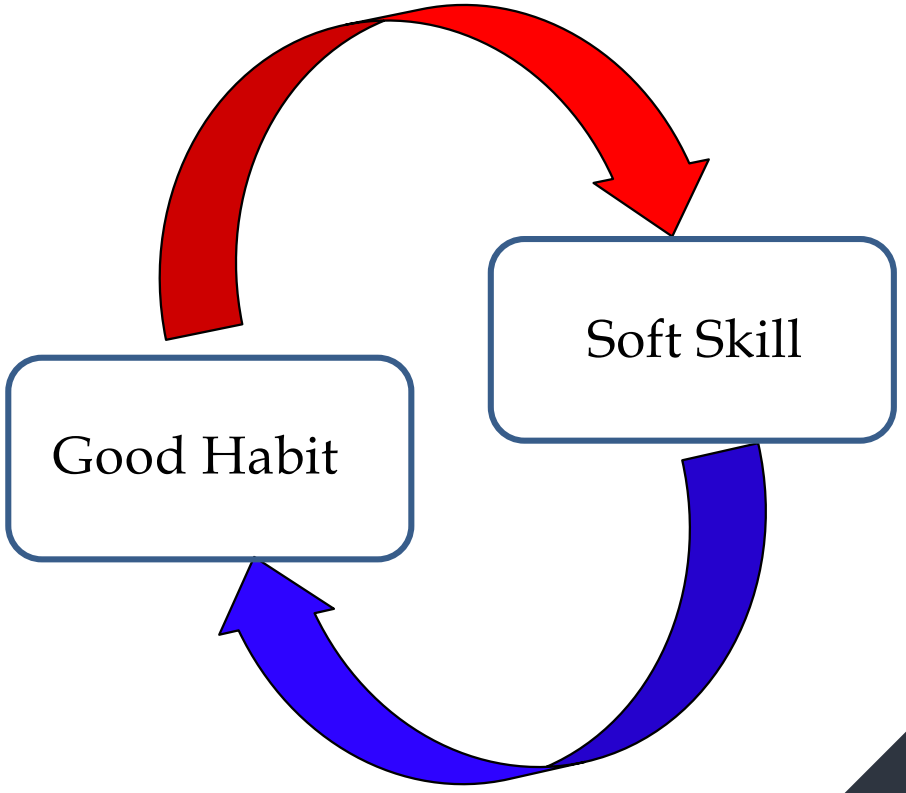






What's the next…

- I focus on **2** types of **habits** and **soft skills**
- I'm not claiming that they are the most important ones…
- It's my personal choice given the time available



Good habit and soft skill: ***know yourself and the game of science***

Know yourself

First rule for a successful career:

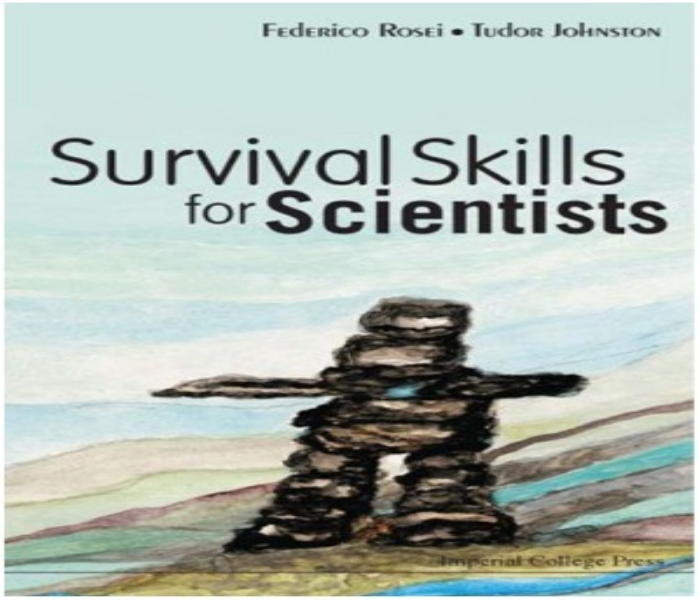
Match your goals to your character and talents

1. Which kind of teams play in your game field ?
2. What sort of player can you really be in the game field of science?

Caveat

- In the following slides, I provide a categorization of players for the game field of science
- But this categorization is not the only possible one, other categorization are possible, with mixed categories and subcategories

Shaping your role as a scientist…



Highly recommended

F. Rosei and T. Johnston, *Survival skills for scientists*, Imperial College Press, 2006

- What sort of player do you want to be in the game of science?
  - ✓ Lone wolf
  - ✓ Collaborator
  - ✓ Team player
  - ✓ Team leader
  - ✓ Beta scientist
  - ✓ Alpha scientist

Know yourself

- In team sports, players have their own specific role
- In a scientific/business career the situation is similar

Some roles of the players in the game of science:

- ✓ Alpha expert
- ✓ Beta expert
- ✓ Gamma expert
- ✓ Specialist collaborator

Know yourself

Alpha expert

An alpha is an expert who likes to think creatively and to transform her/his thoughts in business outputs and funding

In the Academia, this is the role of a full Professor with tenure leading a large research group

- Usually, an alpha expert does not have the time to do the actual calculations/experiments/coding, and may not be interested in doing that

Know yourself

Beta expert

A beta is a person who likes to do research in lab, get things done, more than thinking creatively and managing a large team

- Usually a beta expert "suffers" managing "things" without knowing all the details…
- Doesn't like to "imagine" things and manage people&money to realize things
- She/he loves doing things!

Know yourself

Gamma experts, specialist collaborators

Well educated researchers and technicians which help the beta expert to pursue alpha expert's goals

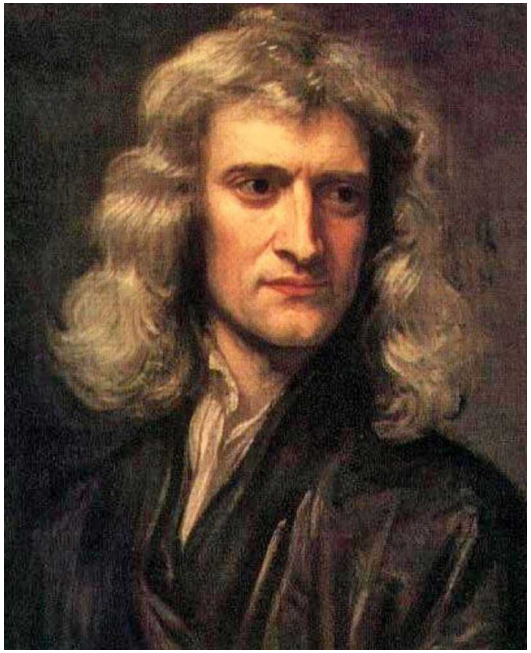
Be careful!

- We are not recommending at all that everyone should strive for becoming an alpha expert

Know yourself and match your goals to your character and talents

Which kind of player is this?

And this?



Know yourself and your country…

The above classification of "players" in the science game is quite true in some countries

But it is less true in other countries

- ✓ In some countries, there is more "room" for beta scientists and also for specialist collaborators
- ✓ And they can get a permanent position…
- ✓ A research group can be made by alpha, beta scientists, …, with permanent positions (full, associate, assistant professors)

In some countries, permanent positions are very few, and, often, are only for alpha scientists

How to know yourself and match your goals to your character and talents?

Write your mission statement

- In order to identify clearly yourself and your mission, start writing down your **mission statement**
- It's a difficult and time expensive task. Can take years…
- But writing it helps a lot to identify your mission, namely, your **role and goals** in the game of science

Templates for mission statement

Template Sample 1

My mission is to use my [passion/abilities/positive personality traits] to achieve [your goals], based on my [principles/values].

Template Sample 2

As [your role A], I use my [passion/abilities/positive personality traits] to achieve [your goals for role A]
As [your role B], I use my [passion/abilities/positive personality traits] to achieve [your goals for role B]

Template Sample 3

To be known by [passion/abilities/qualities you wish to develop], as someone who follows the right [principles/values] to achieve [your goals]

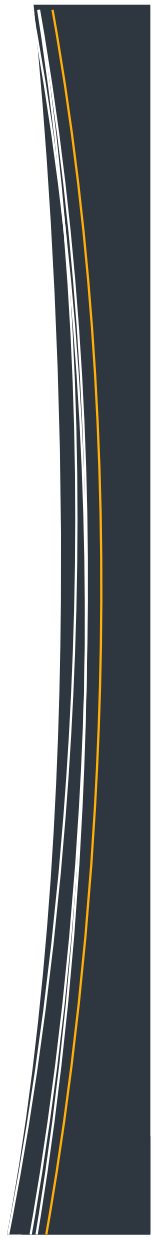
Bits of my mission statement

- As scientist
  - I do research according to Kurt Lewin's motto ("There is nothing more practical than a good theory")
  - To pursue this goal, I try to be a good scientist and a good manager
  - I serve the society by leading projects with industrial partners, serving as member in advisory panels, provide advice and assistance….
  - ….
- As father
  - I try to make the difference in my kids' life. I challenge and support them.
  - ……
- As individual
  - I live according to the ancient Roman motto (Giovenale, Satire, X, 356): "mens sana in corpore sano"
  - I do physical exercise on a regular basis
  - I read a lot of books on non-professional topics
  - ….

From theory to pratice…

- Now I know myself…
- Alpha/beta/gamma/delta role is the best match between my goals and my character and talents
- But what should I do to implement effectively my mission?

Good habit and soft skill: *time management*



Time management

- Should I start by doing a to-do list?

Time management

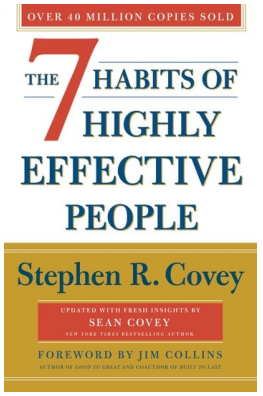
- Should I start by doing a to-do list? **NO**

How to implement your mission…

How to implement your mission

Covey's four quadrants

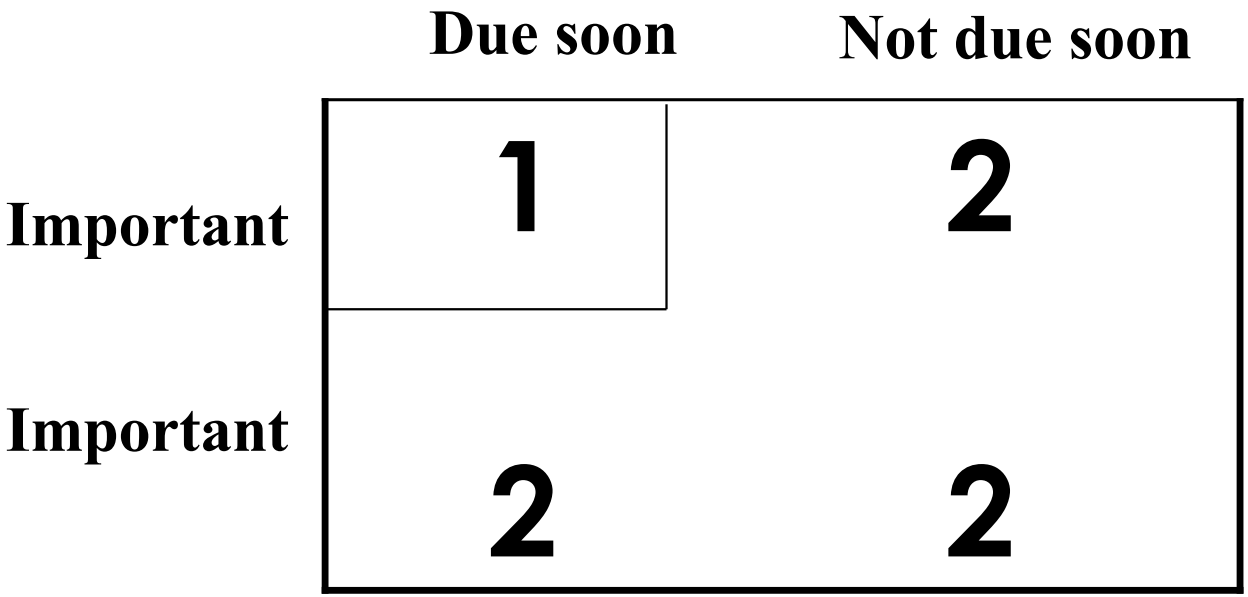
	Due soon	Not due soon
Important	1	2
Not Important	3	4



Your mission lies on the 2nd quadrant

- The achievement of your mission goals depends on the size of the second quadrant
  - ✓ Long term goals lie on the second quadrant !

➢ You must expand the second quadrant !

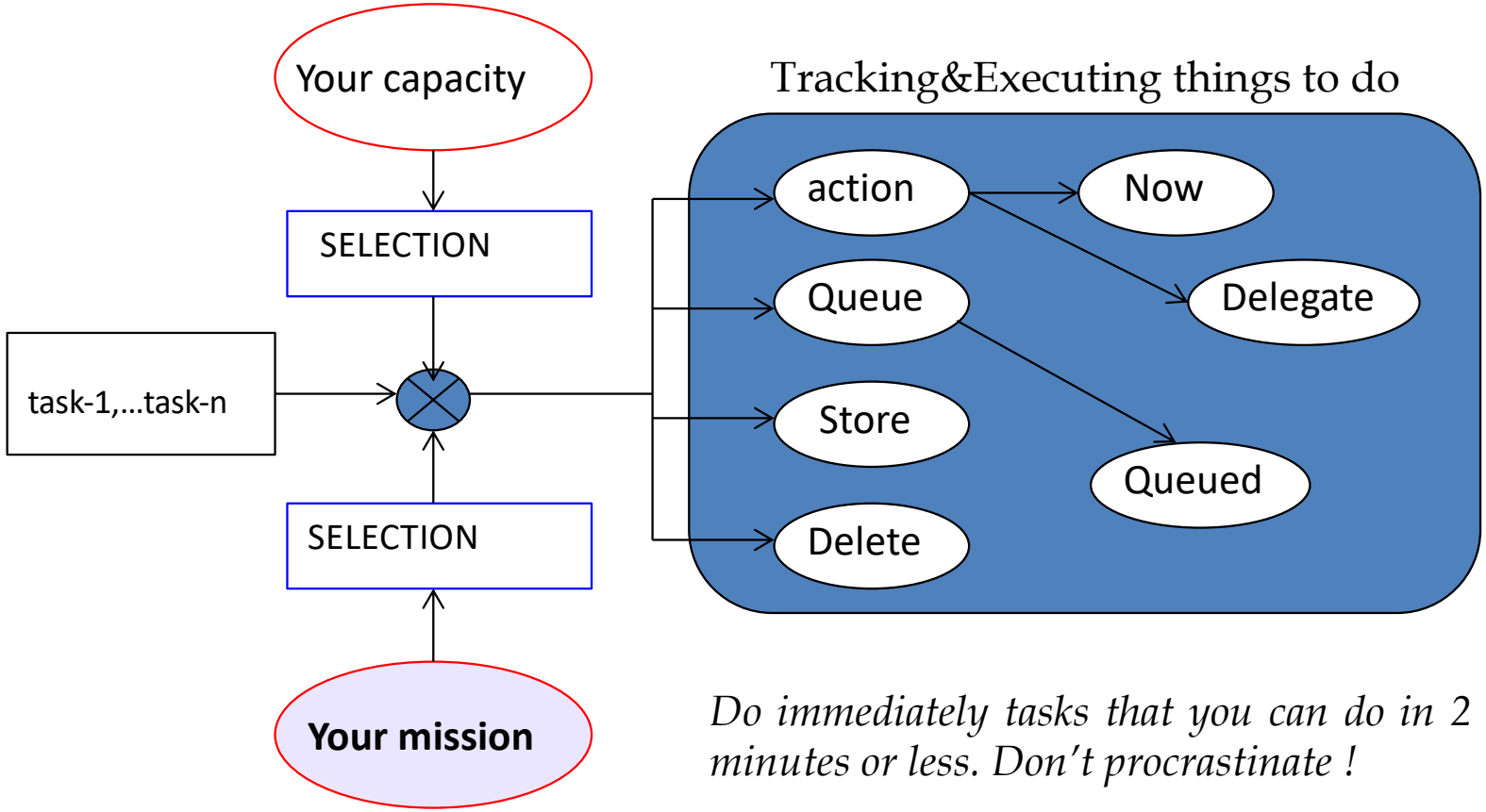


Day-by-day time management

The Covey's matrix is super useful to focus on tasks of your mission statement, your long-term tasks, your "big rocks" in Quadrant II

But what about day-by-day time management and the classical list/queue of things to do?

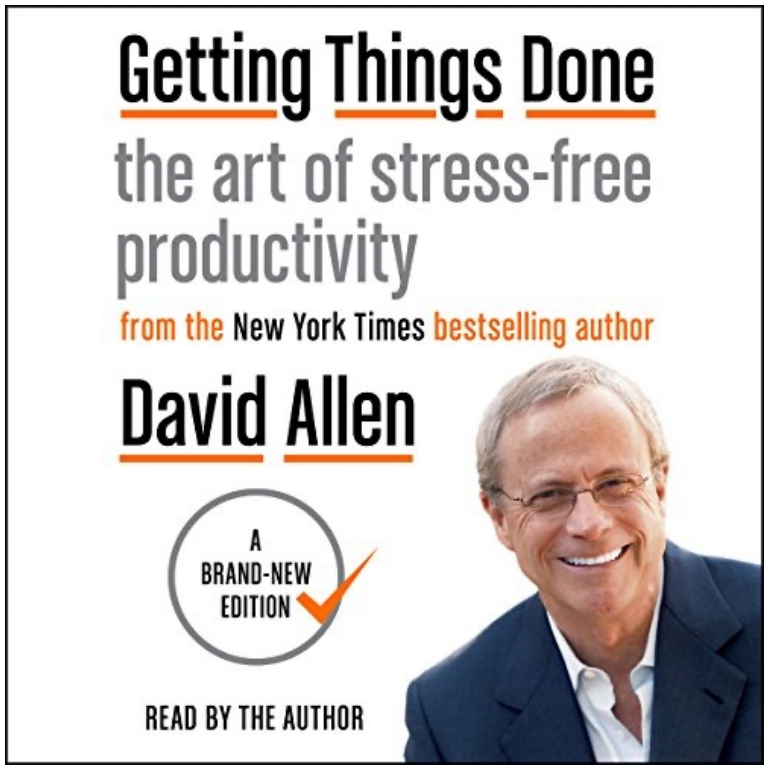
A flowchart for task management



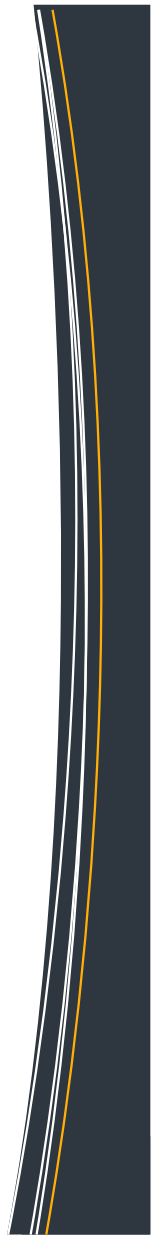
Do immediately tasks that you can do in 2 minutes or less. Don't procrastinate !

[P. J. Denning, Managing time, Communications of the ACM, March 2011]

Recommended reading



My weekly to-do list…



My weekly to-do list…

It contains **4 Sections**

My weekly to-do list…

The **first Section** contains the «roles» in my **Mission Statement** for the next 3 years. My **BIG ROCKS**.

- Family Man
  - ….
  - ….
- Scientist for fun and profit
  - ….
  - ….
- Teacher and Mentor
  - ….
  - ….
- Me&Fun
  - ….
  - ….
- Sharpen the Saw
  - ….
  - ….

My weekly to-do list…

The **second Section** contains the BIG ROCKS already done for each role

- Family Man
  - done
  - ….
- Scientist for fun and profit
  - ….
  - done
- Teacher and Mentor
  - done
  - ….
- Me&Fun
  - ….
  - ….
- Sharpen the Saw
  - done
  - ….

My weekly to-do list…

The **third Section** is the List of NOs

My weekly to-do list…

The **fourt Section** is a structured list of things to do for the week

Monday

1. Long Tasks
2. Frogs
3. Big Rocks

Tuesday

1. Long Tasks
2. Frogs
3. Big Rocks

Wednesday

…..

…..

…..

Saturday and Sunday

…..

……

My weekly to-do list…

- Family Man
- Scientist for fun and profit
- Teacher and Mentor
- Me&Fun
- Sharpen the Saw

The BIG ROCKS already done for each role

The list of NOs

Monday

1. Long Tasks
2. Frogs
3. Big Rocks

…..

Wednesday

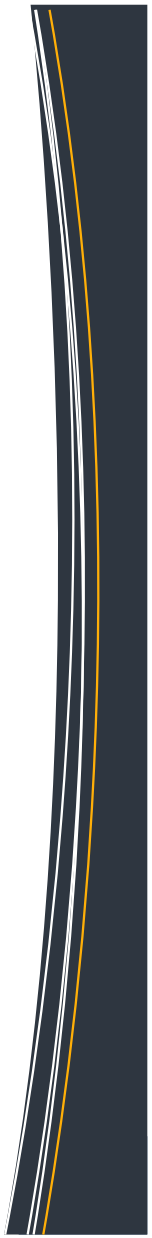
…..

Saturday and Sunday

…..

And to conclude…

The ultimate end of good habits and soft skills



Work-life balance !

Thanks for Listening!

Any question?

If you really want to be a first-class scientist you need to know yourself, your weaknesses, your strengths, and your bad faults.
(Richard Hamming, You and Your Research, 1986)