

# Pressure at Play: Measuring Player Approach and Avoidance through the Keyboard

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# DYNAMIC PLAYER EXPERIENCE

- The player experience is the result of the combination of *physical activities*, *cognitions* and *emotions* a player has during or shortly after play.
- It emerges from play, and changes during and after play.
- This temporal character makes it a complex construct to analyse and characterise.
- One approach is to adopt phasic analysis (event-based), relating in-game events to player experience measurements.

# MEASURING PLAYER EXPERIENCE

- Players' verbal accounts during play (e.g. think-aloud protocols) or after the fact (e.g. interviews, questionnaires).
- Psychophysiological measurements (e.g. EMG, skin conductance).
- Behavioural responses (e.g. movement synchrony, gamepad pressure).

# BEHAVIOURAL INDICATORS

- Behavioural indicators may include:
  - postural responses (static and dynamic)
  - exerted pressure (on controls and environment)
  - intensity of movement
  - synchronicity of movement
- Benefits of using behavioural indicators may be:
  - using naturally occurring responses
  - non-disruptive, continuous real-time during gameplay
  - increasing integration in game peripherals
  - possible future use as qualified game input

# FUNCTIONAL AND BEHAVIOURAL

- Player behaviour related to game input can be interpreted as *functional*:

The player intentionally presses a button to trigger one of the in-game actions.

- Using additional behavioural measures, such actions may be experientially *qualified*:

The button force or speed of depressing may be indicative of the player's determination.

# FUNCTIONAL AND BEHAVIOURAL



# KEYBOARD PRESSURE

- Keyboard pressure has been related to the experienced level of difficulty in a game: pressure increases.

*(Sykes and Brown, 2003; Tijs, Brokken, & IJsselsteijn, 2008)*

- Keyboard pressure has been related to experiences of frustration and boredom, and correlated with subjective arousal.

*(Van den Hoogen, IJsselsteijn, & De Kort, 2008)*

- Behavioural cues from touchpad pressure can be used as indicators of negative affect in relation to phasic critical incidents.

*(Mentis & Gay, 2002, Park, Zhu, Jung, McLaughlin, & Jin, 2005)*

# APPROACH/AVOIDANCE BEHAVIOUR

- In general, negative events and actions are experienced and expressed stronger than the positive ones.

(Baumeister et al., 2001)

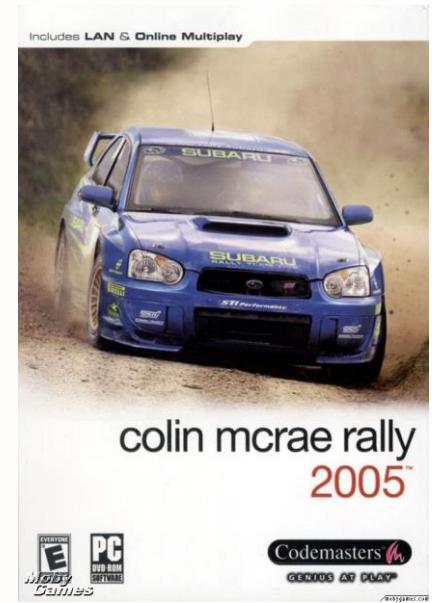
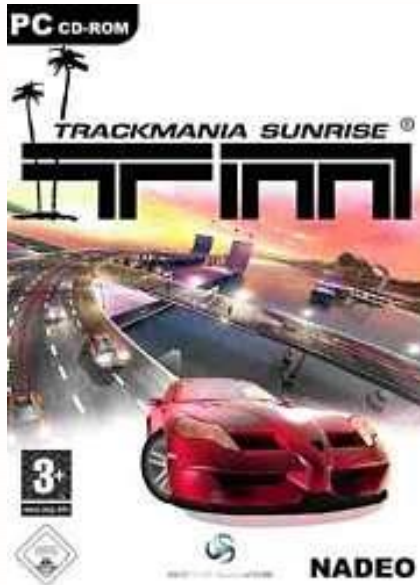
- Avoidance (of undesirable goals) is expressed stronger than approach (of desirable goals).
- Following psychology, we differentiate between:
  - in-control approach behaviour, pursuing desirable goals
  - out-of-control avoidance behaviour, avoiding undesirable goals



# HYPOTHESIS AND METHOD

- *Hypothesis*: For fast-paced action games, such as first-person shooters and racing games, we predict that a player's avoidance behaviour is expressed with higher keyboard pressure than approach behaviour.
- Tested with 19 participants (M=12, F=7; aged 18-42).
- Test with 4 different games.
- Measurements through:
  - retrospective self-report (SAM 9-point scales)
  - realtime keyboard pressure

- Four games: 2 first-person shooters and 2 racing games, played for 10 minutes each.



# KEYBOARD PRESSURE MEASURE

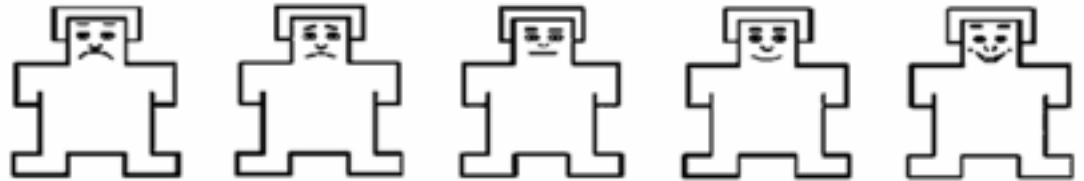
- Keyboard-based input (WSAD or arrows) using pressure sensors at the four corners.
- Mean pressure for each event type was calculated:
  - average pressure of the four corners
  - range correction (pressure w.r.t. max pressure per participant)
  - mean value of range-corrected pressure for approach and avoidance



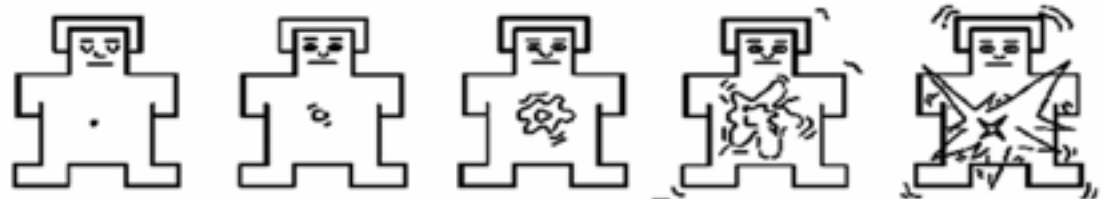
# SELF-REPORT SAM MEASURE

- Retrospective visual self-report:

***Pleasure***



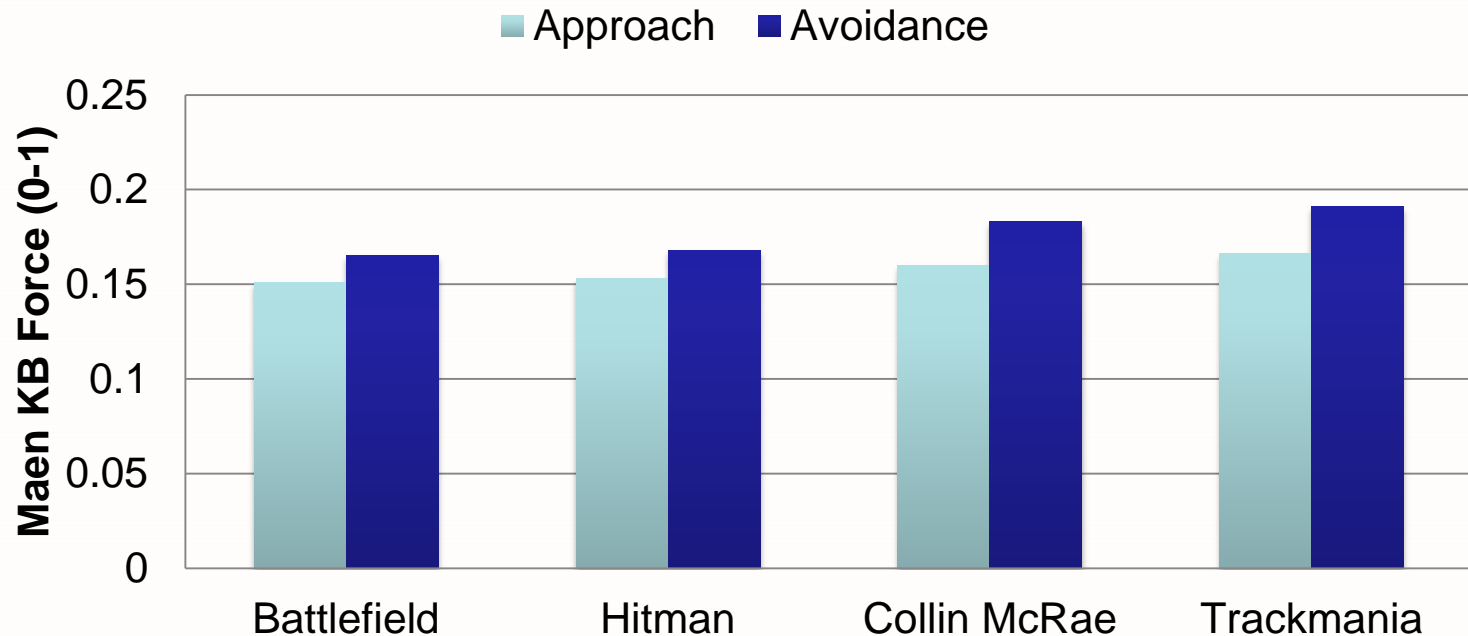
***Arousal***



***Dominance***



# RESULTS KEYBOARD PRESSURE



- Re-MANOVA: Game (one of the four games), and Direction (forward vs. backward movement) as within subject factors with interface force as dependent variable.
- Higher average force for the backward movement ( $M=.17$ ,  $SE=.04$ ) than forward movement ( $M=.15$ ,  $SE=.04$ ), ( $F(1,16)=14.06$ ,  $p=.002$ )

# RESULTS SAM SCALES

- LMM analyses:
  - SAM arousal (fixed factor)
  - Difference score between approach and avoidance pressure (dependent variable).
  - Participants number (random factor)
- A significant main effect of SAM Arousal on the difference score of keyboard pressure ( $F(1,66.18)=5.73, p=.02$ )
- Increased levels of arousal related with greater difference between forward and backward oriented keyboard pressure.

# CONCLUSIONS & DISCUSSION

- Approach actions expressed with more force than avoidance actions.
- Corresponds with self-reported arousal throughout the games.
- Combination of behavioural and functional measurements: qualitative indicator of player experience.

# FUTURE RESEARCH

- Currently focused on mean force per input type; additional research could add more detailed analysis. (e.g. dynamics, range, trends or onset & offset dynamics)
- Expert players may use such behaviours in different, perhaps more advanced ways:
  - As found by (Elliot 2006), behaviours may be adopted in the context of goal-orientation in an anticipating way.
  - Not all players smile after dying virtually, indicating player dependent behavioural patterns (v.d. Hoogen et al., 2012)



# THANK YOU // Q&A



**Eelco Braad**

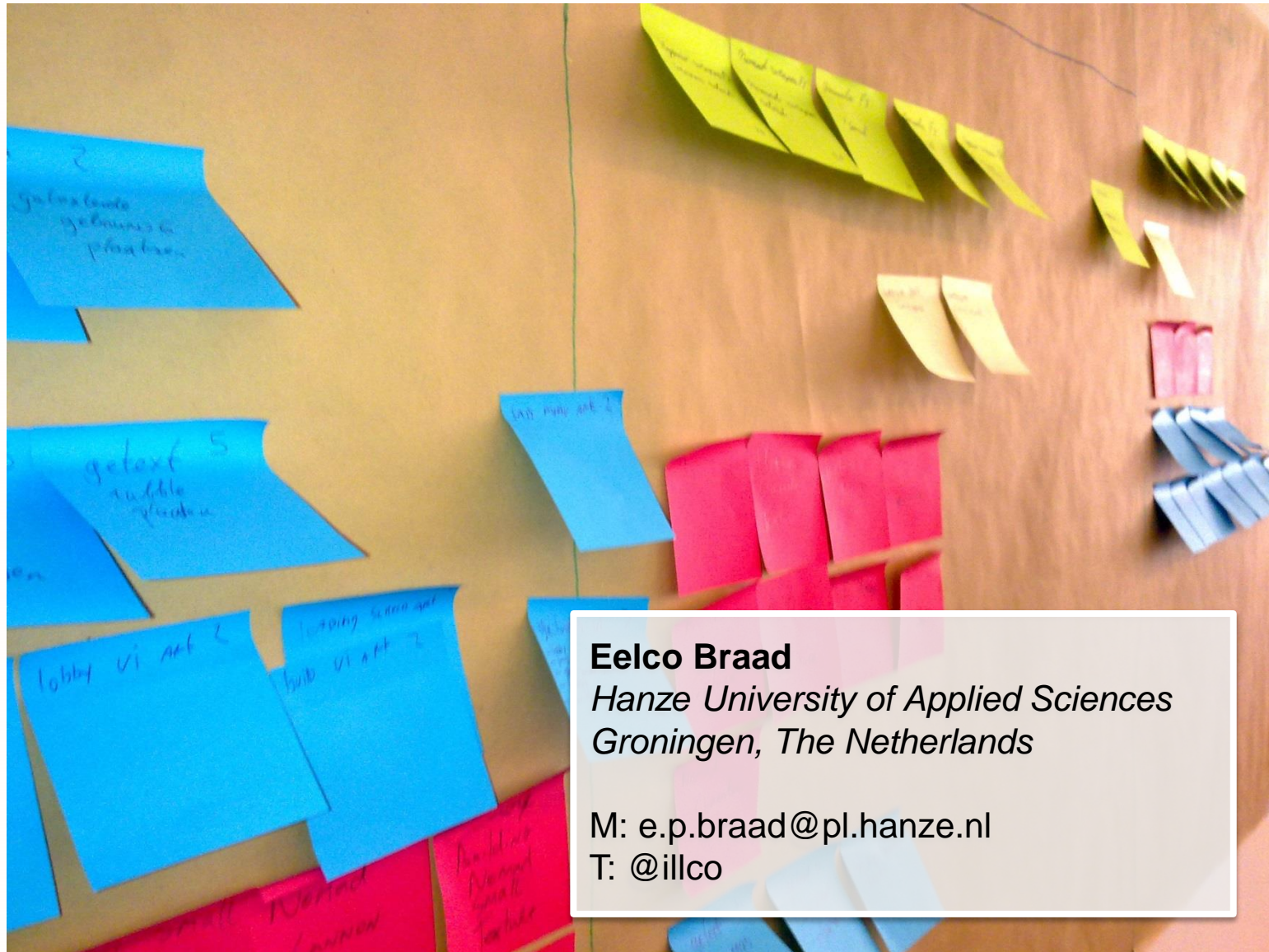
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# THANK YOU // Q&A



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