Assessing Person-Situation Dynamics: A Pilot Study of a Game-Based Approach Using Virtual Situations

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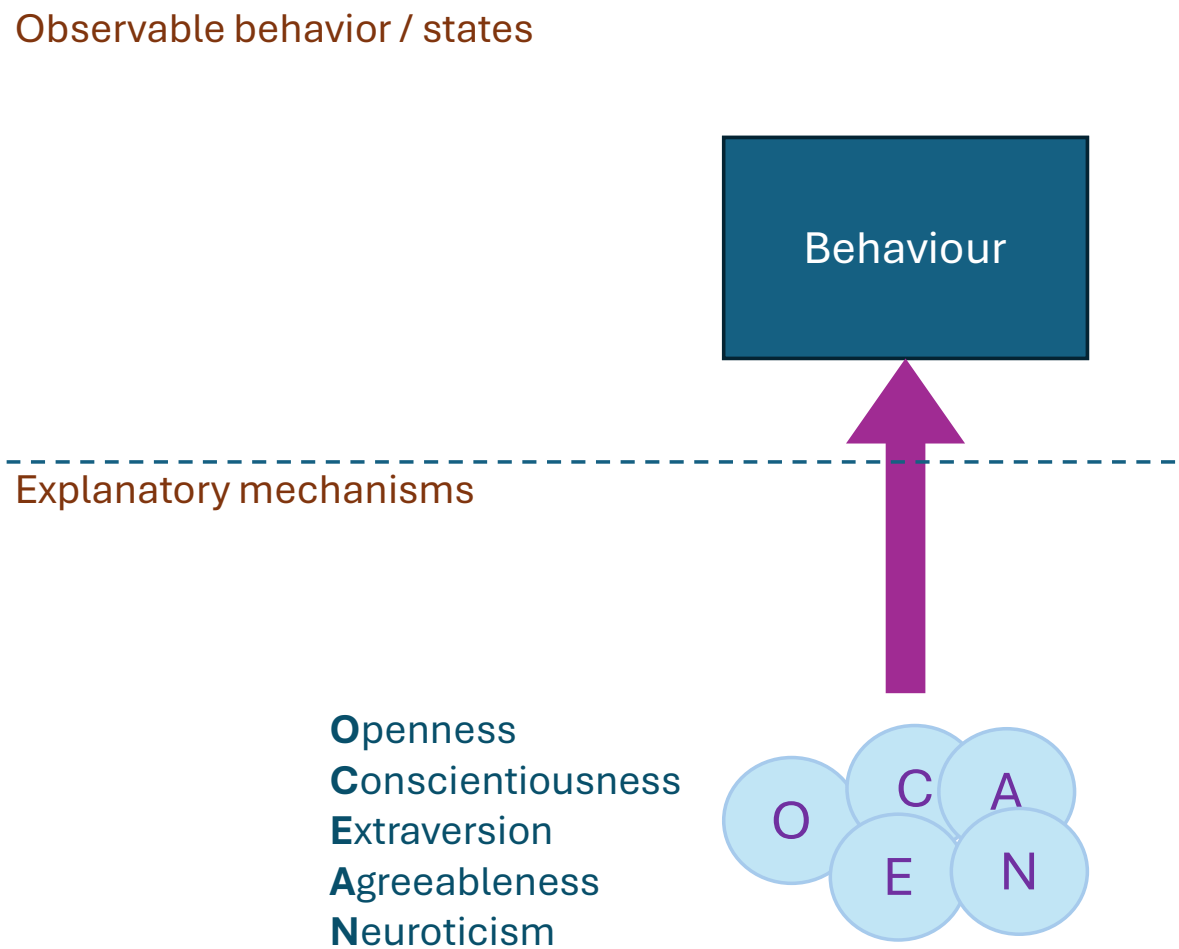
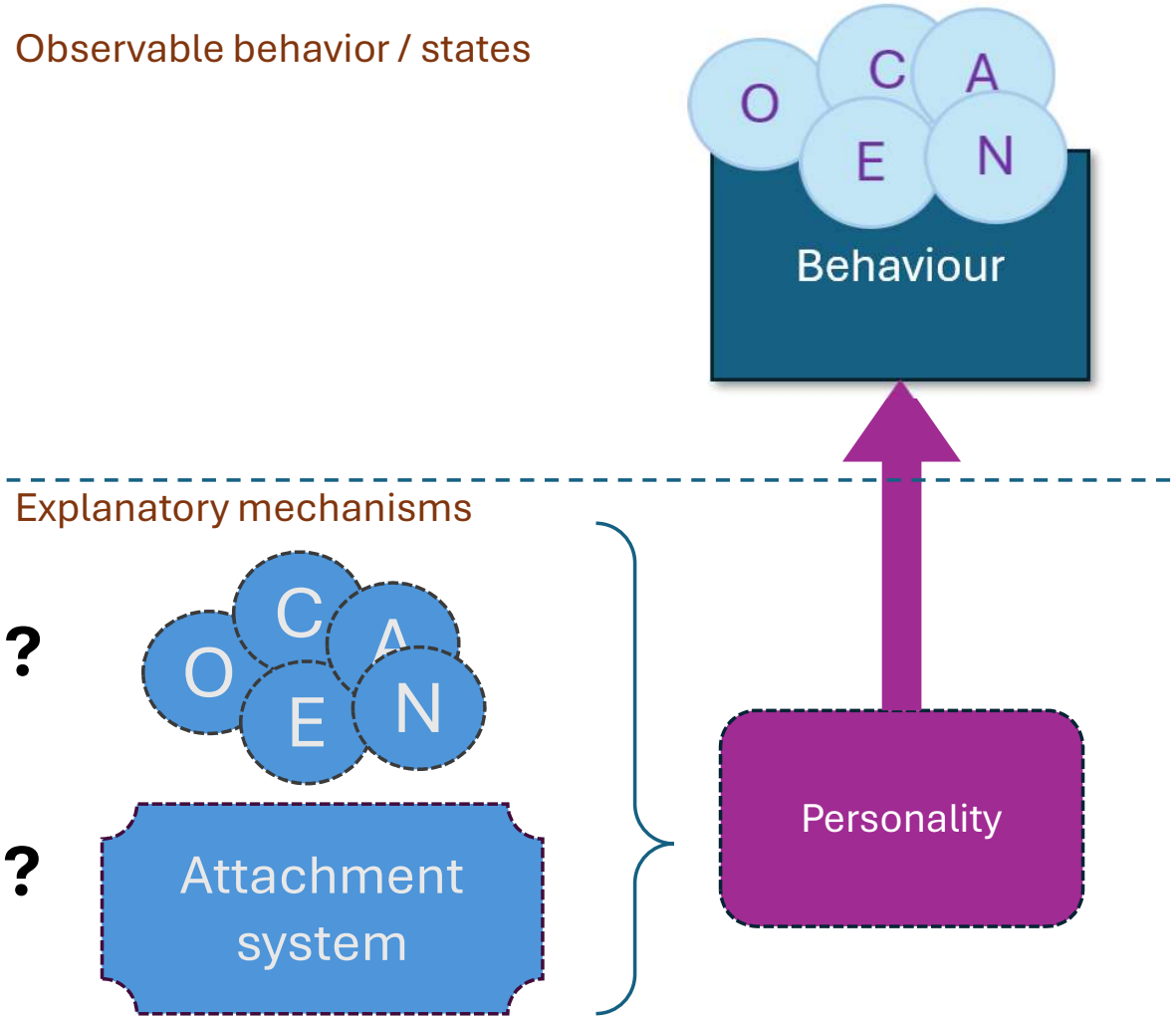


- Personality shapes behavior, right?
- Big Five (B5) = Most widely used model to describe individual differences
- Using the B5-traits to *explain* behavior can be high problematic! Risk of cirucar logic. (e.g., Quirin et al., 2020)
- But the B5-dimensions are likely excellent descriptions of observable behavior (e.g., as EMA-states; Wilson et al., 2017)

(e.g., Quirin et al., 2020; Wilson et al., 2017)

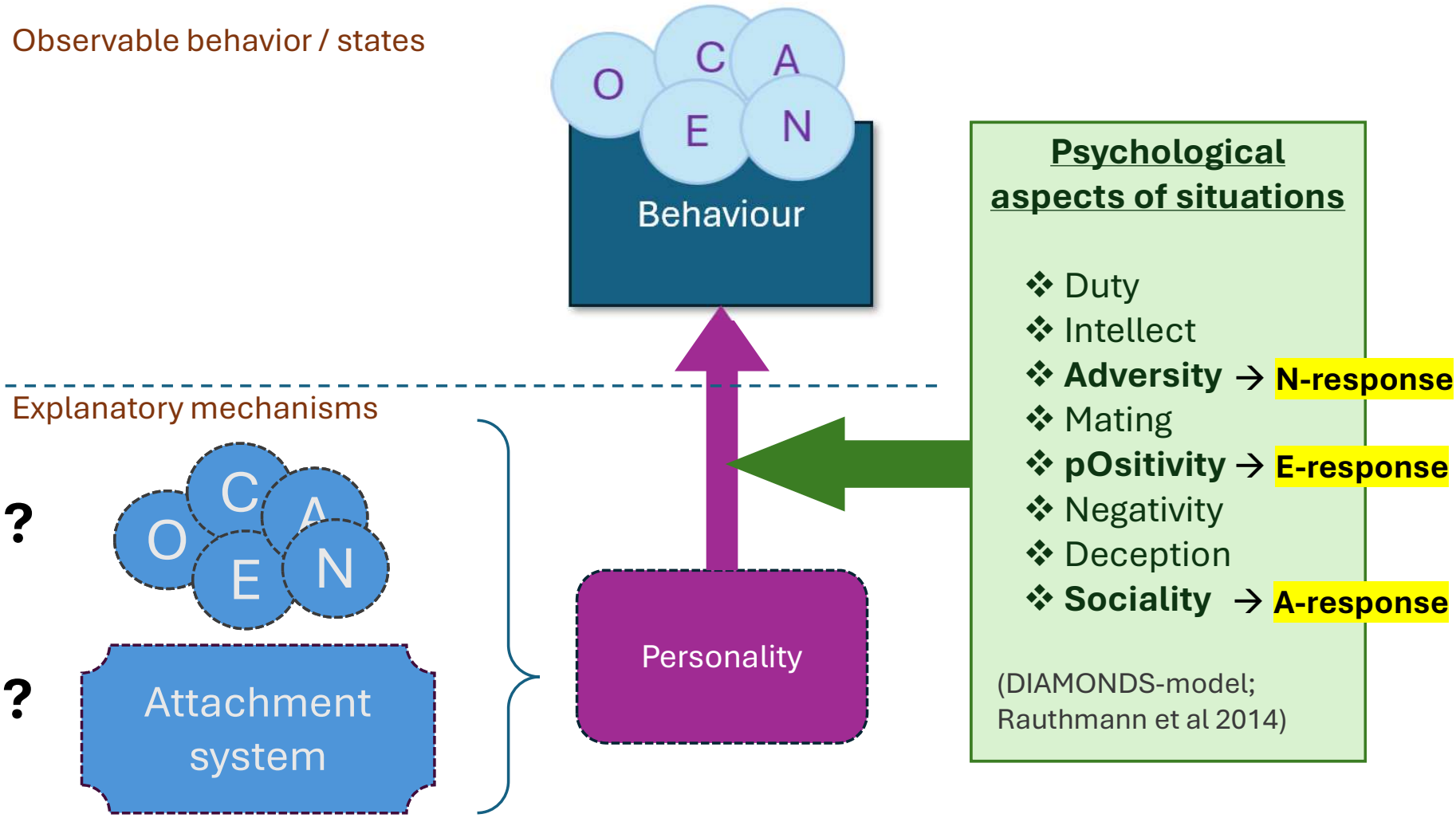


- We still need to identify the actual explanatory mechanism:

- Option 1: They are not anything like B5! One example is Attachment system: ▪**Monitors**: sense of safety. ▪**Actions**: trust and continue / seek help / avoidance. ▪**Goal**: restore sense of safety. (Tammilehto et al., 2024).

- Option 2: As suggested by DeYoung (2015) there may be evolutionary regulatory systems that correspond with the B5 dimensions (e.g., threat system and Neuroticism).

(Tammilehto et al., 2024; Mikulincer; DeYoung, 2015)

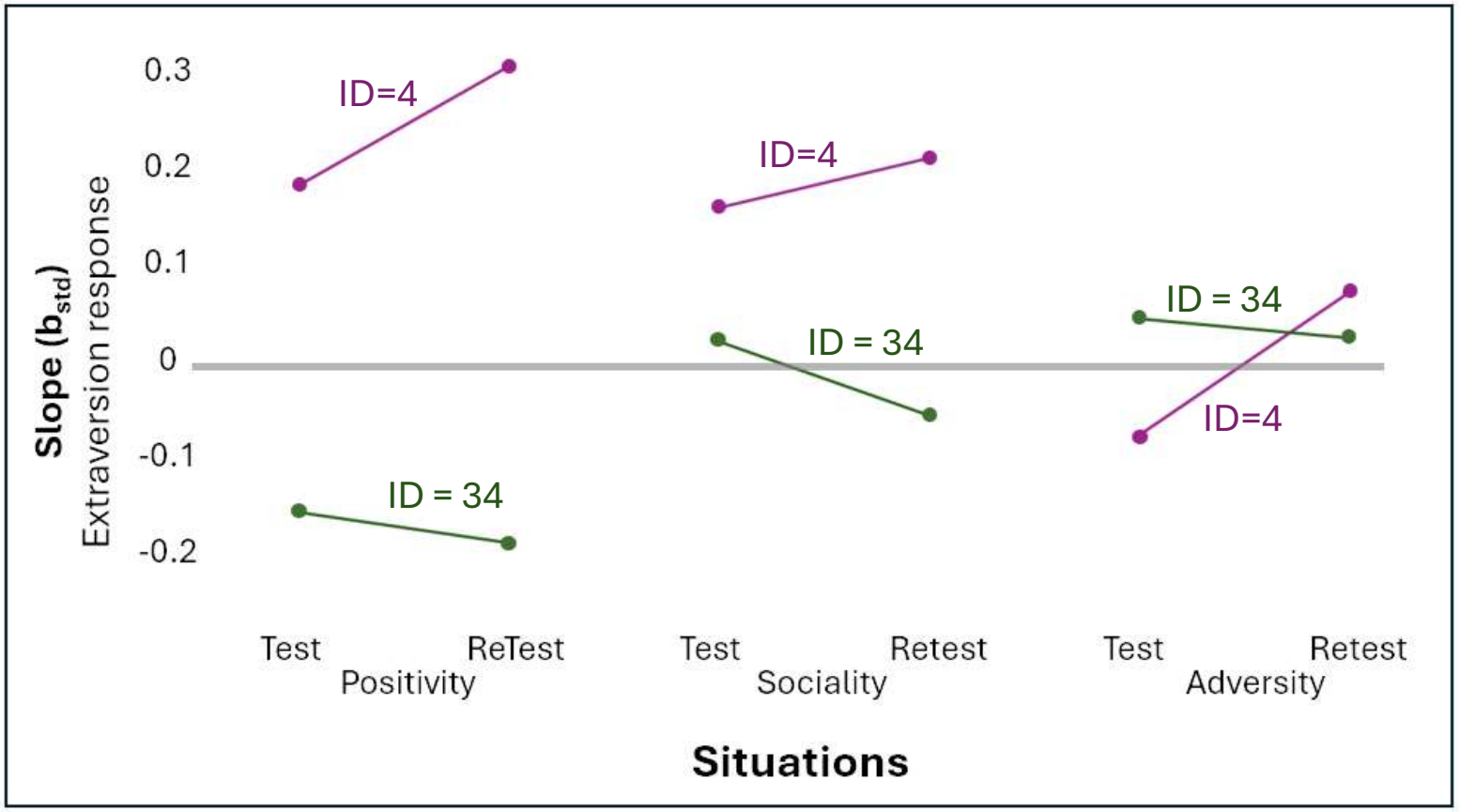

Observable behavior / states
O
C
A
E
N
Behaviour
Psychological aspects of situations
❖ Duty
❖ Intellect
❖ Adversity → N-response
❖ Mating
❖ pOsitivity → E-response
❖ Negativity
❖ Deception
❖ Sociality → A-response
(DIAMONDS-model; Rauthmann et al 2014)
Explanatory mechanisms
?
O
C
A
E
N
?
Attachment system
Personality

Core personality lies in *Situation Response Contingencies* (SRCs)?

Psychological aspects of situations

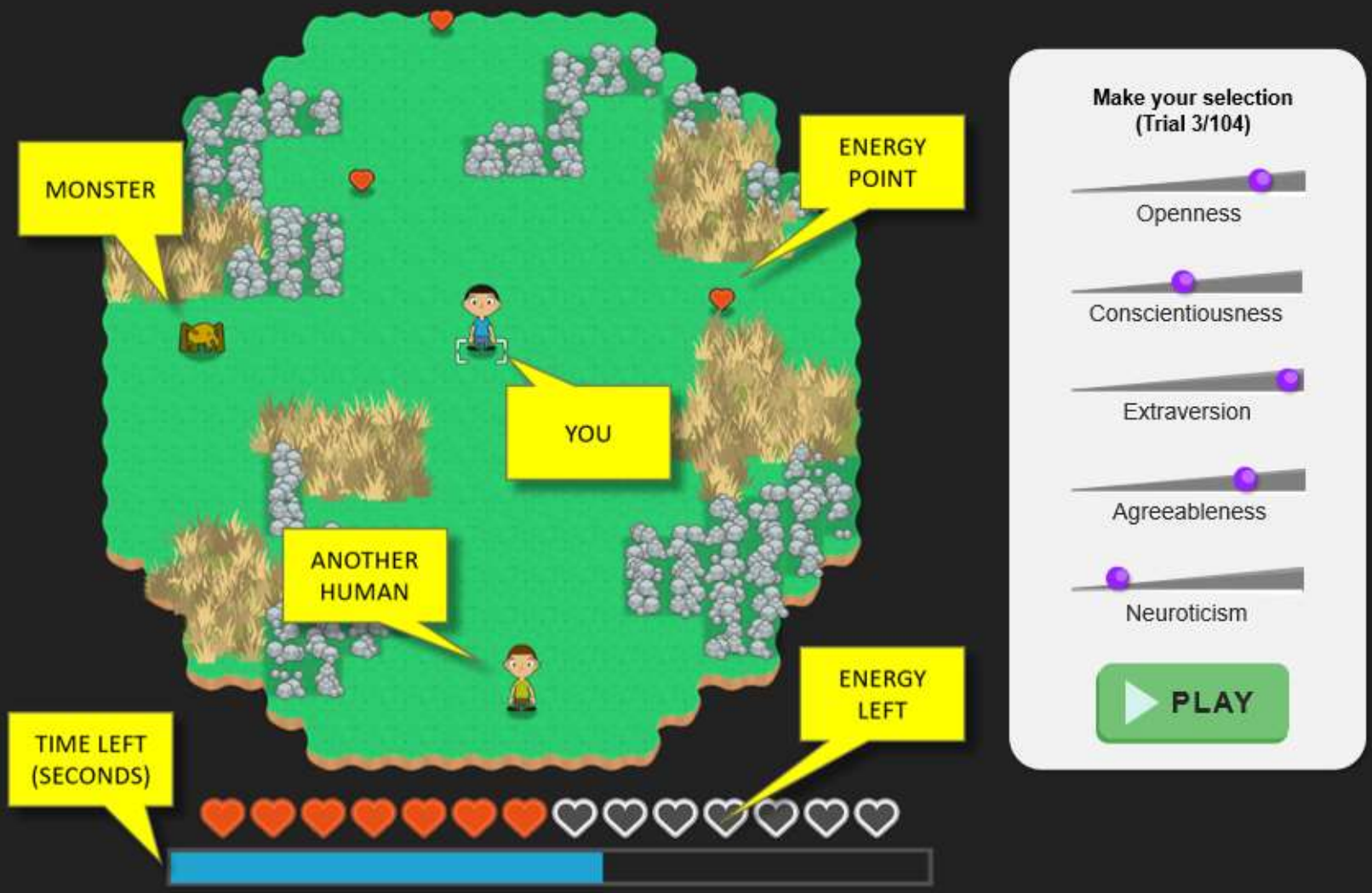
- ❖ **pOsitivity**
- ❖ **Sociality**
- ❖ **Adversity**

(DIAMONDS-model; Rauthmann et al 2014)



”Personality signature” (Mischel & Shoda, 1995): Demonstrating individual differences in responsiveness to three situations.

GAB5: Game-based Assessment of Big Five



Experimental design

SITUATIONS: Three experimental factors balance randomized

- **Threat:** Number of monsters/eggs (0-4)
- **Social:** Number of other humans (0-4)
- **Reward:** Number of energy (0-4)

High number of repetitions of varying trials: 104 situations

- Duration max 13-20 seconds
  (some played “blinded” to save time)

After instructions, the task can be completed in less than 0.5h (via web-browser).

Example trial A

- **Situation:** 2 humans (nice)
- **Response:** O:3 C:2 E:4 A:1 N:2
- **Result:** Death, no points (attacks nice humans)

Example trial B

- **Situation:** 2 rewards and 1 acute threat
- **Response:** O:4 C:4 E:4 A:1 N:3
- **Result:** Death, no points (too low defending)

Responses are given using B5-dimensions

Your character with …

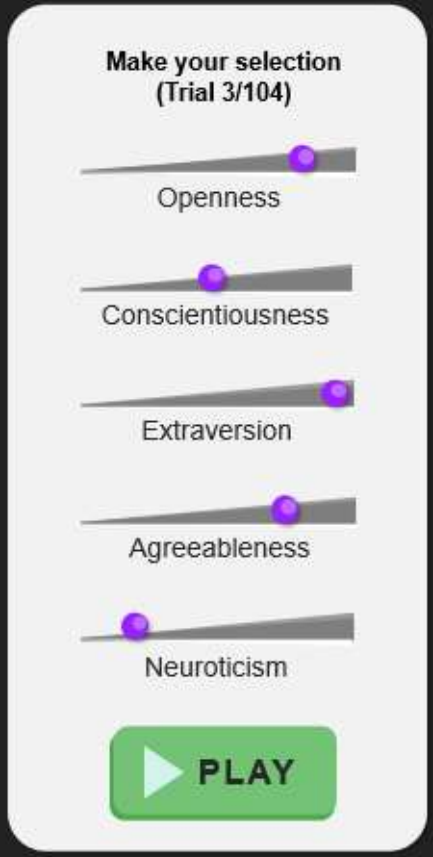
OPENNESS
- … high O reacts to and considers things that are far from themselves. They also actively explore their environment.
- … low O focuses only on their immediate surroundings.

CONSCIENTIOUSNESS
- … high C sticks to their decisions and goals.
- … low C can be absent-minded but responds quickly to changing situations.

EXTRAVERSION
- … high E approaches things that provide or can provide energy.
- … low E does not get excited about much and may prefer being alone.

AGREEABLENESS
- … high A willingly cooperates with others and acts kindly.
- … low A may attack others and act deceitfully in cooperative situations.

NEUROTICISM
- … high N is fearful, easily angered, and prone to fighting.
- … low N is calm, fearless, and unconcerned about dangers.



Definitions adapted/inspired:
DeYoung's Cybernetic Big Five Model

Pilot study: Validate and explore GAB5

GAB5 uses B5-dimensions as responses and includes situational cues of Threat (two subtypes), Reward and Sociality (three subtypes).

- ❑ **RQ1:** What is the multilevel reliability of the situation-response contingencies (SRCs)?
- ❑ **RQ2:** Do the SRCs correlate with self-reported B5 personality traits?
- ❑ **RQ3:** Can the SRCs be experimentally influenced using Attachment priming approach?
  - Secure attachment → Secure oriented responses (e.g., heightened collaboration)
  - Insecure attachment → Defensive responses (e.g., heightened threat responses)

Data & Methods

Participants

Collected from Prolific-platform (on-line)

- English native
  → International sample
- N = 170
- Age m=28, sd=5.7 (18-40 years)
- Male 48%
- Education: Mostly bachelor level or high school
- Received monetary compensation and a bonus for good performance in GAB5!

Questionnaires

Big Five Aspects Scale (BFAS-40; DeYoung et al., 2007)

- 40-item shortened version (Gallagher et al., 2022)
- Principal Component Analysis: Five trait factors (Equamax rotation)

N: Neuroticism

A: Agreeableness
(mostly compassion)

C: Conscientiousness

E: Extraversion
(mostly assertiveness)

O: Openness
(mostly intelligence)

Game-Based Assessment of Big Five (GAB5, v3.0)

- 104 situations (52 pre-priming and 52 post-priming)
- Half (50%) of the situations ”blinded” without animations
- Elements (0-4): Threat, Rewards, Sociality
  - Subtypes of Threat: Latent (egg) and Acute (monster)
  - Subtypes of Sociality: Nice (high A-trait), Normal (moderate and variable A-trait), Mean (low A-trait)

Attachment priming procedure (Gillath et al., 2022)

Write for 5 minutes of a personal memory about:

(A) Going shopping (describe in detail the route) → **Control**

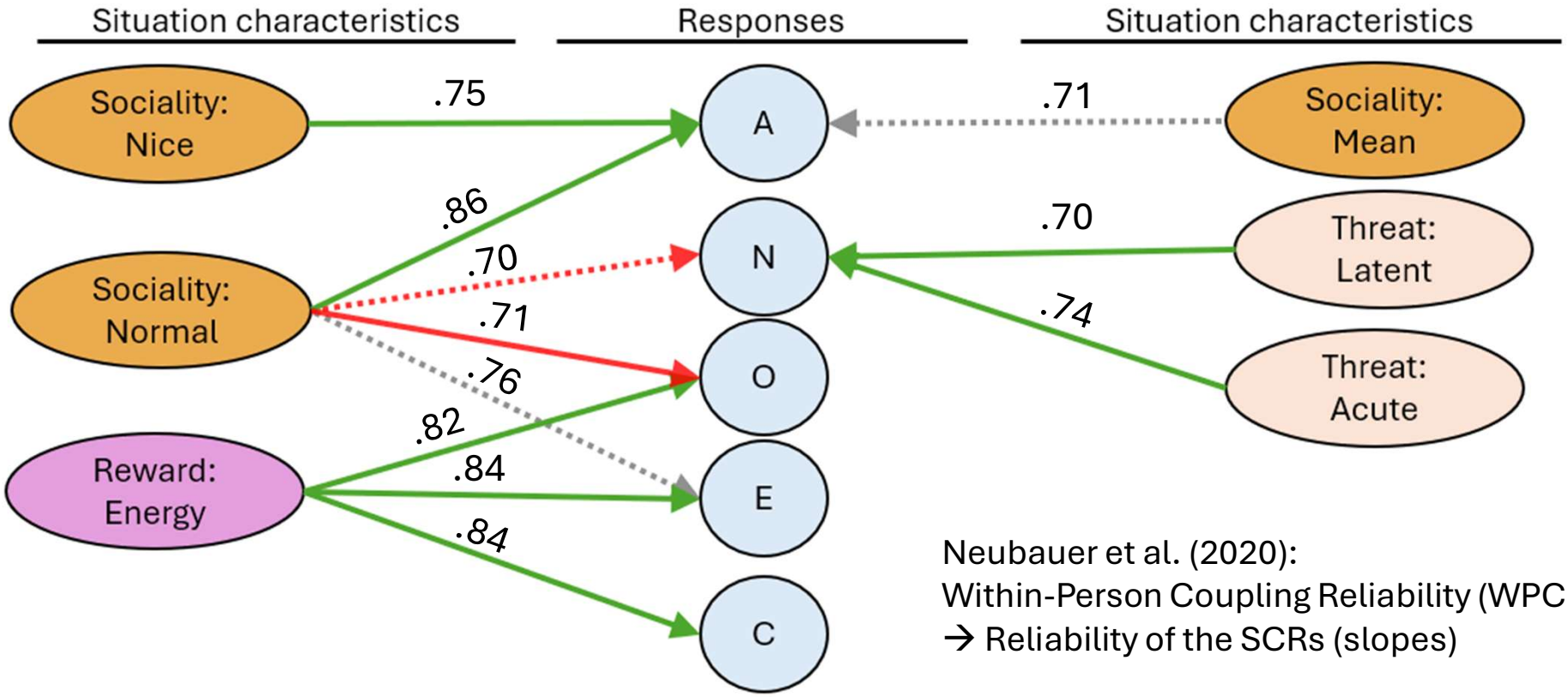
(B) When you felt not loved or respected → **Insecure**

(C) When you felt loved and cared for → **Secure**

Statistical analyses: Linear Mixed Model (LMM)

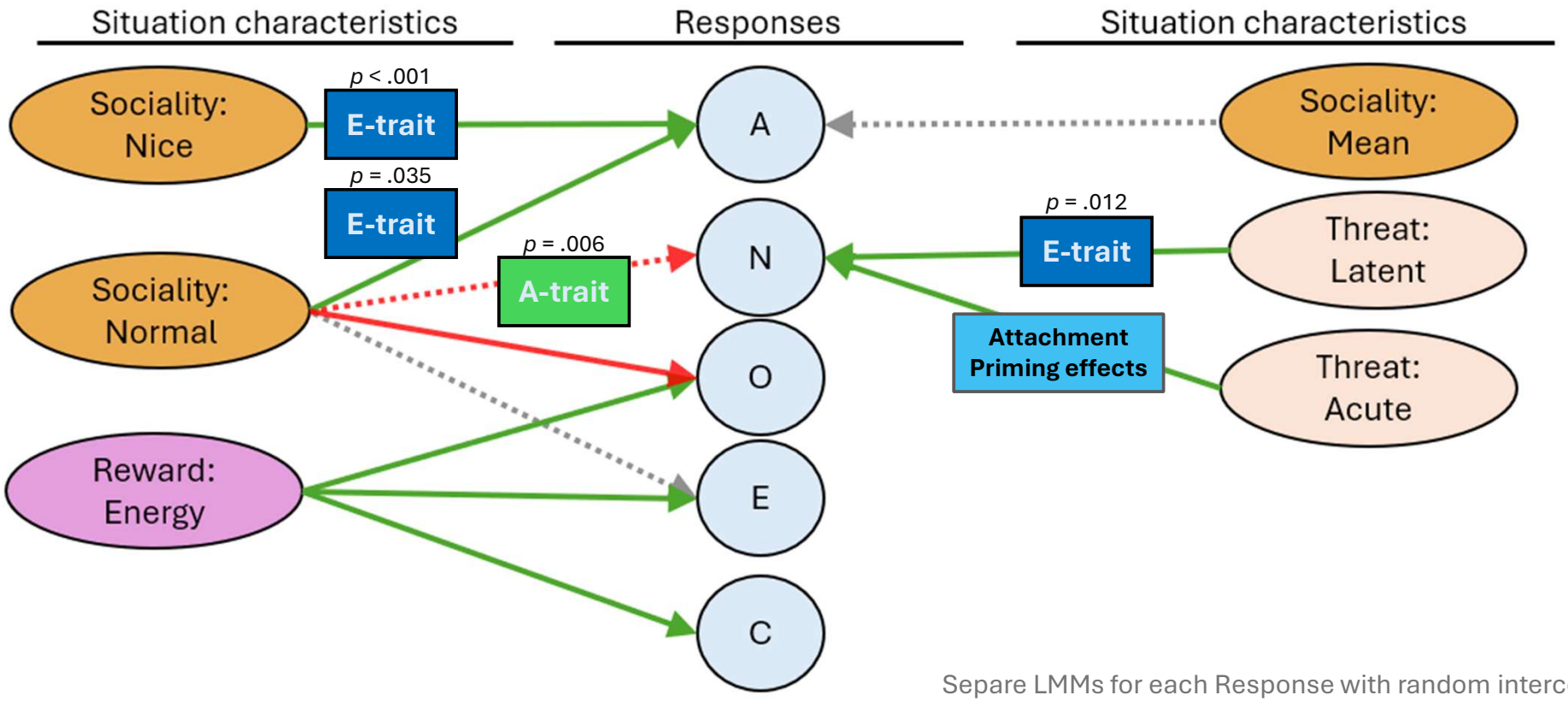
- Effects of situations modeled as linear (covariates)
- Controlled for repeated measurements (AR1)
- Random factors: Intercepts and situations
- All analyses control for (including interactions): Sex, Gaming as Hobby, and Age

RQ1: Are the assessed situation-response contingencies (SRCs) reliable? **WPCRs >.70 shown:**



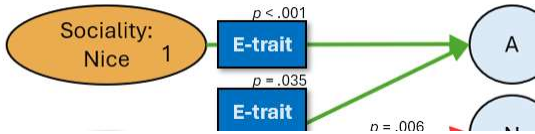
Neubauer et al. (2020):
Within-Person Coupling Reliability (WPCR)
→ Reliability of the SCRs (slopes)

Do the SRCs correlate with self-reported B5 personality traits (**RQ2**) or experimentally primed attachment (**RQ3**)?

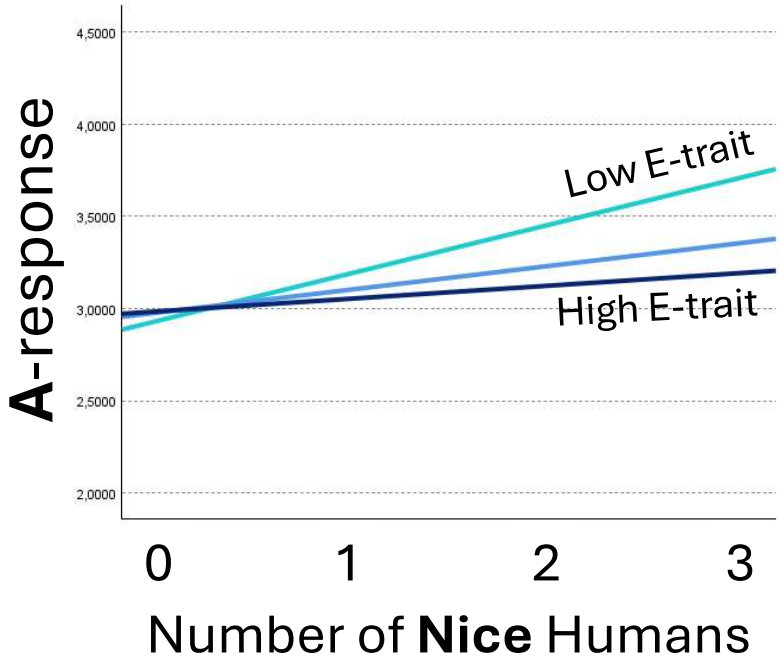


O-trait N-trait C-trait

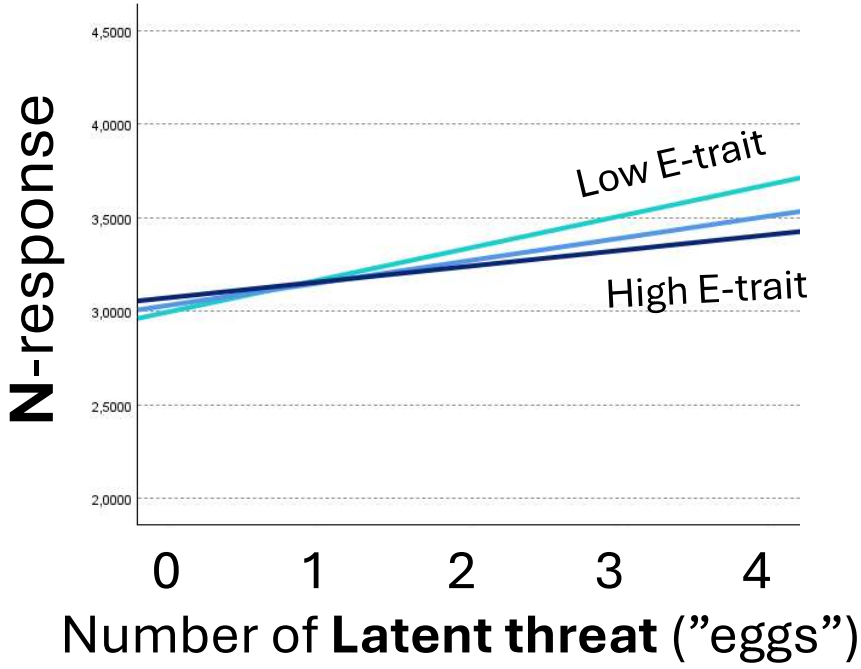
Separe LMMs for each Response with random intercepts and slopes. Controlling for Age, Sex and Gamehobby (including interactions). Trait analyses focus only on pre-priming trials (52). Analysis of attachment priming effects: Pre/Post * Condition(3).



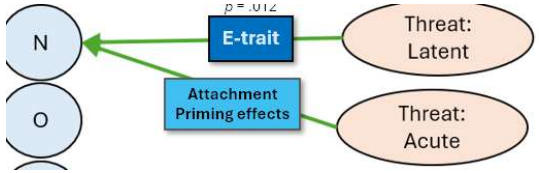
Effects of E-trait (mostly assertiveness)

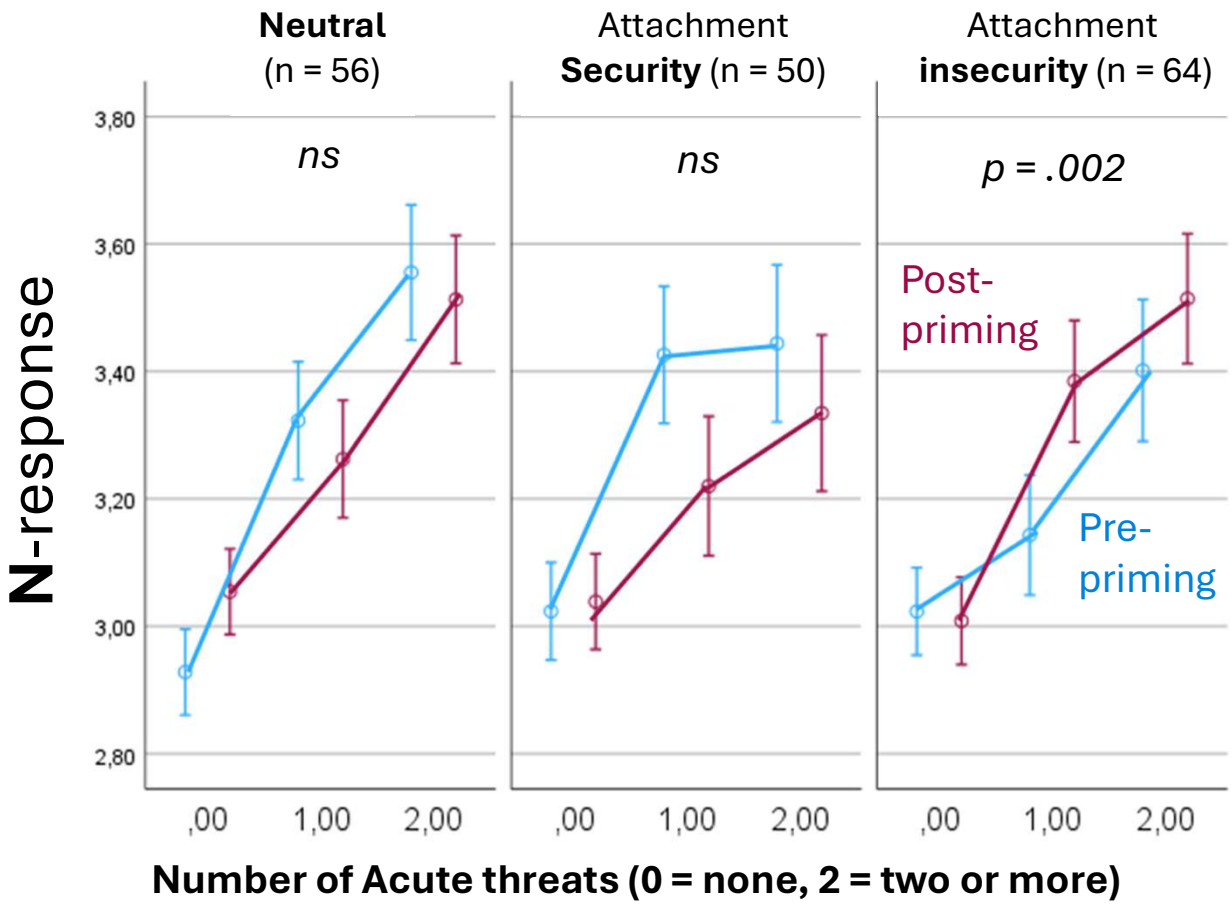


(effect was highly similar for **Normal** Humans)



RQ3: Experimental priming effects of attachment *security and insecurity*





Priming-condition * Pre/Post * Acute-Threat → N-response
$F(2, 168.65) = 3.99$, $p = .020$

Does it work?

Optimistic

- 11 SRCs could be reliably captured (with expected average direction)
- Some trait associations. ”Strong” personality inhibits effects of situation (Schmitt et al., 2013). ”Low” personalities prioritize and perceive situational cues for their purposes / goals.
- Experimental attachment priming altered threat processing & responding. This suggests state-to-state causal effects!

Pessimistic (or realistic)

- Only 5 of 55 tests emerged as significant → Random findings?

  ALSO Kuper et al. (2022) found **no associations** between B5 and SRCs assessed in EMA (k = 5, n = 950).
- Against expectations, attachment priming did not influence social responding?
- It is not yet clear what we are assessing: Individual differences on gaming attitudes, or more core aspects of personality?

Next steps

- This was a pilot study and GAB5 is under further development.
- Traditional **trait-approach may too flat** to expand to the realm of SRCs: Need to validate GAB5 against **SRCs in EMA!**
- More advanced statistical approaches to consider the **multidimensional** (and strategic?) nature of the response.

- *The **principle is more important** than the single implementation!*

  What psychological constructs could be studied using virtual situations (involving the whole cybernetic loop from perception to response to feedback and forming/updating new SRCs)?

Thank you for your attention!

Feel free to contact:
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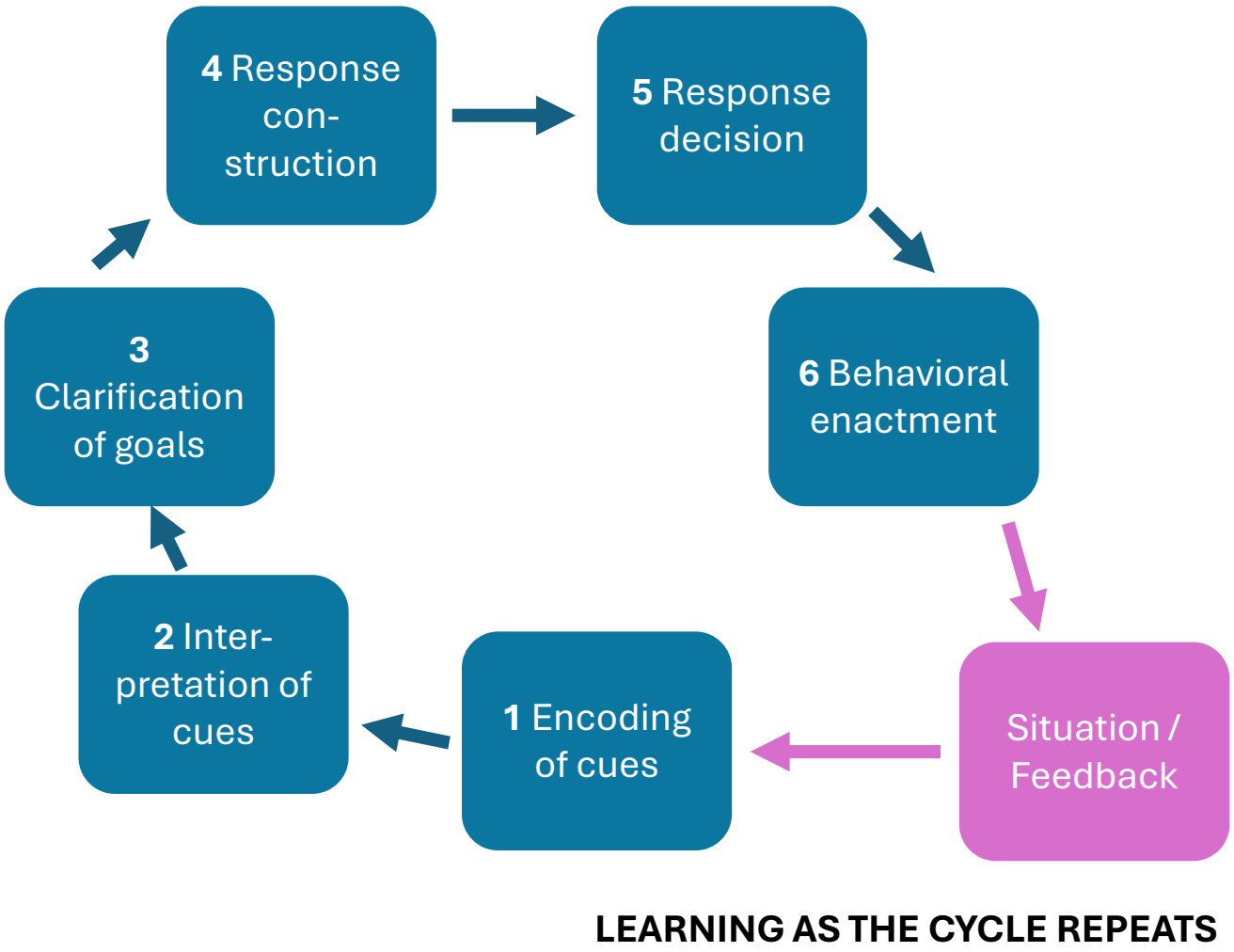
Send funding!

GAB5-project

https://projects.tuni.fi/game-based-assessment/

Including playable online demo!

Kudos to the team:
Guy Bosmans (KUL), Juho Hamari (TUNI), Aleksandra Kaurin (Wuppertal), Kristian Kiili (TUNI), Niclas Kuper (Münster), Peter Kuppens (KUL), Kaija Puura (TUNI), John Rauthmann (LMU), Jaakko Tammilehto (TUNI)



Adapted from Crick and Dodge (1994): Social information processing model