Science backed practical guideline to Productivity

How to increase your flow...

About me:

Freelance MLE by day, medical science nerd and biohacker by night. Love reading about new health-related researches. Love playing around with gadgets. Love over-optimizing =)

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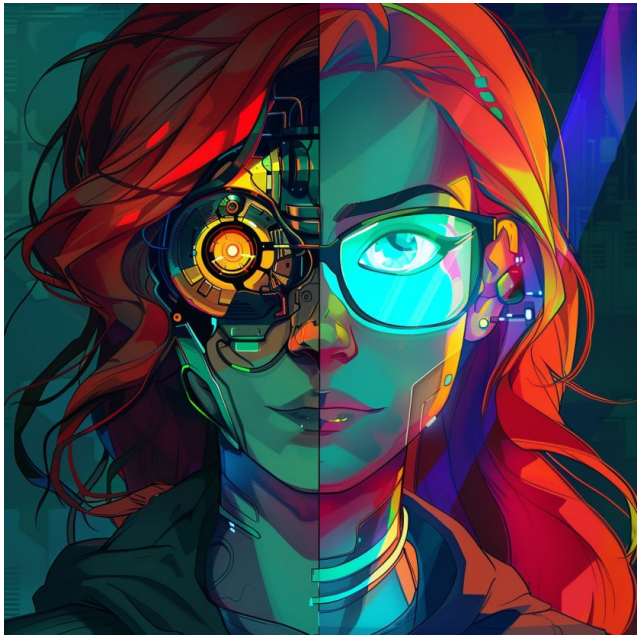


https://github.com/Alisa-lisa/conferences/tree/master/DD_2024

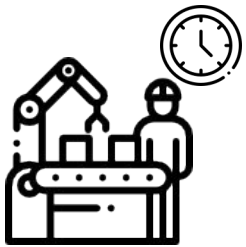
Structure

1. **Intro**
    a. Scope
    b. Methodology
2. **Mechanisms**
    a. Stages of flow
        i. Struggle
        ii. Release
        iii. Flow
        iv. Recovery
        v. Reflection
    b. Analysis
    c. Additional factors
3. **Simple summary**
4. **QA**

Productivity vs Flow

Productivity

- Measurement
- Complex
- Per time unit
- Input to output ratio



Context

- Scalable
- Generalized
- Measurable
- Cost efficient
- Transparent

Hypothesis

Flow can be used to improve productivity in most of the systems and processes executed by human.

Flow

Classic definition

“A mental state characterized by full immersion in an activity, where a person experiences intense focus, concentration, and enjoyment.”

Mihaly Csikszentmihalyi

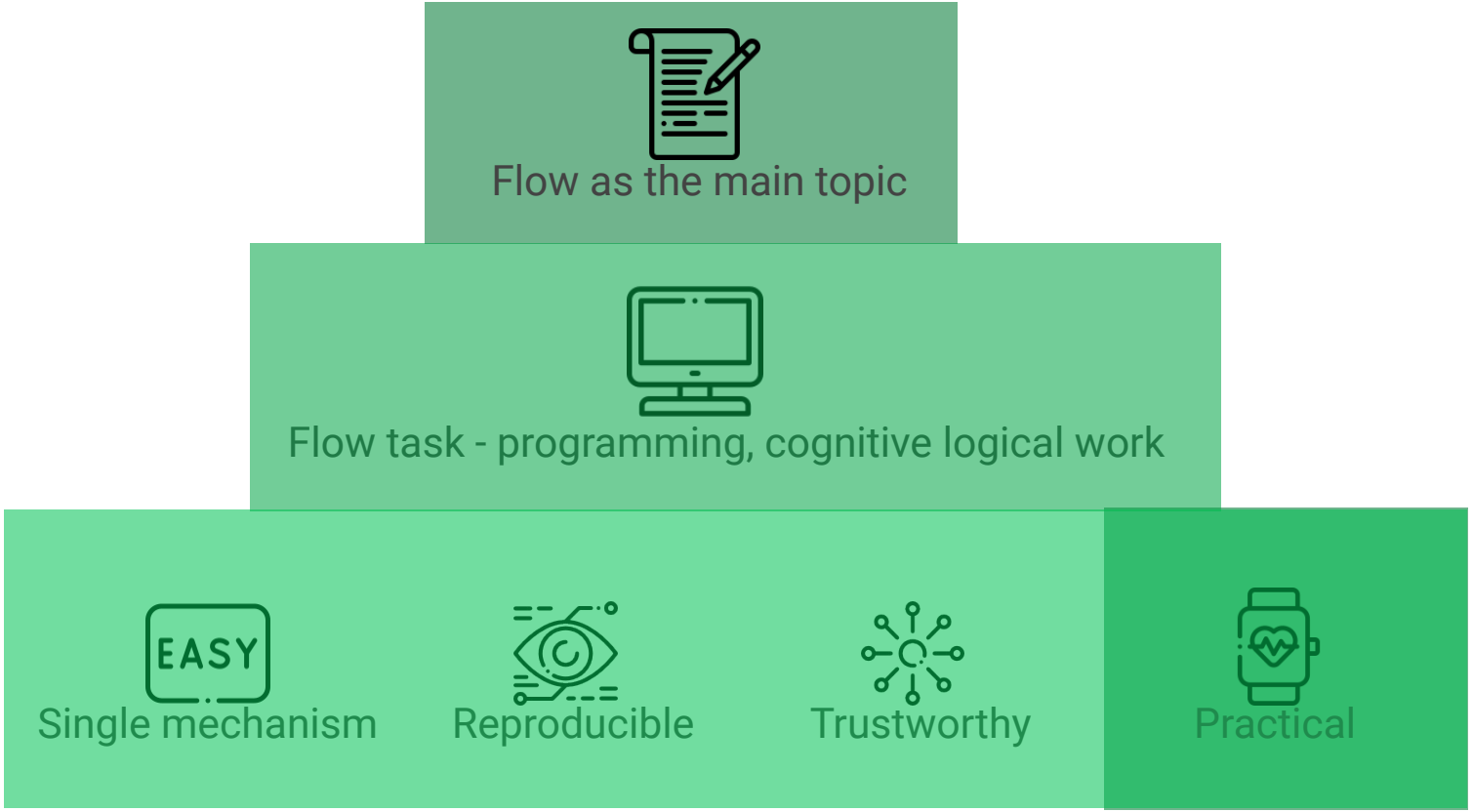
State

- Extreme focus and concentration
- Loss of sense of self
- High motivation
- Loss of time tracking ability
- Deep and calm happiness

Stages

- Struggle
- Release
- Flow
- Recovery
- Reflection (optional)

Methodology



Biological “simple” markers

Electroencephalography (EEG)

Respiration Rate

Electrodermal activity

Pupillary Response

Facial Expression

Heart Rate Monitor (ECG, PPG)

Limitations and scope

- Coding task
- Clear results
- Simple Hypothesis
- Reproducible

- General participants group
- Practical outcome
- Consumer-grade wearables

- Too theoretical
- Impractical
- Suspicious
- Limited citations
- Too good

- Personal bias
- Complexity ceiling
- Science-pop references

Neurological Mechanisms

From theory to practice

From stage, to neurological mechanism, to psychological explanation, to practical advise

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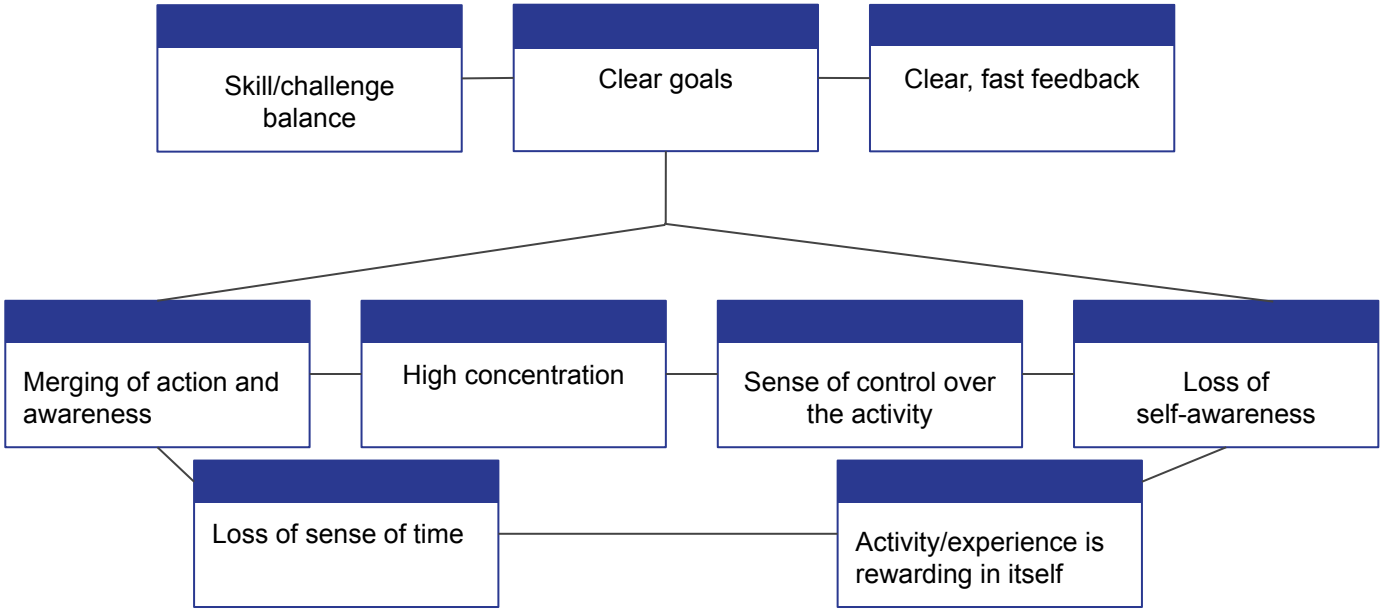
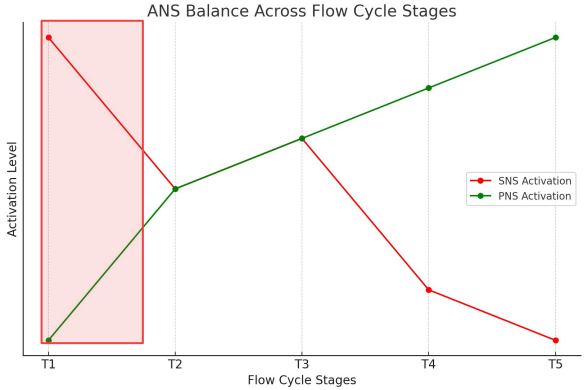
Flow dimensions



Identified mechanisms

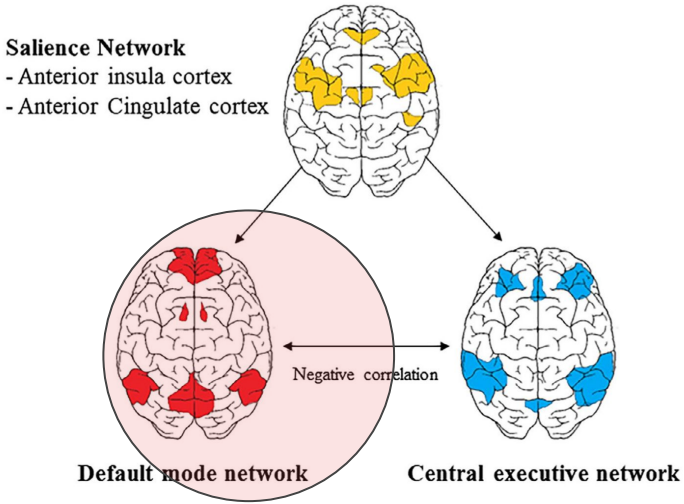
Stage	Stage simple description	Neurological mechanisms	Function	Tracking
Struggle	Anxious or stressed mental state in the face of the task execution planning, resources collection and difficulty assessment	BG starts dopamine production, Locus Coeruleus activates norepinephrine release, SNS activity increase	Promote intense, controlled focus and wakefulness, first level reward assessment, setting reward/desire for the activity	fMRI, HRM, EEG, EDA, ECG
Release	Commitment to a chosen solution, reduced self-awareness, increased concentration	DMN activity reduction, CEN activity increase, SN activity increase, PNS activity increase	Relaxation to some degree, increased concentration on specific task, internal dialog shut down, concentrated stimuli filtering, commitment	fMRI, EDA, EEG, HRM, ECG
Flow	No self-awareness, no time-feeling, extreme focus, no active internal dialog or monologue, joy	ANS regulates balanced PNS and SNS activity, Activation of frontoparietal attention networks and reward network, LC-NE balances engagement, SN assesses feedback	Constantly re-assessing physiological and psychological cost/benefit function, re-assessing external stimuli importance, learning, joy	EEG, EDA, fMRI, HRM, ECG
Recovery	Rapid energy depletion, self-awareness, decreased attention	Re-balancing of engaged systems	Preventing burnout, energy restoration	EEG, fMRI, HRM, FSS, ECG, questionnaire
Reflection	Activation of memory and learning	Basal Ganglia and DMN increase in activity	Active learning and evaluation of the experience, engaging in long-term memory	fMRI, questionnaire

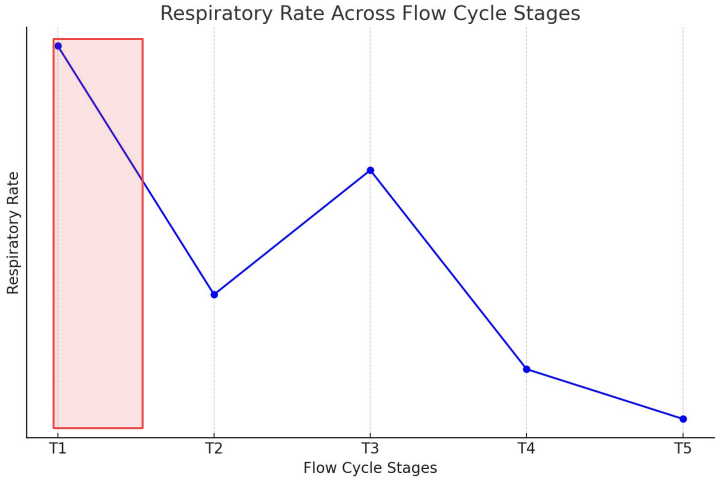
Struggle



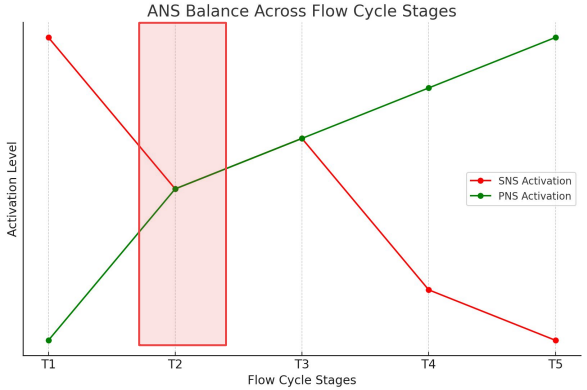
1. Assessment of tasks “value”
2. Increasing stress markers
3. Increased attention
4. Scattered focus present
5. High external stimuli assessment
6. High awareness
7. Time speed up

1. Pupils dilation
2. Shallow breath
3. Increased Respiratory Rate
4. Lower HRV, Higher LF power
5. Increased body temperature



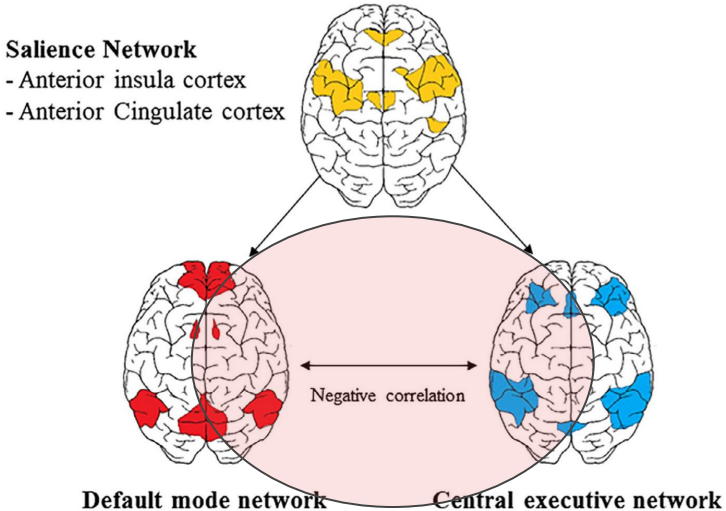


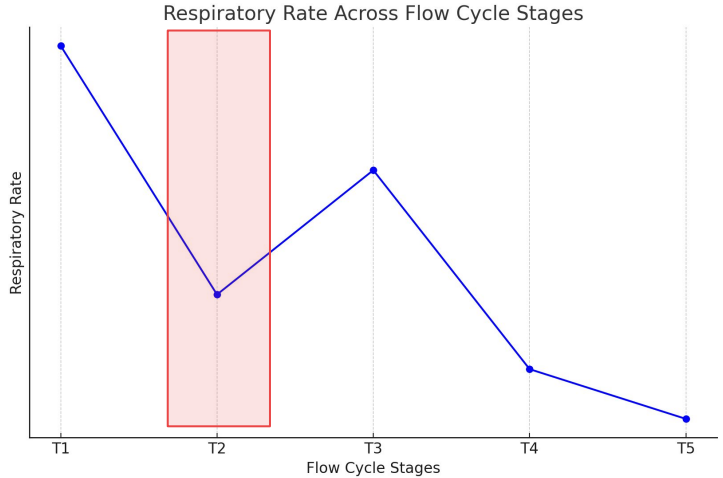
Release



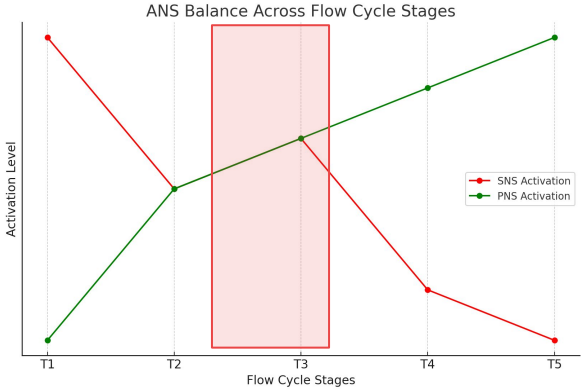
1. Commitment to the task (set value)
2. Reduced stress markers
3. Increased focused attention
4. Scattered attention rapidly diminishes
5. Diminished self-awareness
6. Time slow down
7. Entering state of positive excitement

1. Dilated pupils
2. Increasing breath depth
3. Increasing respiratory Rate
4. Increasing HRV, Prevalent LF power, Increasing HF power
5. Slightly decreasing body temperature



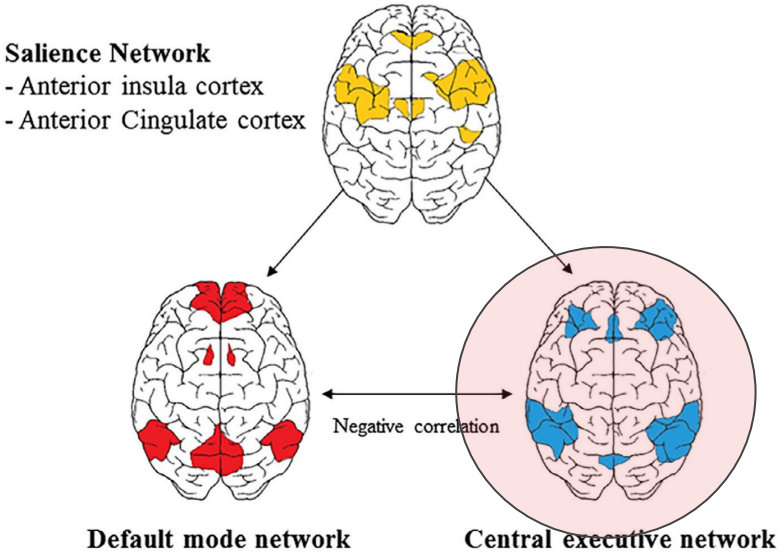


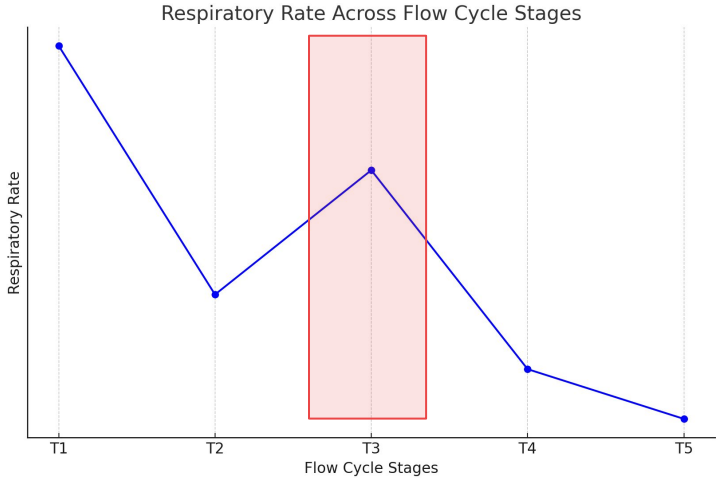
Flow



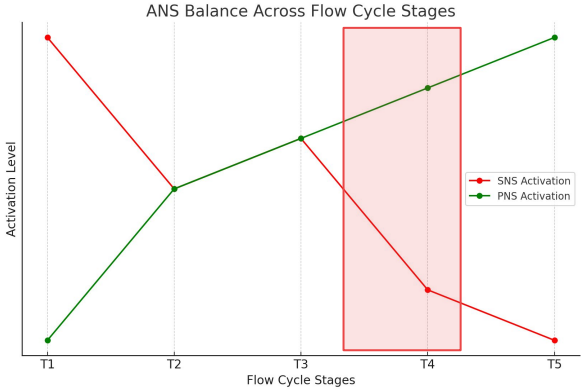
1. No self-awareness
2. Moderate stress markers
3. Extreme focus
4. Extreme on-task attention
5. Super slow sense time
6. Joy, happiness
7. Sense of control

1. Dilated pupils
2. Stabilized higher respiratory Rate, deep breath pattern
3. Potentially irregular time between breaths
4. High HRV, Balanced LF/HF HRV with slight HF dominance
5. Stabilized heightened body temperature



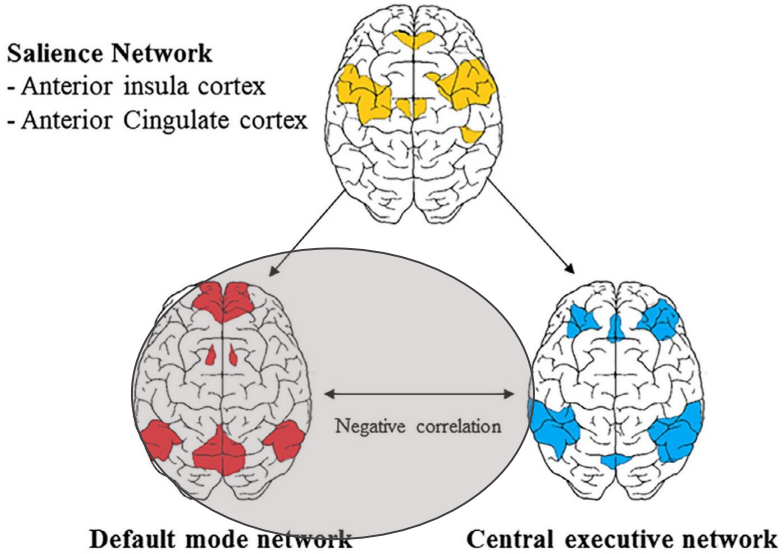


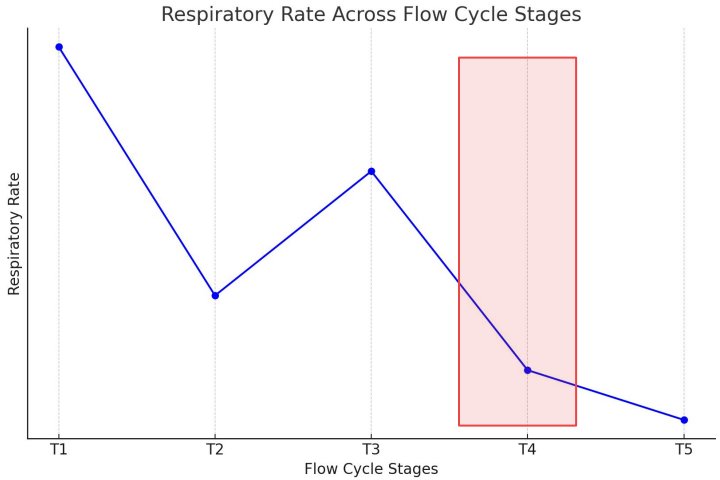
Recovery



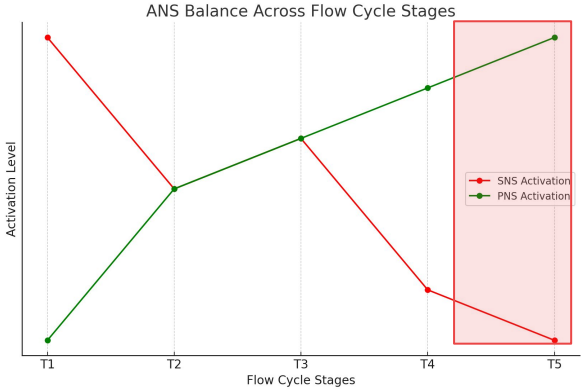
1. Active self-awareness
2. Moderate stress markers
3. Scattered focus
4. Low attention
5. Normal sense time
6. Exhaustion
7. Feeling of satisfaction

1. Constricted pupils
2. Decreased breath depth
3. Normalized time between breaths
4. …
5. Stabilized body temperature



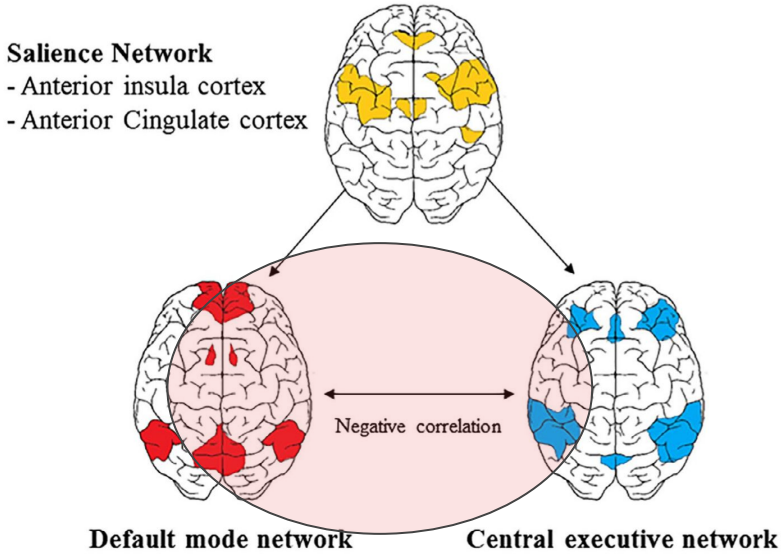


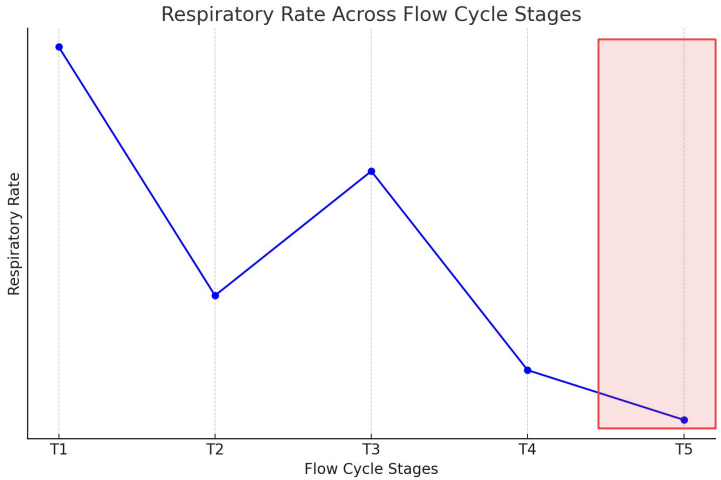
Reflection



1. Active self-awareness
2. Low stress markers
3. Present focus
4. Present attention
5. Normal sense time
6. Gratitude, joy, calm

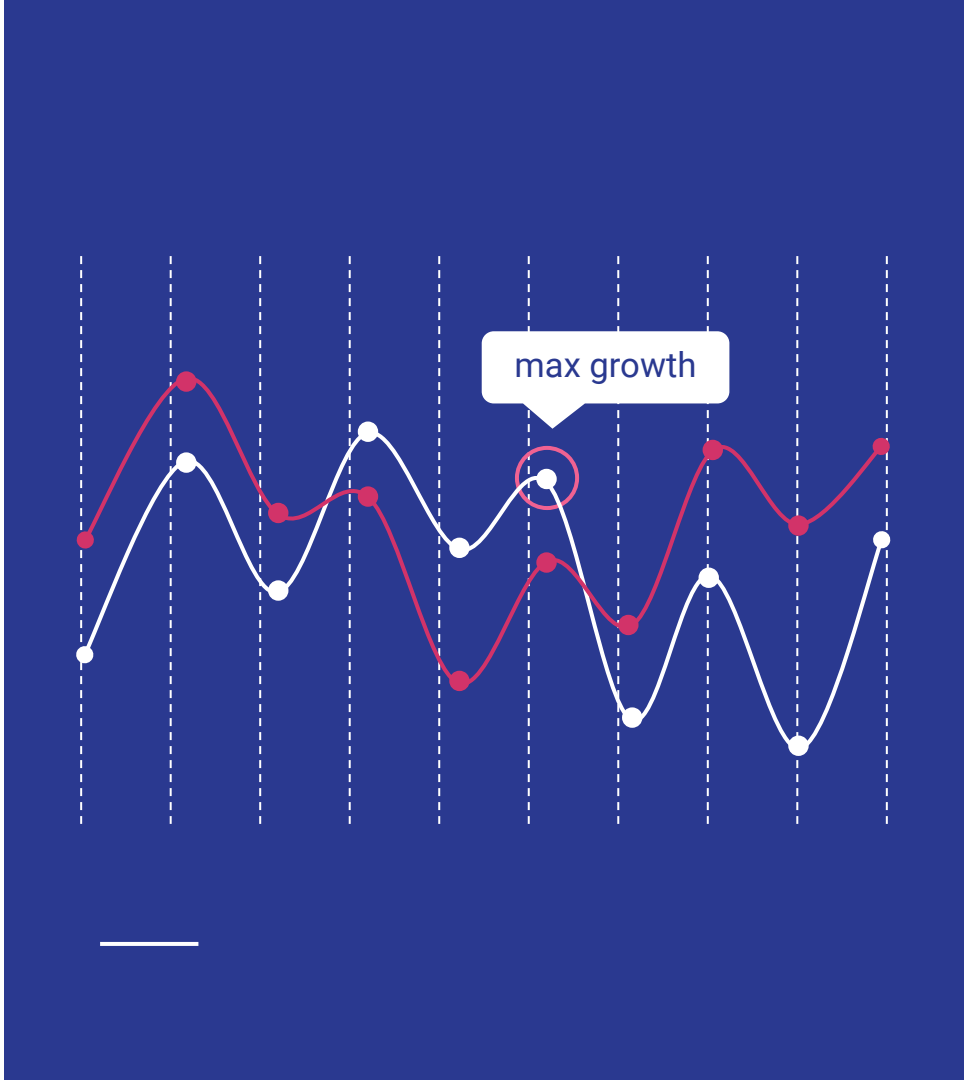
1. Slightly dilated pupils
2. Normalized breathing patterns
3. Normalized temperature
4. High HRV, High HF power, LF present





Analysis

Getting the data



Steps

1. Questionnaire fill-in
2. Check for biometric data to support your subjective experience
3. Reflect on details
4. Do it over multiple days

Self-assessment: Flow Short Scale with item allocation proposed by Engeser (2012)

- I feel just the right amount of challenge (ABA) - 0 (not at all) .. 5 (absolutely)
- My thoughts/activities run fluidly and smoothly (FP)
- I do not notice time passing (ABA)
- I have no difficulty concentrating (FP)
- My mind is completely clear (FP)
- I am totally absorbed in what I am doing (ABA)
- The right thoughts/movements occur of their own accord (FP)
- I know what I have to do each step of the way (FP)
- I feel that I have everything under control (FP)
- I am completely lost in thought (ABA)

**** Score is on 0 (not at all) .. 5 (absolutely) scale; ABA - Absorption by activity facto; FP - Fluency of performance factor.**

- HRV
- Breathing patterns
- Stress/Rest
- Sleep
- Blood pressure (optional)
- …

- General trends
- Anomalies and anomalies trends
- Seasonality

- Infrequent sampling
- Hard to get raw data
- Aggregated data
- Inaccurate readings
- Timing bias

- Mental state
- Flow experience
- Stress
- Mood

- Trends
- Cyclic components
- Anomalies
- Shifts

- A number of biases
- Inconsistent scale
- Adaptation

Notebook overview here

Additional factors

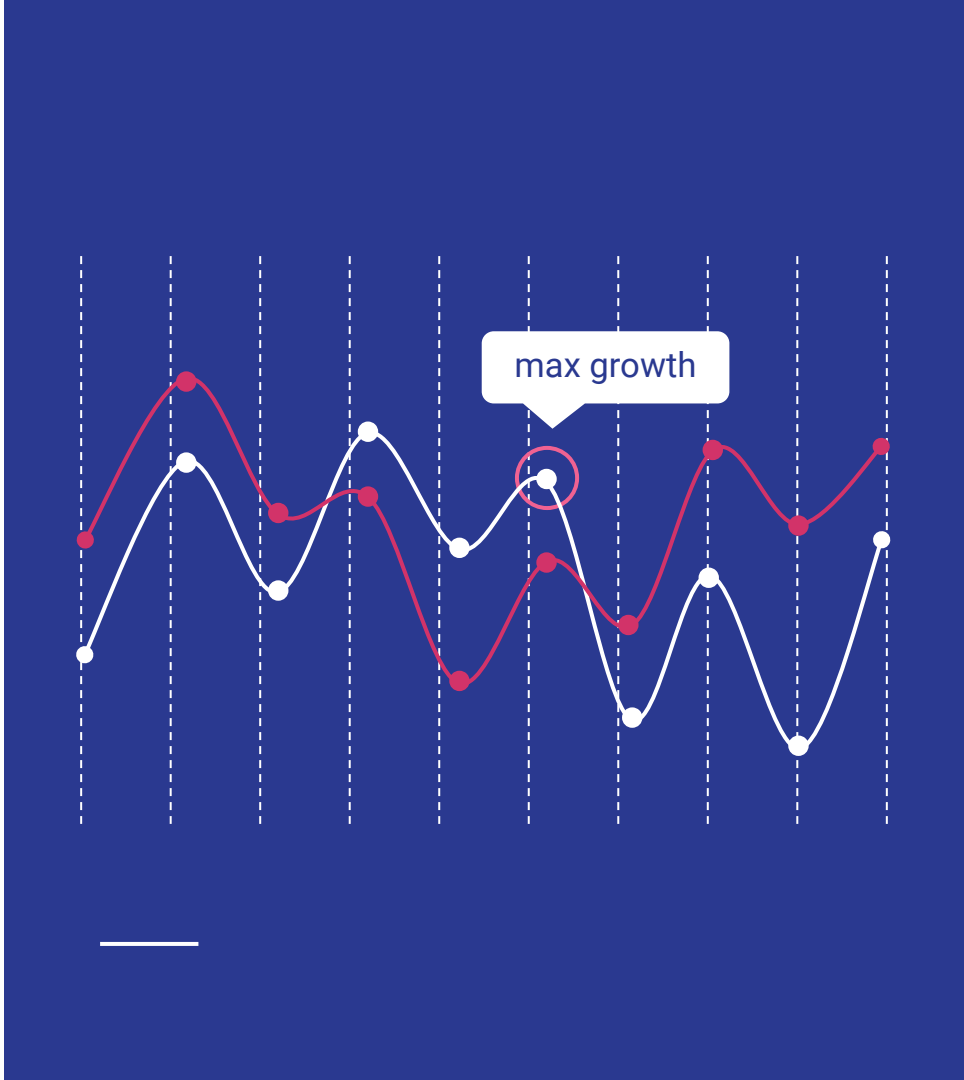
- General health
- Higher happiness
- Autonomy over task
- Growth mindset
- Mindfulness
- Certain level of skill

- Illness
- Negative mindset
- Perceived risk is too high
- New skill
- Inappropriate environment

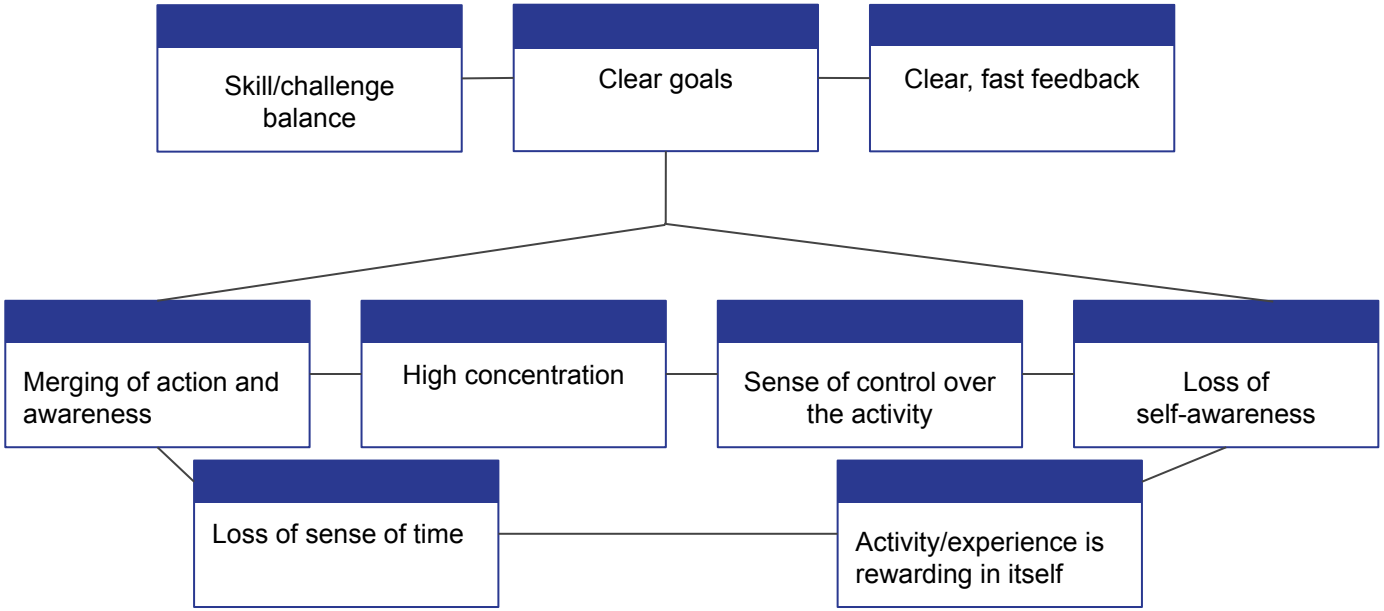
- Genetics

Summary

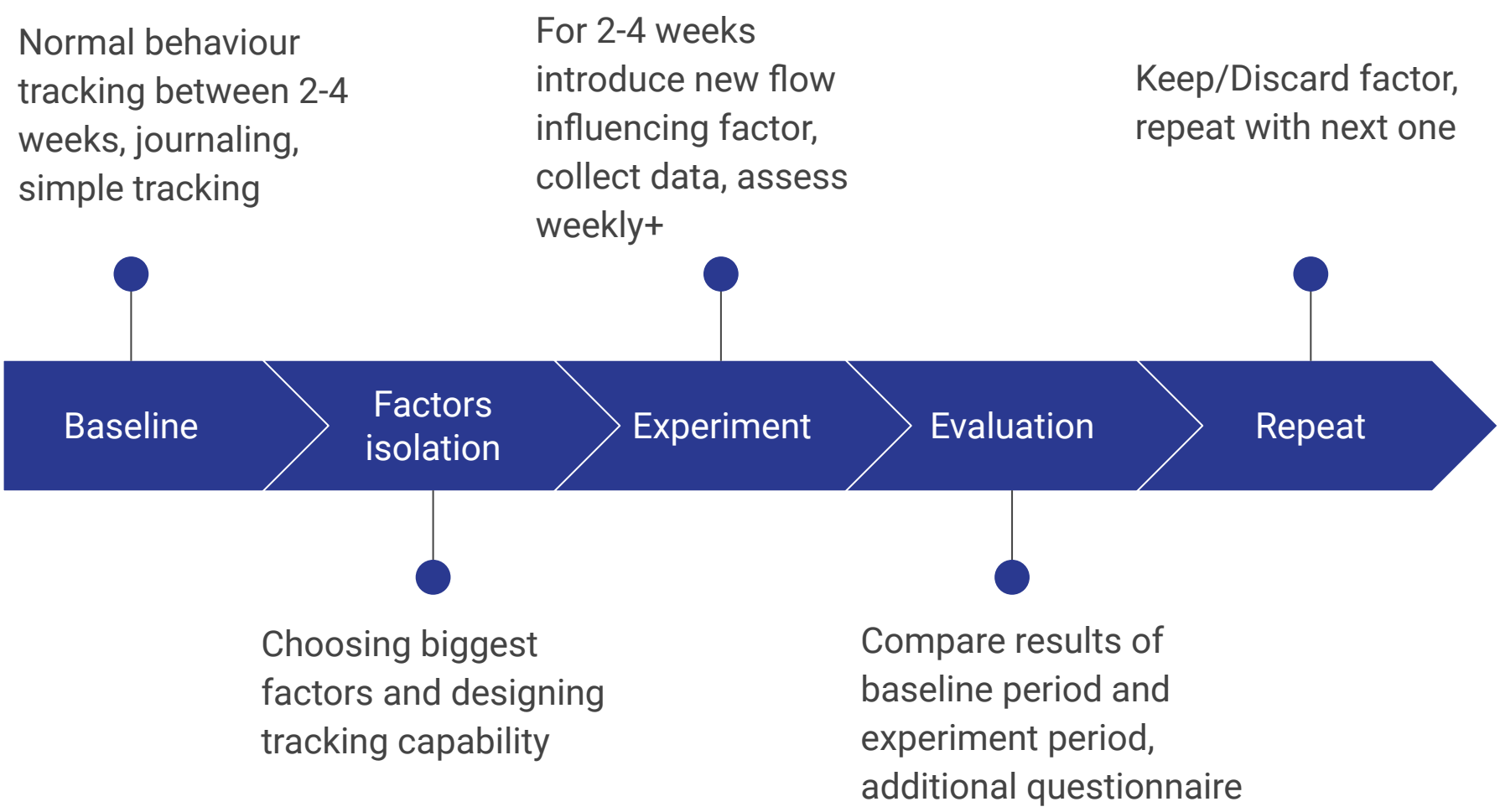
Practical recap



Flow dimensions



1. Is a factor positive or negative?
    a. Do you want to add to your routine or take away?
2. Which dimension is it tackling?
    a. Is it very practical or a global change?
3. How high is implementation cost?
    a. Is it cheap physical addition, or a long, unique process?
4. What is the desirable outcome?
    a. Is it a measurable feature of a stage, or improved global factor?
5. How can it be measured?
    a. Is it an objectively or subjectively collected data?
6. Is it sustainable?
    a. Is this change temporary or permanent?
7. Are there side- or compound effects?
    a. What are other dimensions it is affecting?


Normal behaviour tracking between 2-4 weeks, journaling, simple tracking
For 2-4 weeks introduce new flow influencing factor, collect data, assess weekly+
Keep/Discard factor, repeat with next one
Baseline
Factors isolation
Experiment
Evaluation
Repeat
Choosing biggest factors and designing tracking capability
Compare results of baseline period and experiment period, additional questionnaire

Thank you for your attention!

Resources:

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