

Engageing with Servicerobot «Relay»

**A longitudinal study on the change
in emotional, cognitive and
behavioral engagement**

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Introduction

- Increasing use of (service) robots in different areas, including healthcare (Bendel, 2018)
- Long-term binding to robots poses one of the greatest challenges in the field of human-robot interaction (HRI) (Payr, 2011)
- Studies, which have investigated engagement in the field of HRI, consider engagement as a short phenomenon. That means engagement while direct interaction (e.g. operating a touch screen) (Sidner & Dzikovska, 2002; Pitsch, Luff, Kuzuoka & Heath, 2009; Dubovi, 2022)
- The first five seconds at the beginning of an interaction have a significant impact on the further use of the robot (Pitsch, Luff, Kuzuoka & Heath, 2009)

Theoretical assumptions and relevance

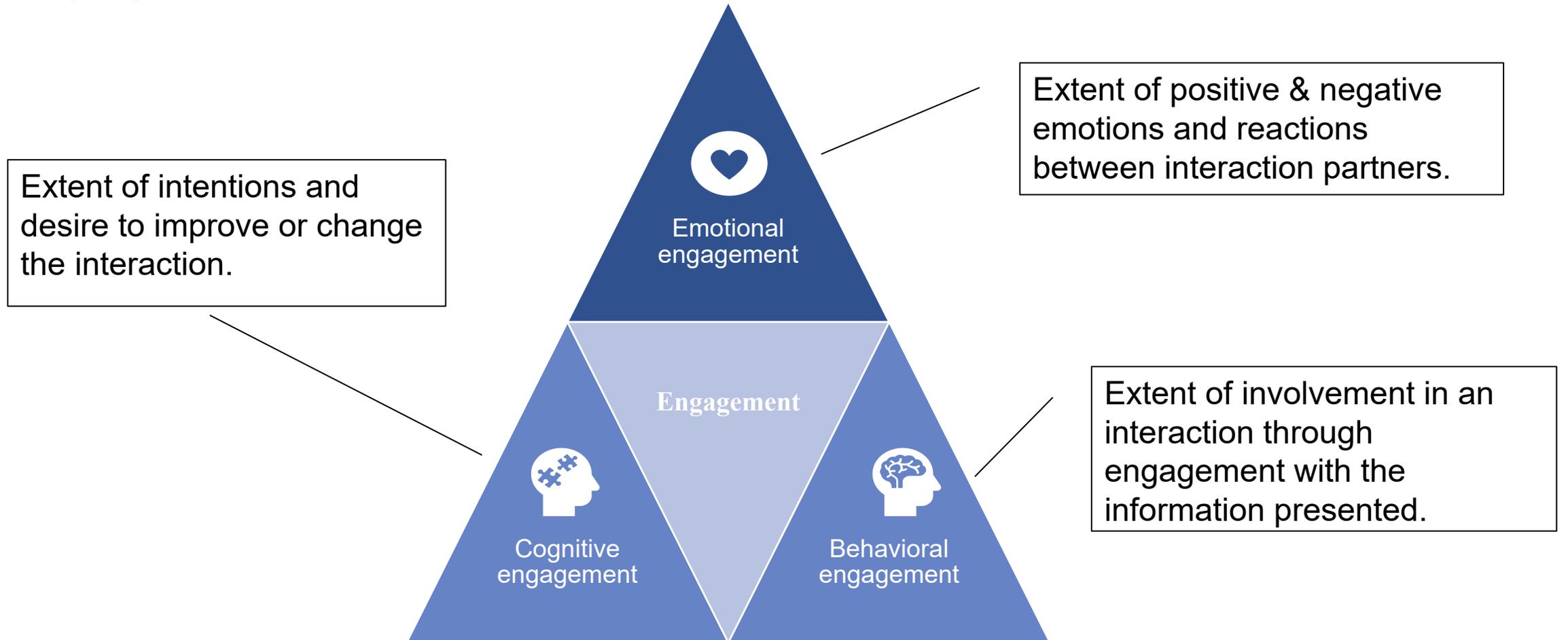
Theoretical assumptions

- Novelty effect decreases over time
- Therefore, a shift **from a short-term to a long-term understanding is necessary**
(Leite, Martinho, and Paiva, 2013)

Relevance

- **To use the full potential of the robots in the field**
- Influencing factors on engagement need to be understood

Engagement dimensions



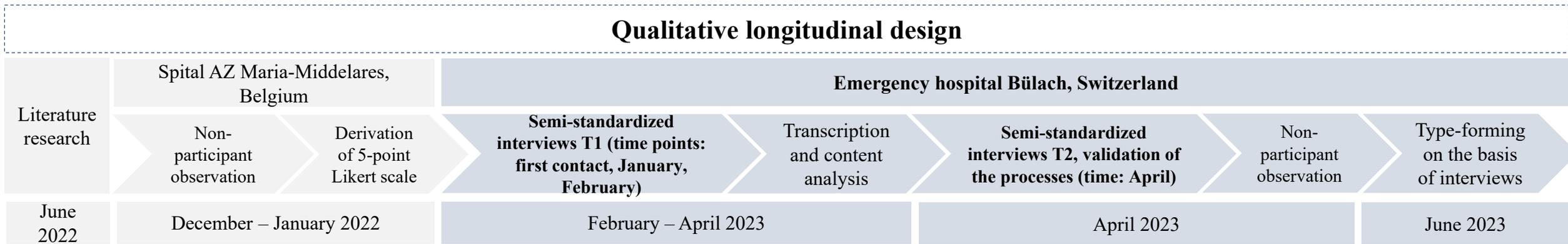
(Oertel, Castellano, Chetouani, Nasir, Obaid, Plechaud, et al., 2020)

Research Questions

How do the expressions of the dimensions of engagement to Relay change over time among cooperators and coexistent people?

- RQ1: How does the emotional, cognitive, and behavioral engagement of cooperators show up in their interactions with Relay in the work context?
- RQ2: How does the emotional, cognitive, and behavioral engagement of cooperators people with Relay change over time?
- RQ3: What factors influence cooperators' emotional, cognitive, and behavioral engagement with Relay in the work context?

Study Design and Sampling



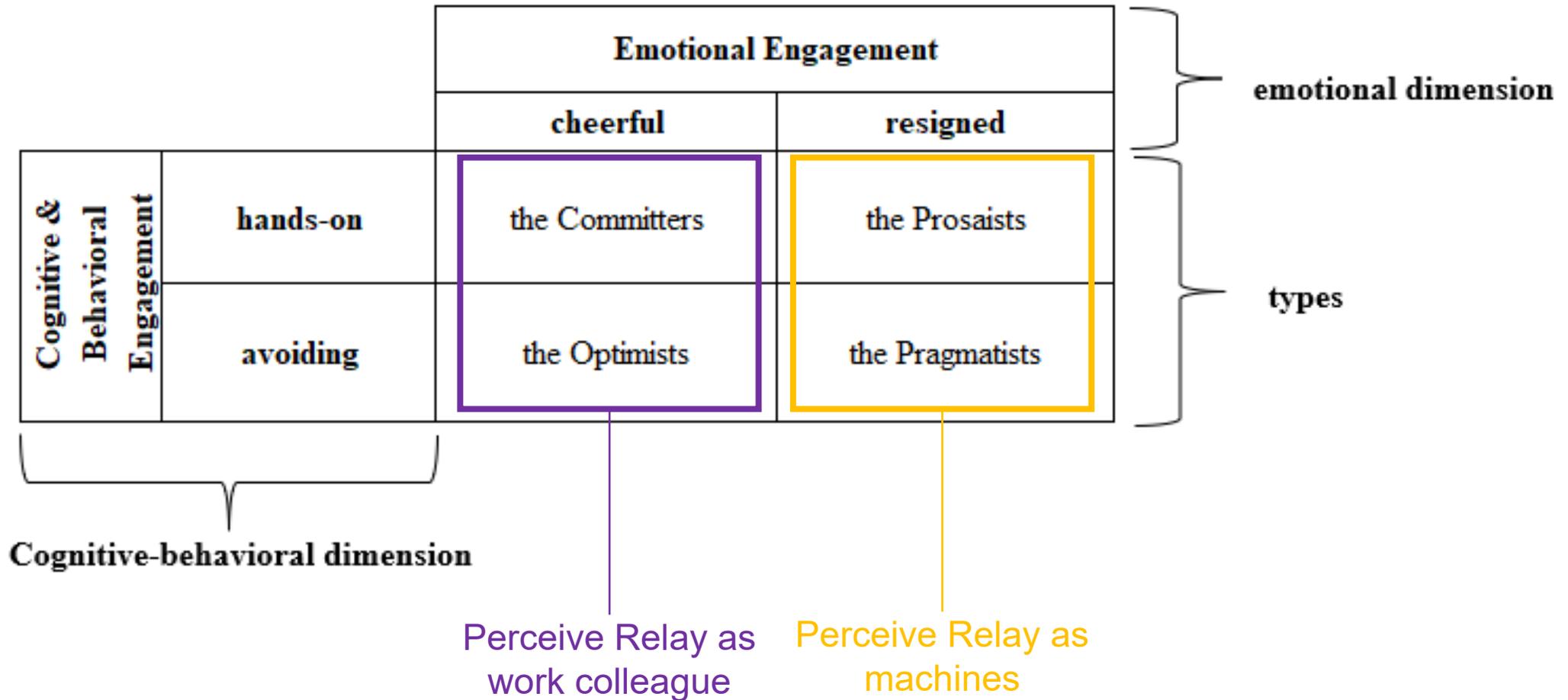
Interview sampling hospital Bülach

N t1 = 8 (7 female, 1 male)

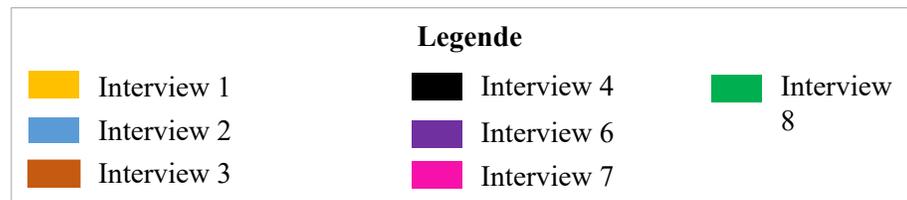
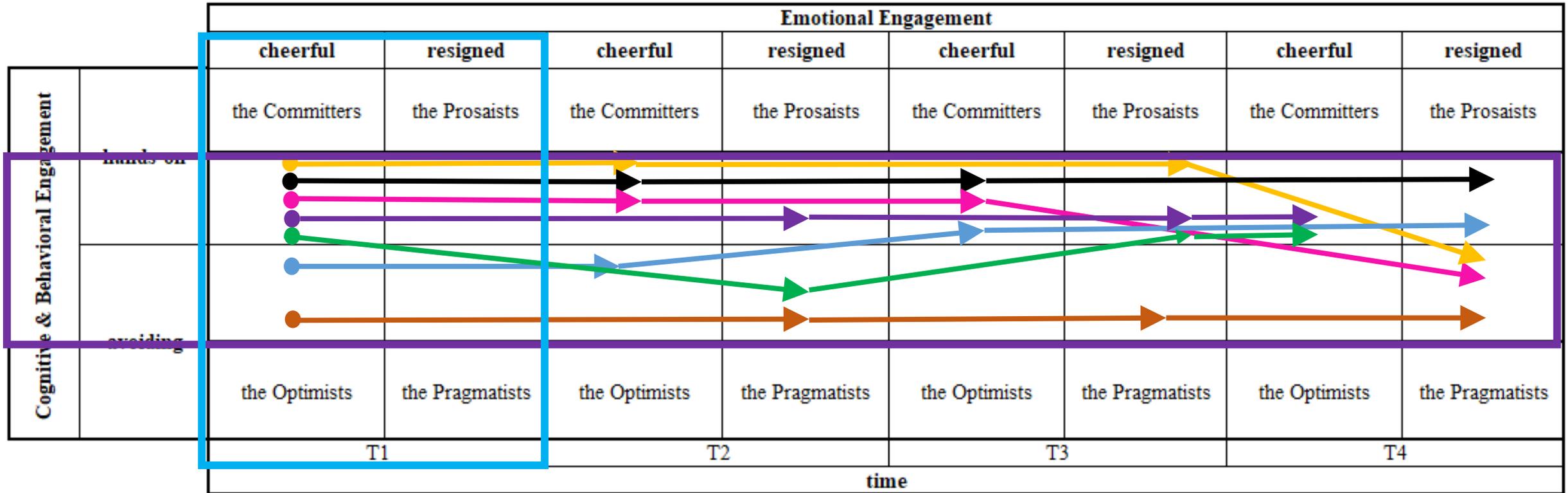
N t2 = 7 (6 female, 1 male)

Functions: internship, nursing assistant, healthcare specialist and emergency expert

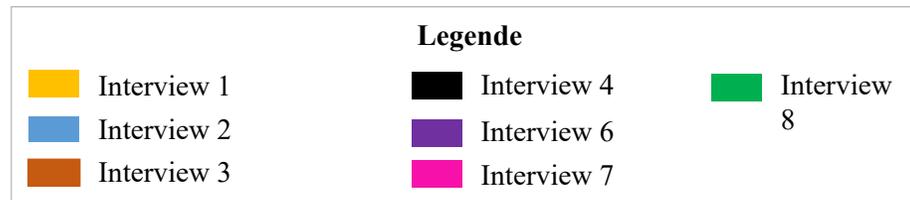
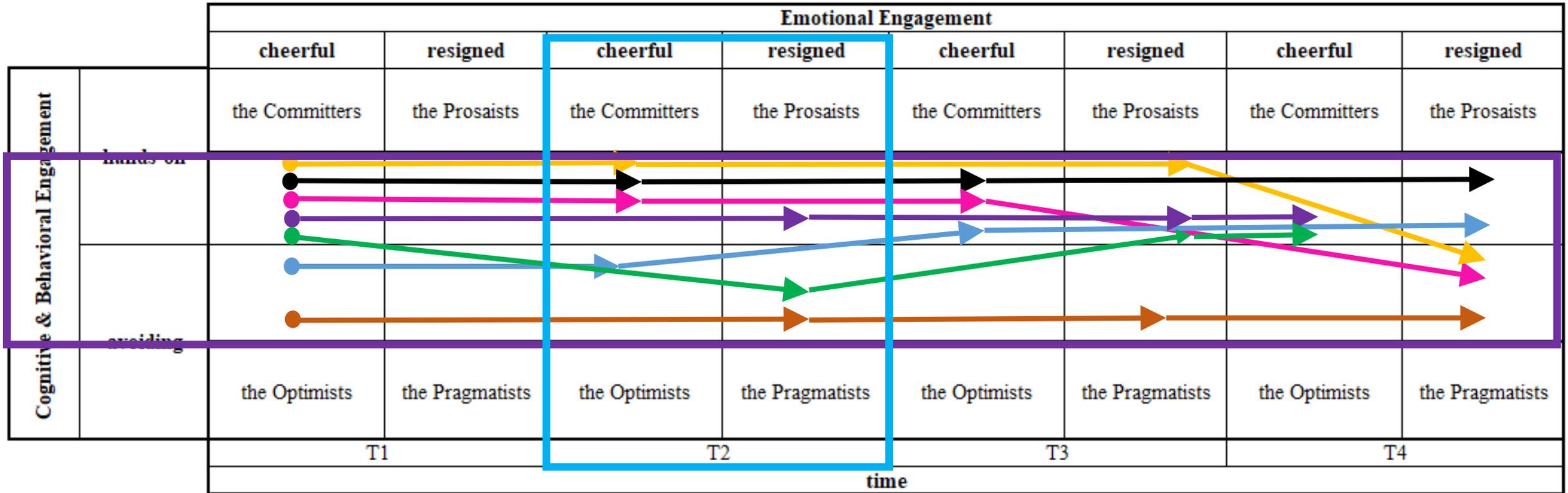
Results – Type Formation (RQ1)



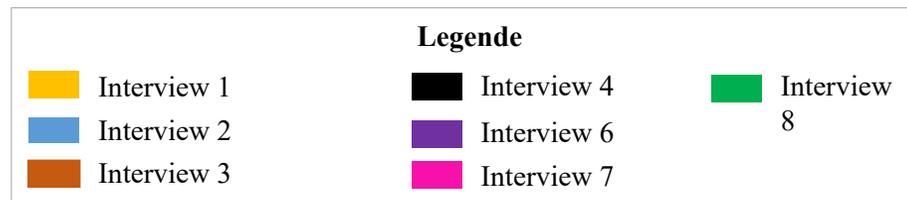
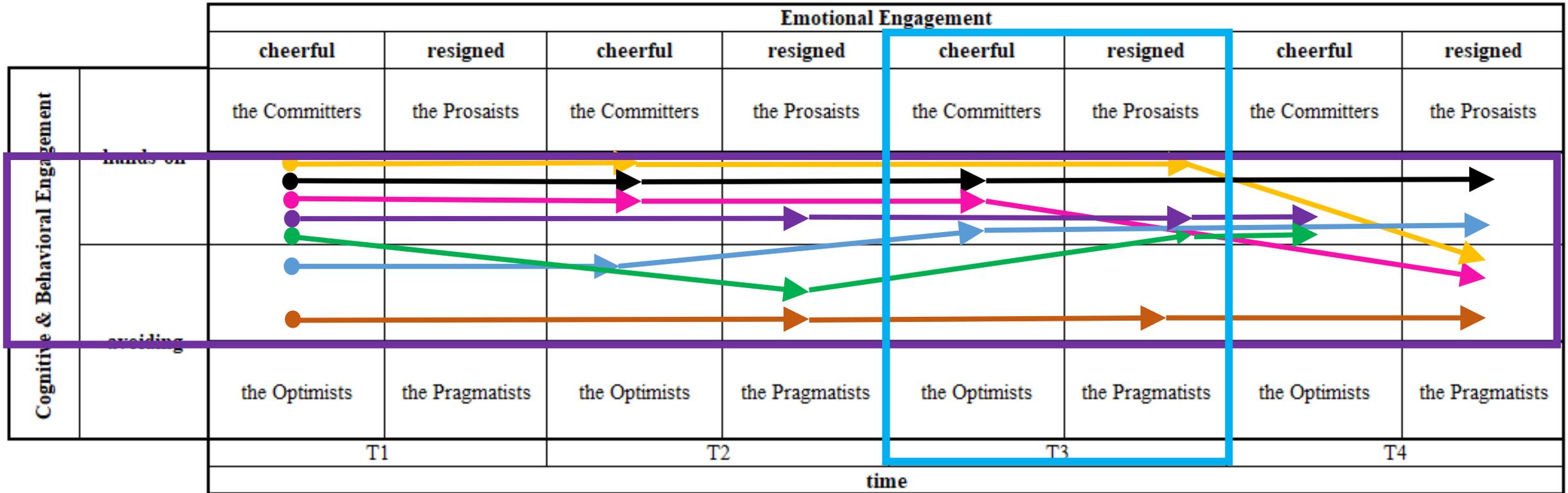
Results – Changes in Engagement (RQ2)



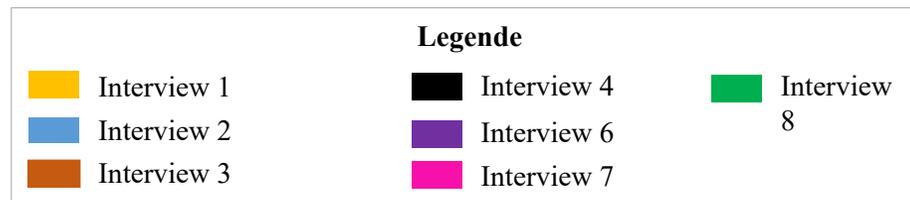
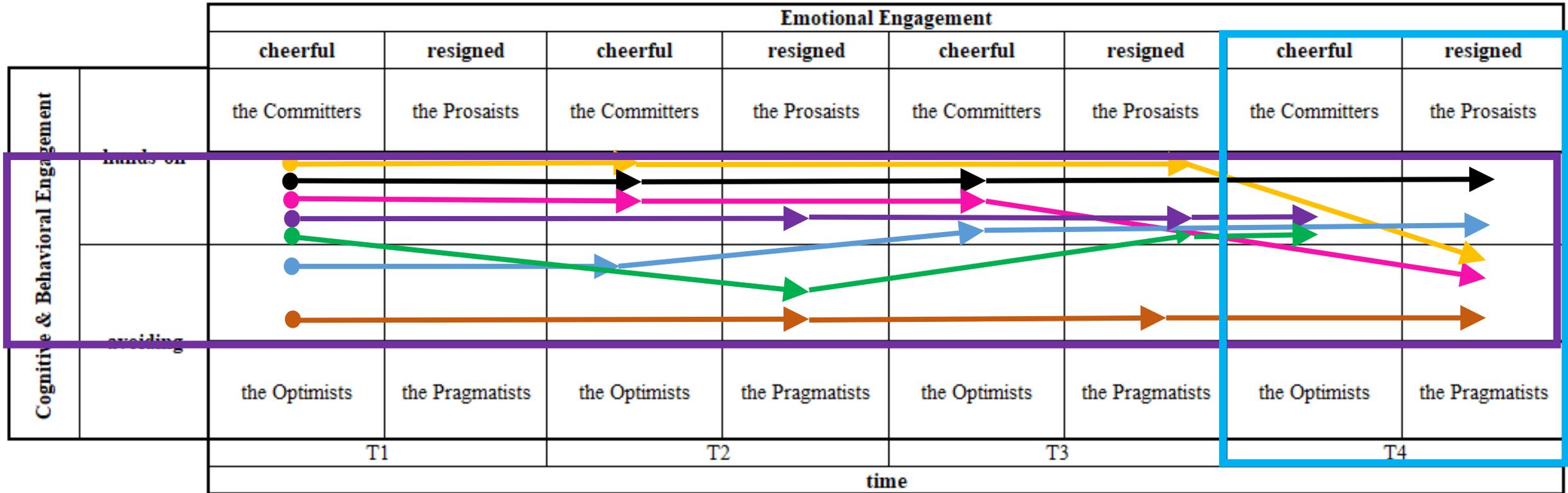
Results – Changes in Engagement (RQ2)



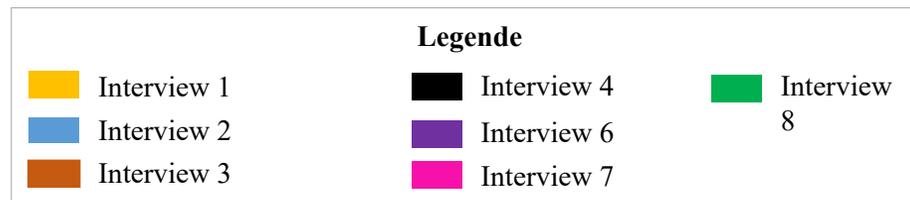
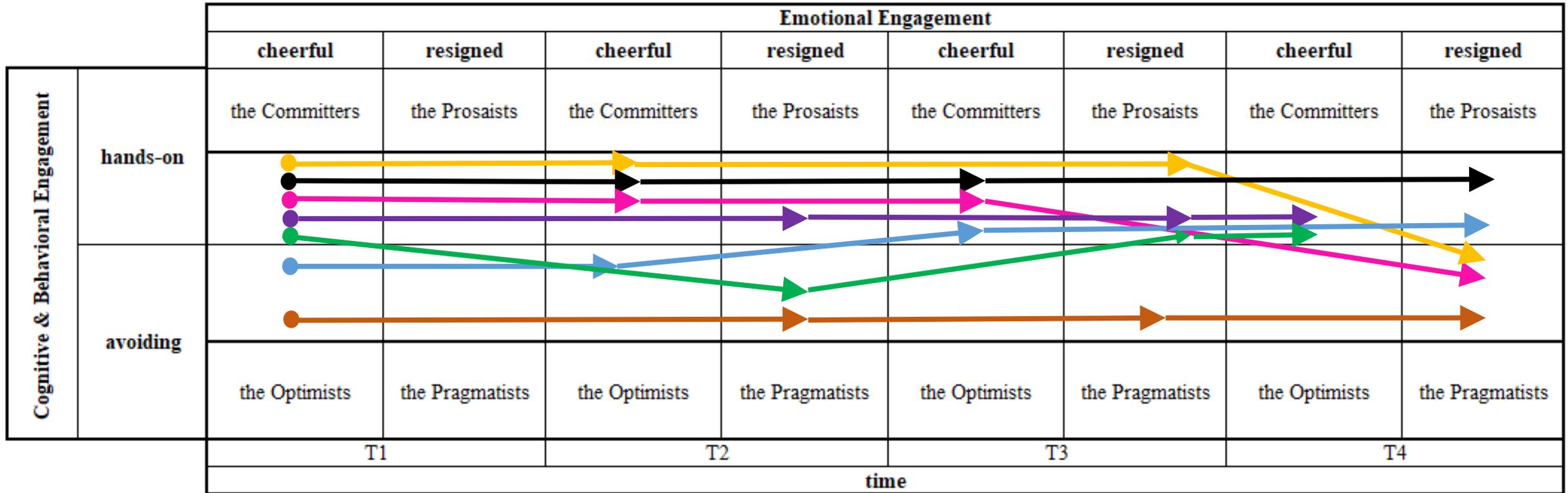
Results – Changes in Engagement (RQ2)



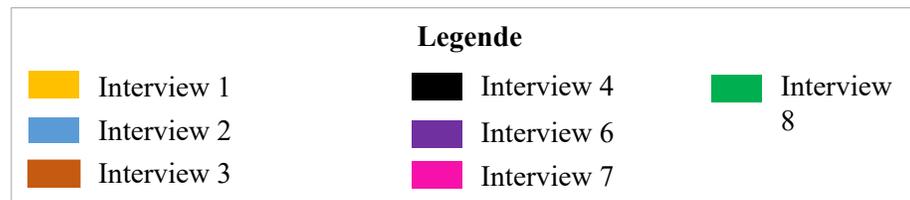
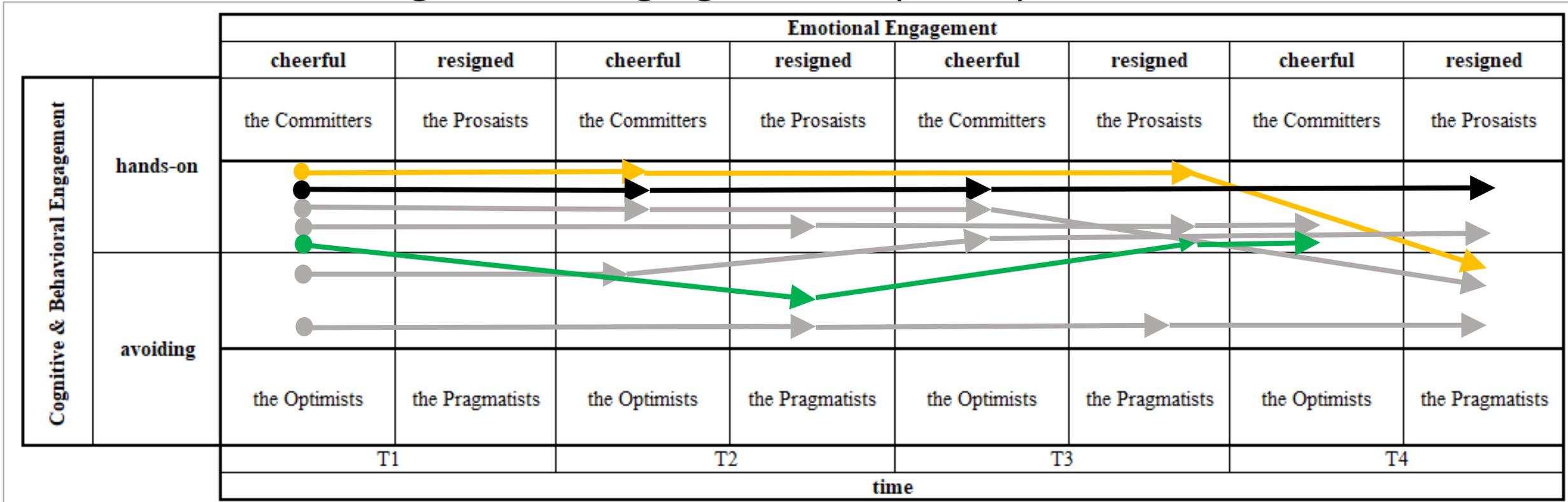
Results – Changes in Engagement (RQ2)



Results – Changes in Engagement (RQ2)



Results – Changes in Engagement (RQ2)



Results – Influencing Factors (RQ3)

Positive emotional engagement

- Know how to act
- Have more control over Relay
- Perception of increasing reliability of Relay
- Perception of Relay as a relief

Neutral emotional engagement

- Habit

Negative emotional engagement

- Malfunctions and failures
- Fear of risks
- Lack of knowledge about how to act in challenging situations

Positive cognitive and behavioral engagement

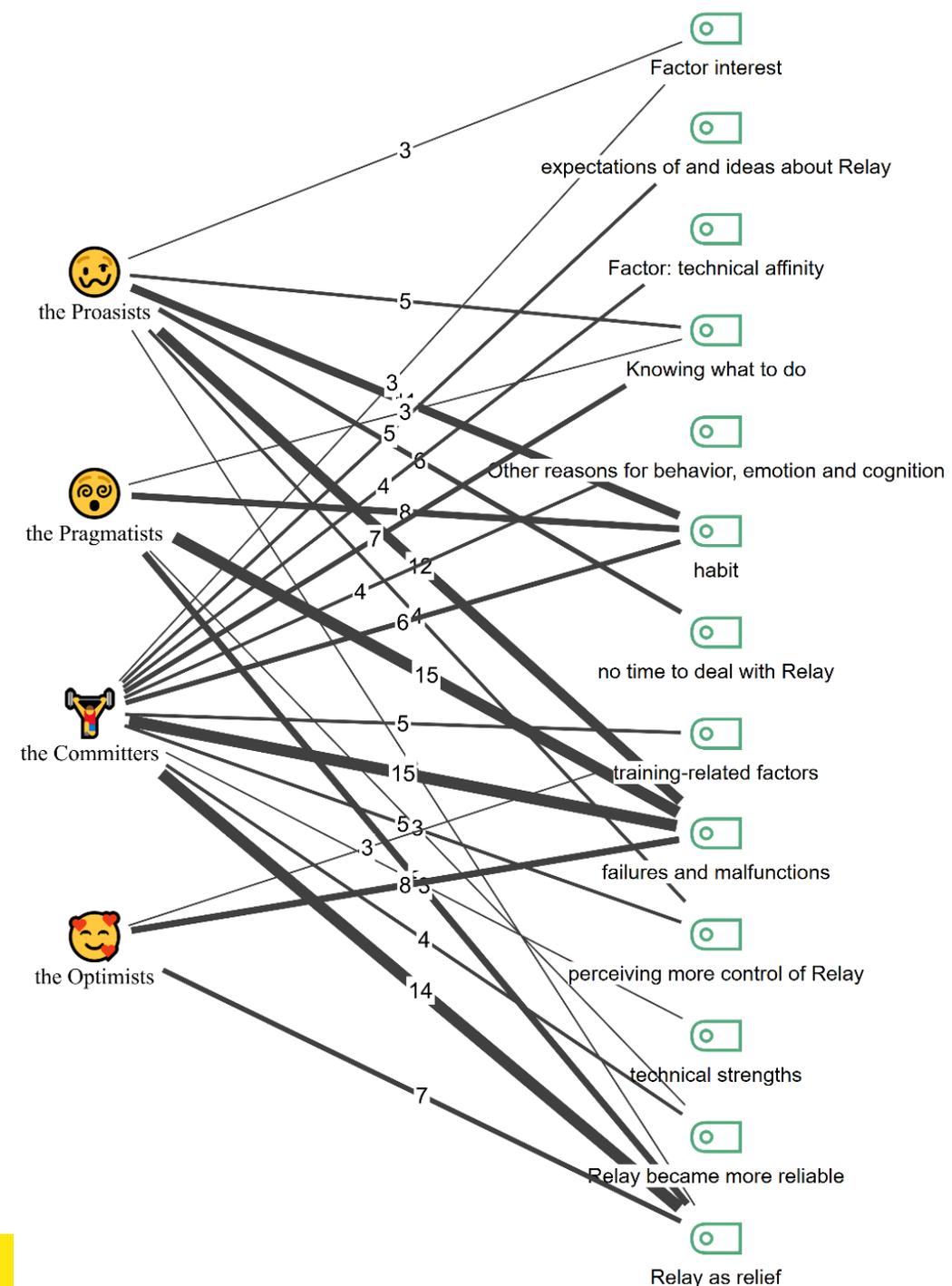
- Received training / instruction
- Habit
- Perception of increasing reliability of Relay

Negative cognitive and behavioral engagement

- No time to engage with Relay
- No training received

Results – Influencing Factors (RQ3)

- **The Prosaists:** high relation to habits and disorders and failures, interest
- **The Pragmatists:** high relation to habit, disturbances and failures and relay as relief, no relation to interest
- **The Committers:** high relation to habit, disturbances and failures, relay as relief, interest, expectations, knowledge like action
- **The Optimists:** high relation to disturbances and failures and relay as relief, no relation to interest



Discussion and Conclusion

- Emotional engagement decreases over time
- Cognitive and behavioral engagement remain constant
- Training can provide a "boost" to engagement due to its feeling of "being empowered"

Outlook

- Realistic expectations, interest, subjective benefits, and high reliability help to address the challenges of long-term engagement

THANK YOU FOR YOUR ATTENTION!



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Operationalization

