

# 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



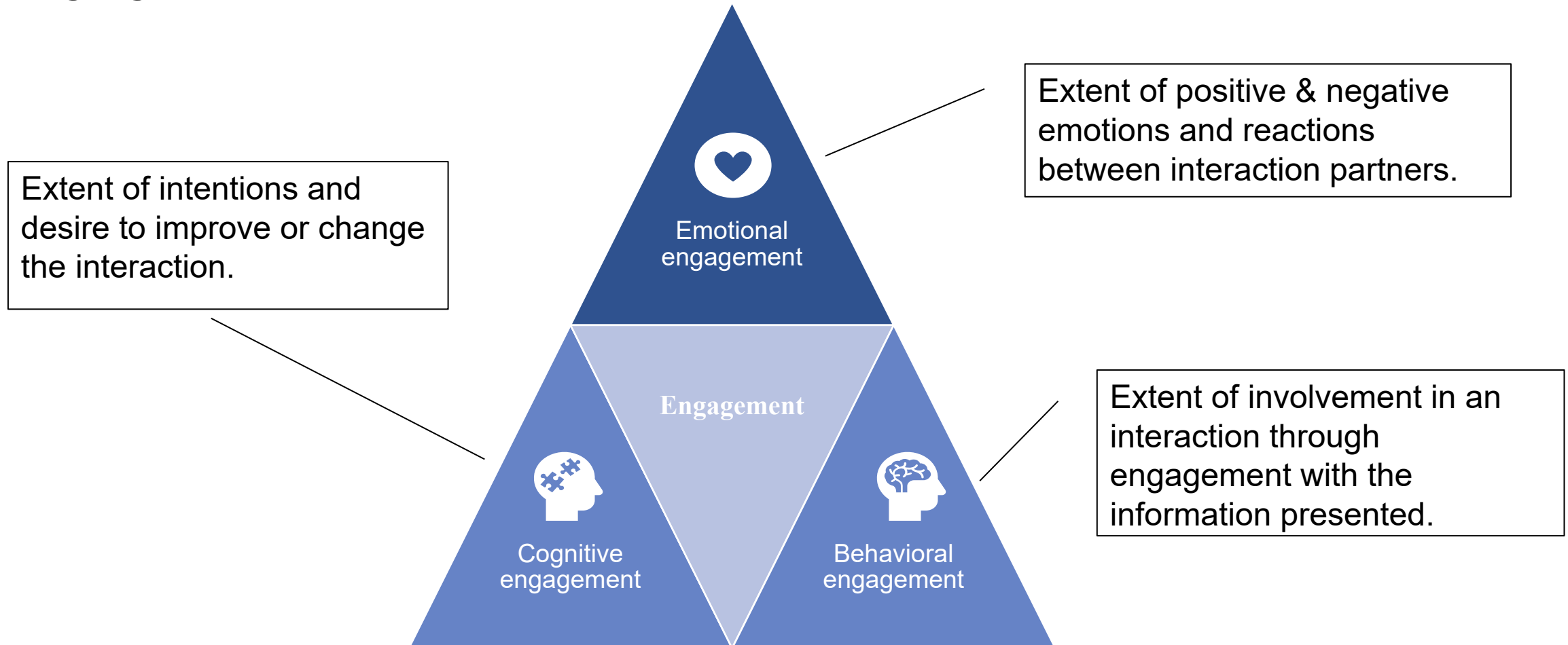
- Novelty effect decreases over time
- Therefore, a shift **from a short-term to a long-term understanding is necessary**  
(Leite, Martinho, and Paiva, 2013)

## Relevance



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

# Engagement dimensions



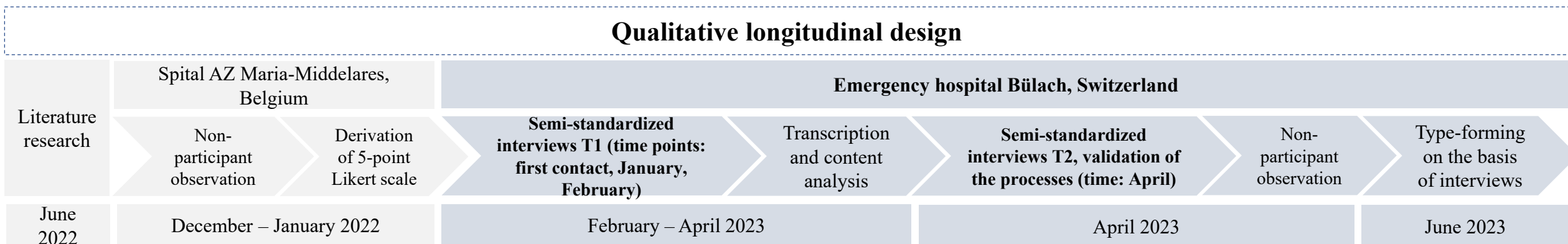
(Oertel, Castellano, Chetouani, Nasir, Obaid, Plechaud, et al., 2020)

# 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



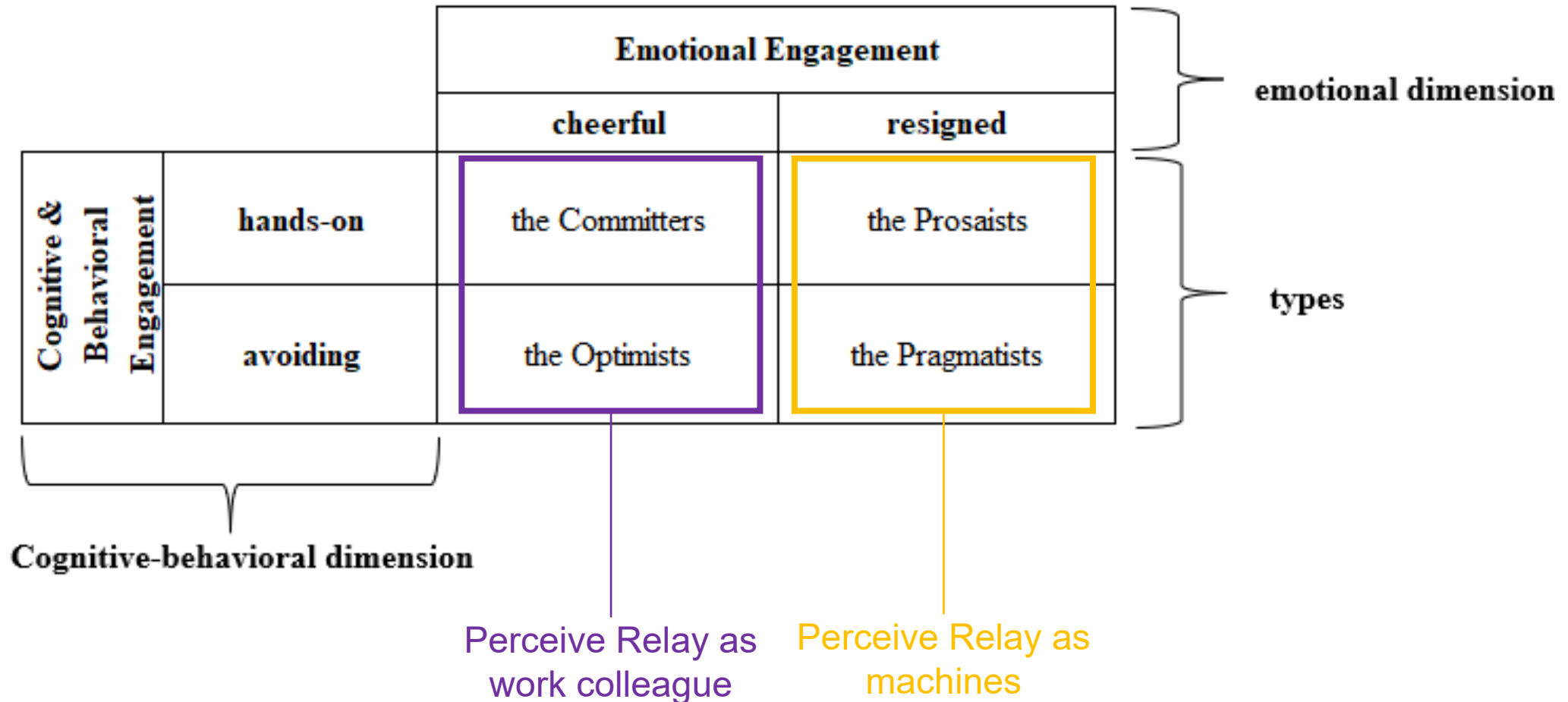
## Interview sampling hospital Bülach

N t1 = 8 (7 female, 1 male)

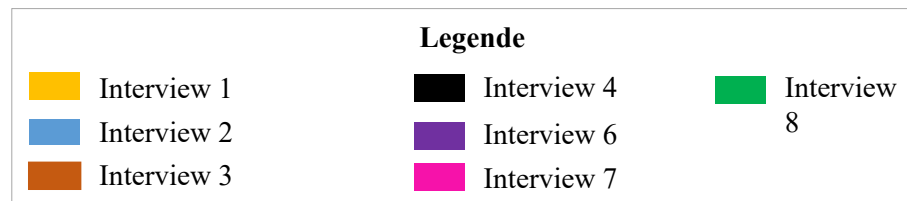
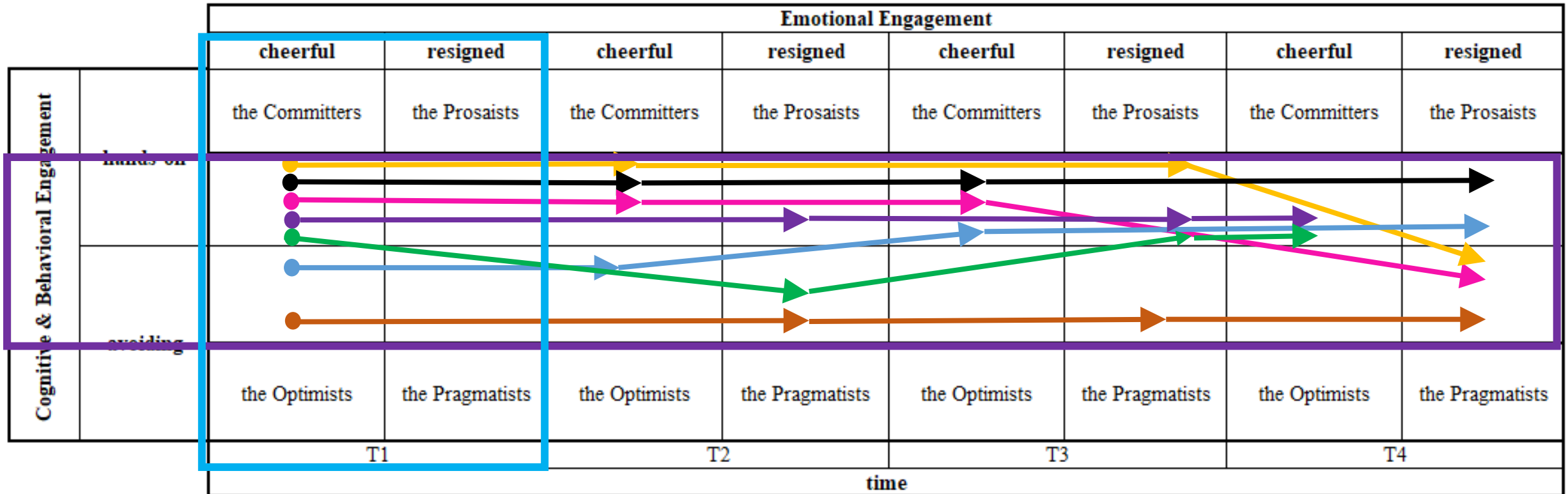
N t2 = 7 (6 female, 1 male)

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

# Results – Type Formation (RQ1)

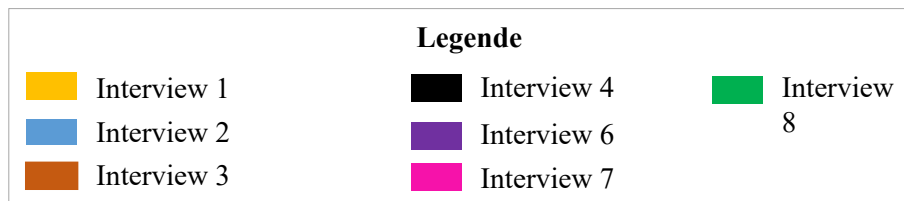
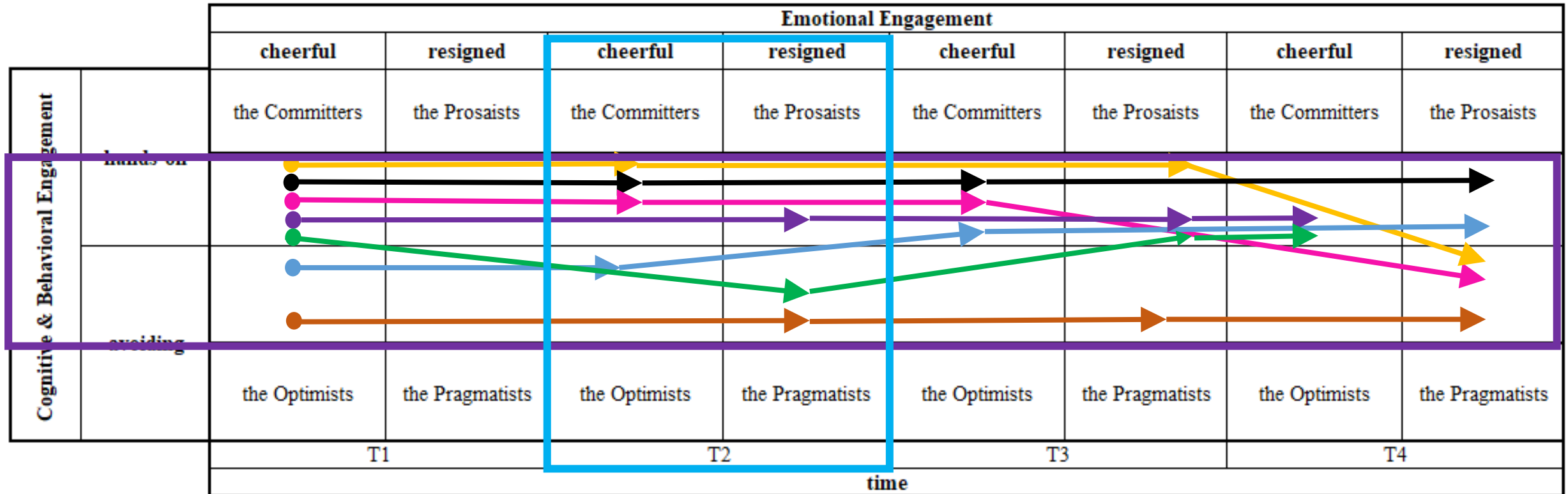


## Results – Changes in Engagement (RQ2)

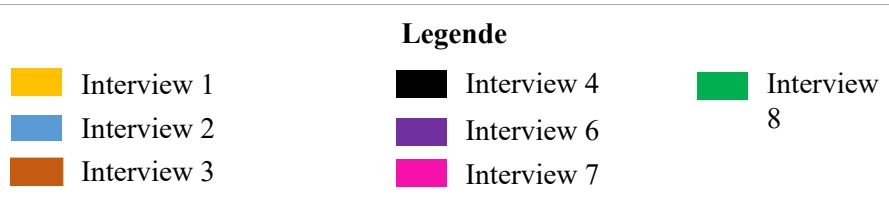
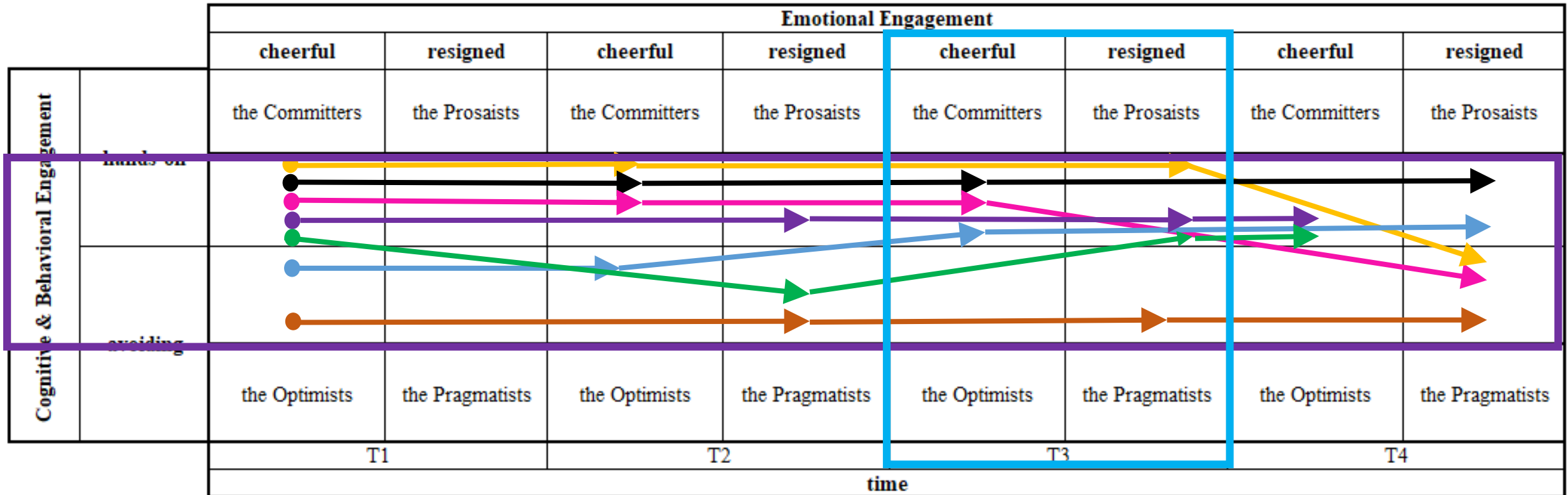




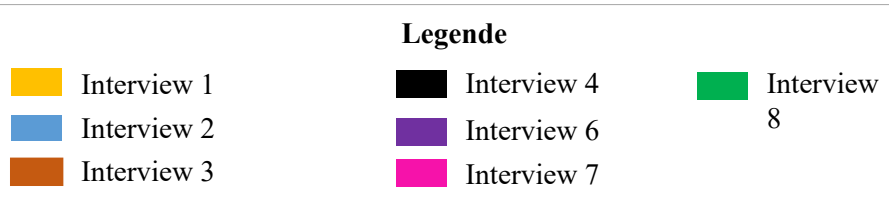
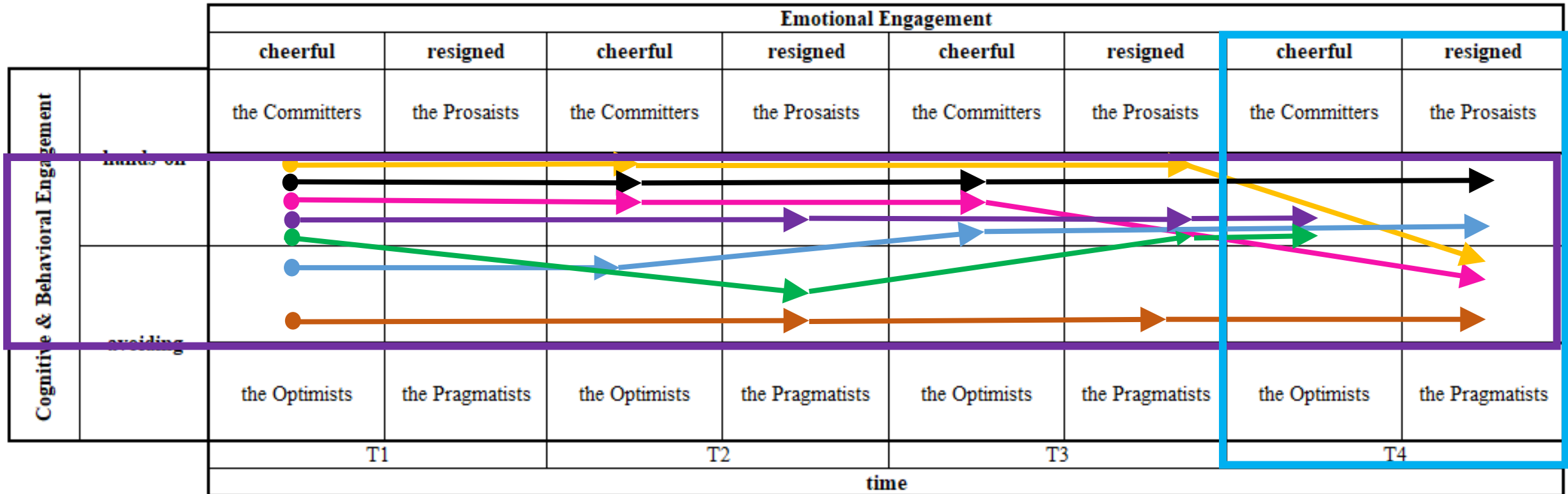
## Results – Changes in Engagement (RQ2)



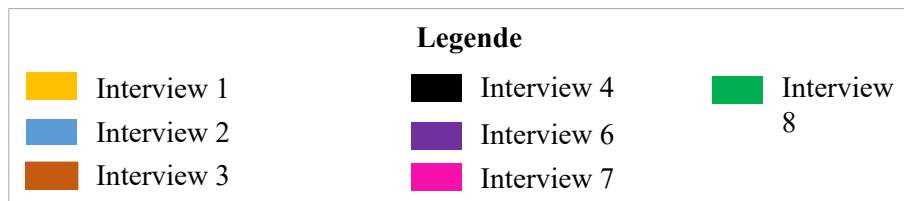
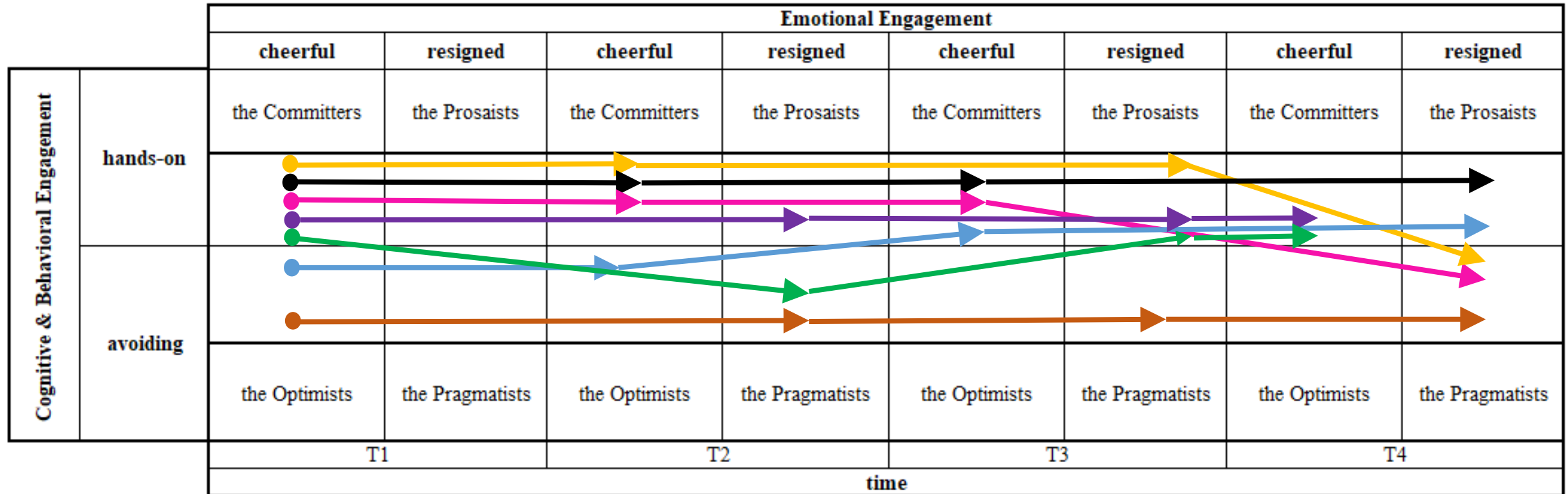
## Results – Changes in Engagement (RQ2)



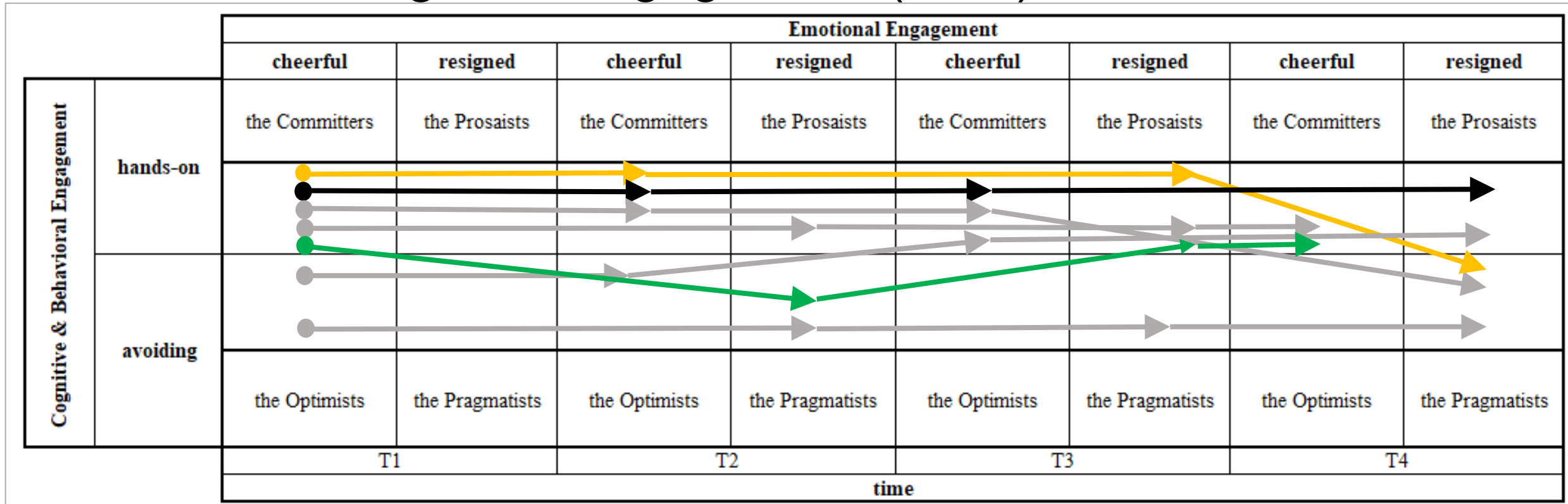
## Results – Changes in Engagement (RQ2)



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## Results – Changes in Engagement (RQ2)



Interview 1  
Interview 2  
Interview 3

### Legende

Interview 4  
Interview 6  
Interview 7

Interview 8

## Results – Influencing Factors (RQ3)

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### 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

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### Positive cognitive and behavioral engagement

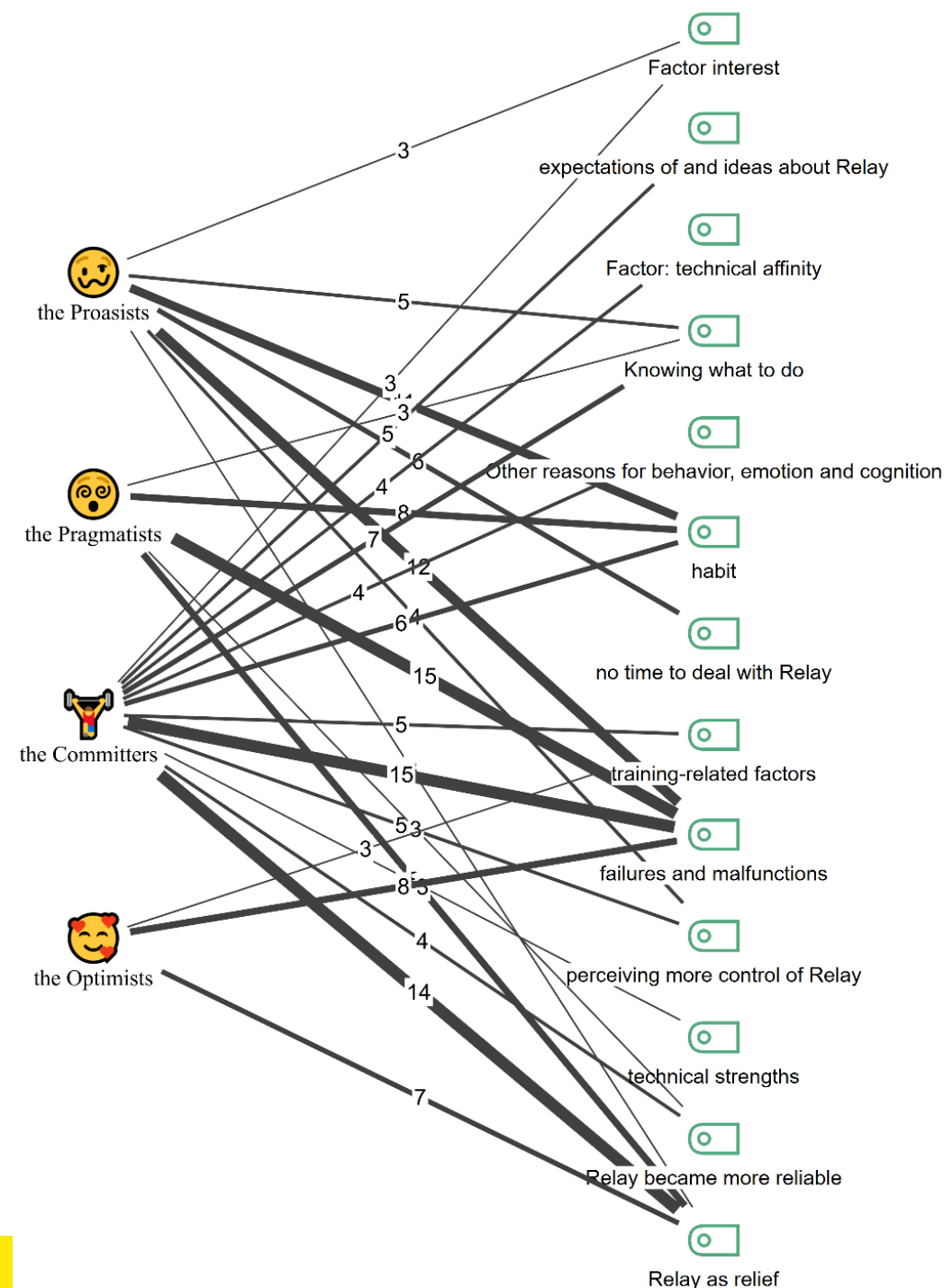
- Received training / instruction
- Habit
- Perception of increasing reliability of Relay

### Negative cognitive and behavioral engagement

- No time to engage with Relay
  - No training received
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## 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

