Optimal Action in High-Speed Environments

Empirical Approach to the Psychological Regulation of Action of Jet Pilots and Speed Athletes

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Introduction

Background

- For 1 year working as a management consultant
- Worked 25+ years in high-speed environments - as a human resources executive in FMCG and TEC companies
- General fascination for speed environments

Research Questions

- How do experts regulate optimal action in high-speed environments?
- What strategies do they use?
- Can these strategies apply beyond?

Objective

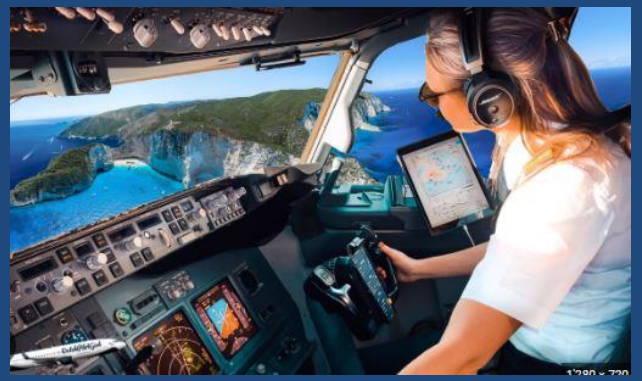
Gather detailed subjective theories from experienced experts and reconstruct their internal representations of optimal action

Introduction

Expert Sample

- 7 aviation pilots (fighter jet and commercial airline), 17 elite athletes (Formula 1, downhill and speed skiing, motorcycle racing, bobsleigh, skeleton)
- Expert Status: Aviation: acknowledged by peers as a leading figure or legend in the profession; Sport: sustained top-level success, demonstrated through repeated wins at the highest competitive level over a 10-year period
- Gender: 1 F / 23 M
- Nations: CH, CAN, GER, IT, GB

- Exemplary micro-worlds allow laboratory-like investigation
- Risk involved provokes seriousness of planning, execution and reflection



Methods

Theoretical framework

… person-environment interaction

- **Action-spae-specific considerations**
- **Cognitive psychological considerations**
- **Action theoretical considerations**

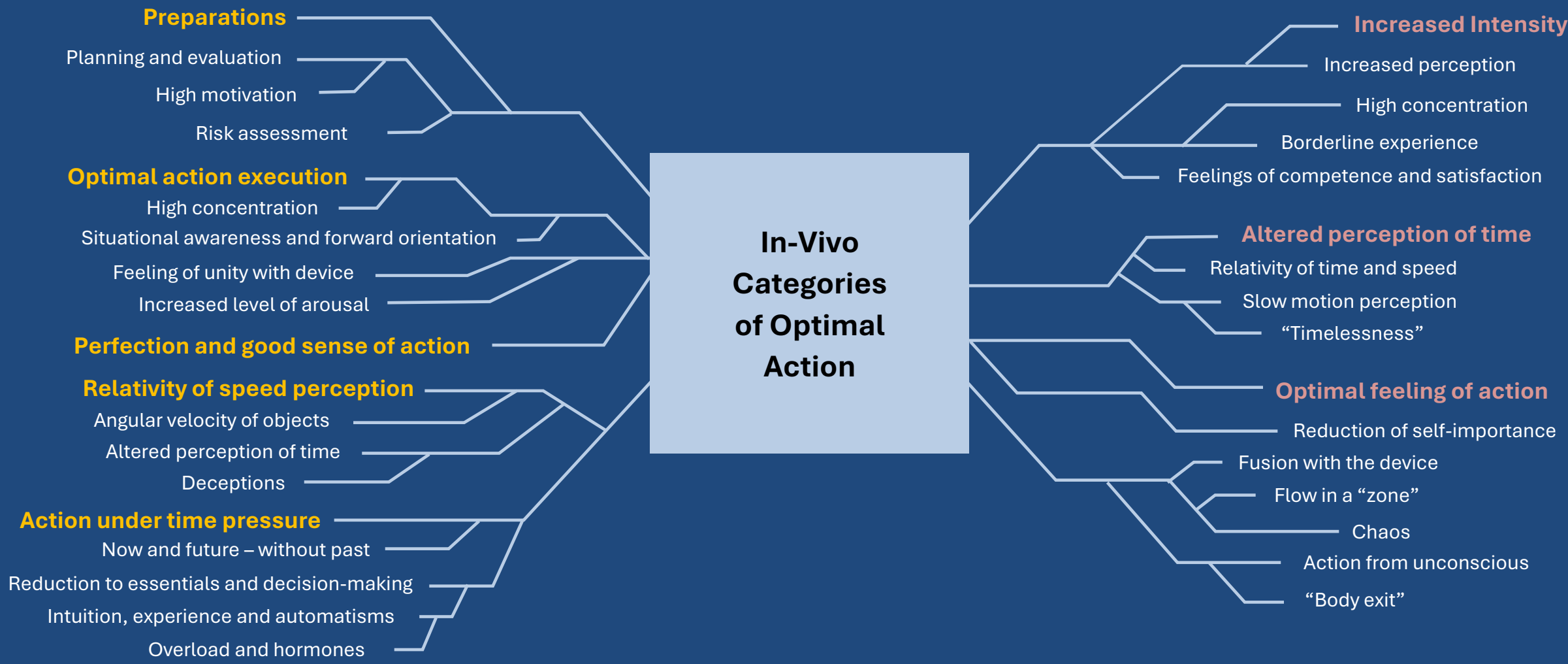
Qualitative research approach / interviewing

… strong focus on a "science of those affected"

- **Philosophy of science paradigm**
- **Grounded theory[1)]**
- **Researcher as instrument – Autoethnography[2)]**
- **Expert sampling[3)]**
- **Research process**
- **Methodological limitations**

Sources:
1) Grounded Theory: Glaser & Strauss (1967); Strauss & Corbin (1990); Charmaz (2006, 2014)
2) Autoethnography: Ellis & Bochner (2000); Adams, Jones & Ellis (2015)
3) Expert Sampling: Patton (1990, 2015); Denzin & Lincoln (1994, 2005); Charmaz (2006, 2014)

Results – In-Vivo-Categories of Optimal Action in Aviation and Sport



Results – Text Examples From Interviews

Reduction to essentials and decision making
Military jet pilot

… At high-speed low over ground, the bucket is already very full in terms of processing capabilities … it's a primary task ... You just have to see that you get the level in the bucket back down there that nothing overflows …

Intuition, experience and automatisms
Military jet pilot

... Then comes intuition … which tells you how to act correctly ... So, in air combat, a lot is still intuitive ... It is experience you gain through endless training ...

Optimal feeling of action
Formula 1 car driver

... It is about trying to get the harmony with the car, trying to be one with the car ... It's the car and me as one … We are one ... that is your task …

Action from unconscious
Speed skier

... It's harmony, it's rhythm, it's sensational in terms of feeling ... simply a state where everything comes together... I don't think that one still thinks then … it's about letting go of all barriers in these situations … the subconscious is what has to control that, actually learned and approached …

Results – Empirically Derived Categories Foster the Following Hypothesis

1

Triadic
action circle

Anticipation
Realization
Interpretation

2

Huge time pressure

High attention and concentration

Information reduction to the essentials

3

High competence beliefs and motivation

Optimal visualization

4

Synchrony of psychological reality with physical reality

5

Emotional valuation has core action-regulatory function

6

Reproduction through delegation to automatisms

7

Accelerated cognitive processes

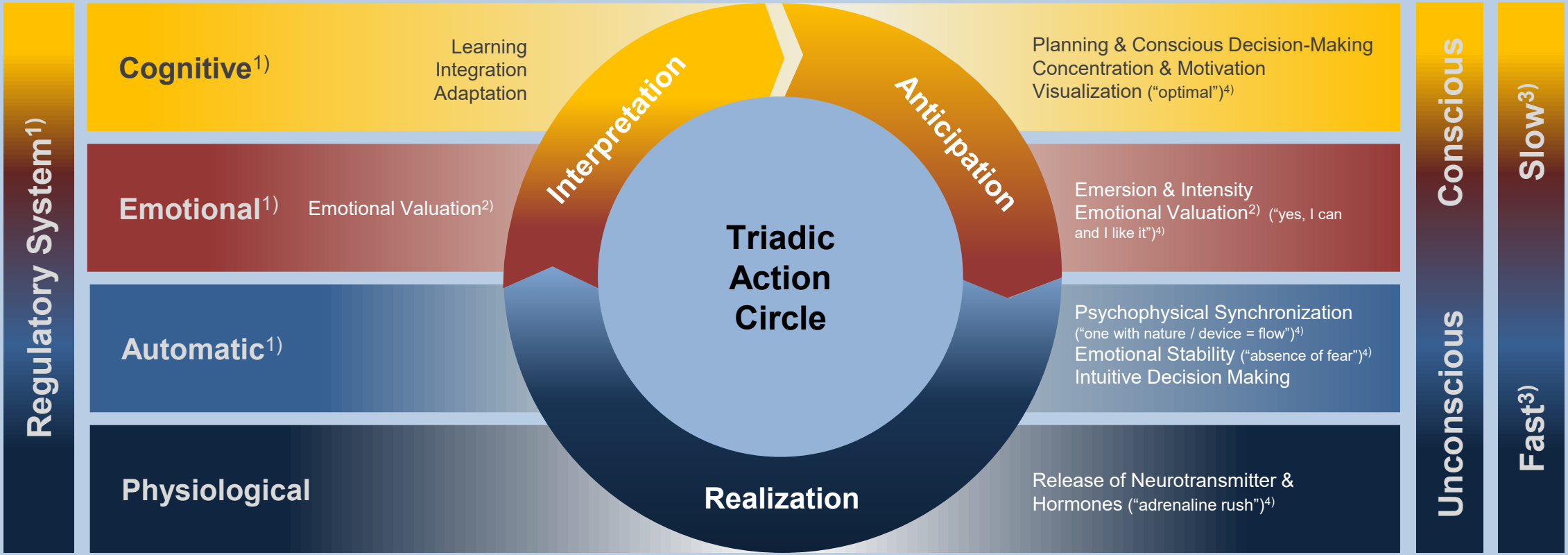
Release of neurotransmitters and hormones

8

Overloaded information processing

Borderline experiences force physiological adaptations

Results – Hypothetical Integrative Psychological Model of Optimal Action



Sources:
1) Regulatory Systems: Piaget (1967); Nitsch & Munzert (1997); Nitsch (2004)
2) Emotional Valuation: Goleman (1994, 2024)
3) Thinking Fast and Slow: Kahnemann (2011)

Notes: (4) "…" = In-vivo categories mentioned by experts

Recommendations regarding optimal action in high-speed environments

1

Pattern recognition

Radically filter for critical information

2

Feedforward

Mentally visualize, anticipate and pre-structure

3

Trustful feeling

Central importance of emotional valuation

4

Intuition and automatisms

Deliberately practice to embrace and cultivate

5

Post-action debrief

Adaptation and continuous learning

6

Full recovery

Enhance systemic support for human limits

More details

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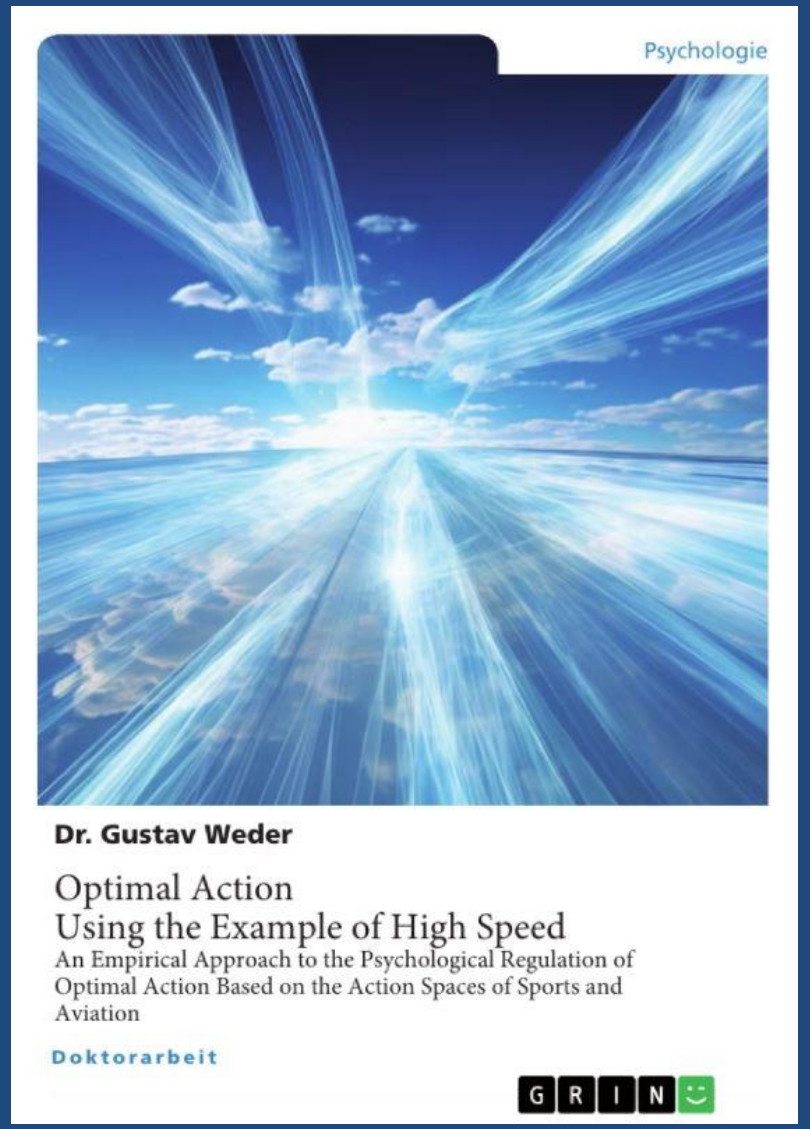

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