Lecture 12

Intelligent User Experience Engineering
IN4179

Emotion and Avatars

Willem-Paul Brinkman

TU Delft

Today in first hour

- General Introduction to Emotion
- Avatars
  - facial expression
  - Non-verbal communication
  - Verbal communication in VRET

Terminology

- **Emotional** and **affective**: either the physical or cognitive component of emotion
- **Emotional state**: internal dynamics when you have an emotion
- **Emotional experience** or **Feeling**: consciously perceive of your own emotional state.
- **Emotional expression**: emotion that is revealed to others (voluntarily, or involuntarily)
- **Mood**: a longer-term affective state, Moods operate on longer time scale compared to emotion. Moods are always there, emotions come and go

(Picard, 1997)

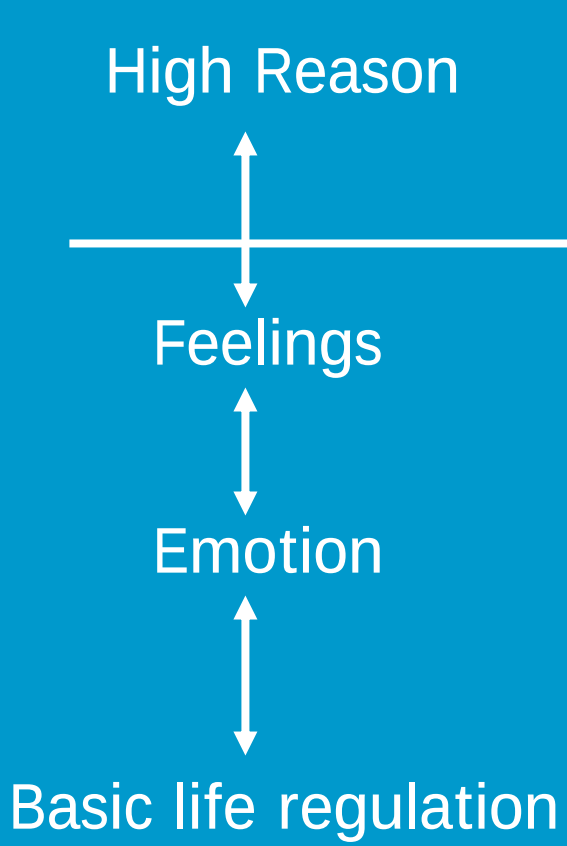
Emotion, Feelings, moods

- **Emotion**: "...actions or movements, many of them public, visible to others as they occur in the face, in the voice, in specific behaviour" (p. 28).
- **Feelings**: "...are hidden, like all mental images necessarily are, unseen to anyone other..."
- **Feeling** is a reflection of the state of the body
- **Emotions** precede **feelings**
- **Emotions** operate on **low level** (the body), whereas feelings on a **high level** (the mind).

(Damasio, 2004)

Levels of life regulation

(Damasio, 1999)



Complex, flexible, and customized plans of response are formulated in conscious images and may be executed as behaviour

Consciousness

Sensory patterns signalling pain, pleasure, and emotions become images

Complex, stereotyped patterns of response, which include secondary, primary and background emotions.

Relatively simple, stereotyped patterns of response, which include metabolic regulation, reflexes, the biological machinery behind what will become pain and pleasure, drives and motivations

TU Delft

Physical aspects of emotion

Apparent to others

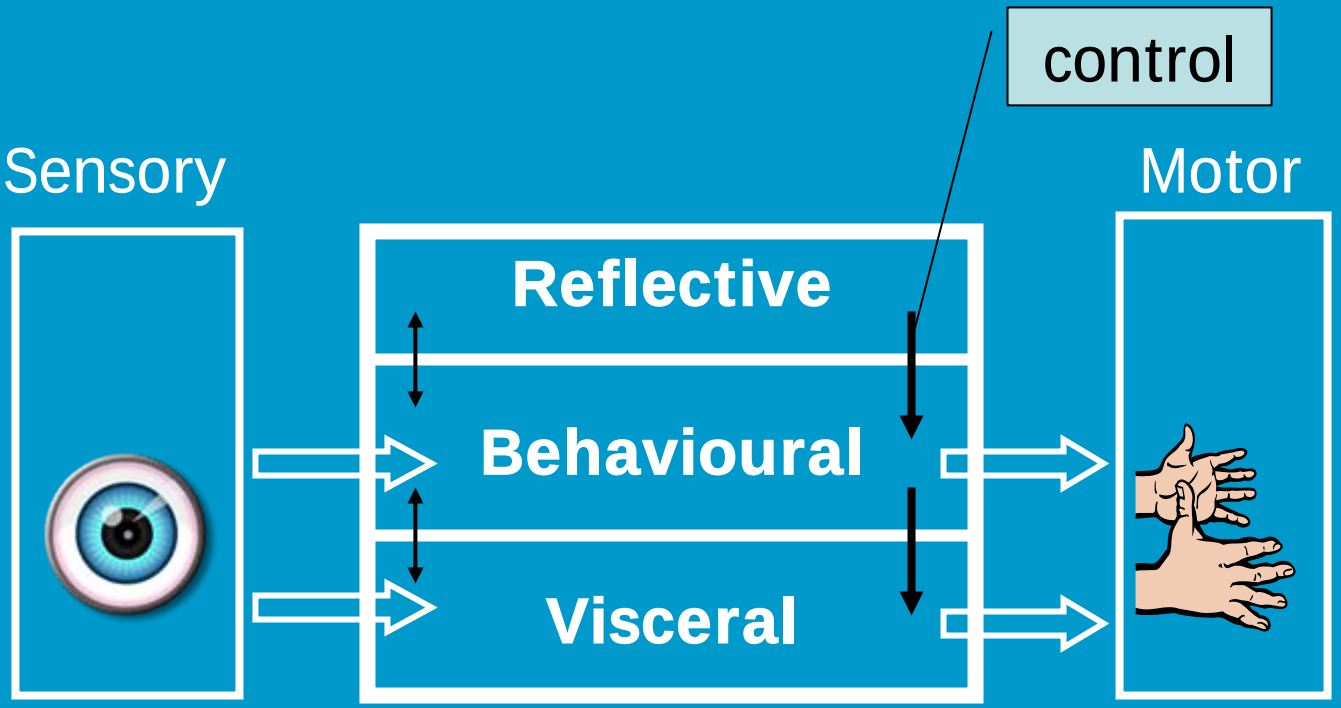
- Facial expression
- Voice intonation
- Gesture, Movement
- Posture
- Pupilary dilation

(Picard, 1997, p.27)

Less apparent to others

- Respiration
- Heart rate, pulse
- Temperature
- Electodermal response, perspiration
- Muscle action potentials
- Blood pressure

Three levels of affective processing



(Norman, 2004, p. 22).

TU Delft

Affective processing levels and Product characteristics

- **Reflective design** -> Self-image, personal satisfaction, memories
- **Behavioural design** -> The pleasure and effectiveness of use
- **Visceral design** -> Appearance (look, feel, and sound)

(Norman, 2004).

TU Delft

Six facial expression of emotions

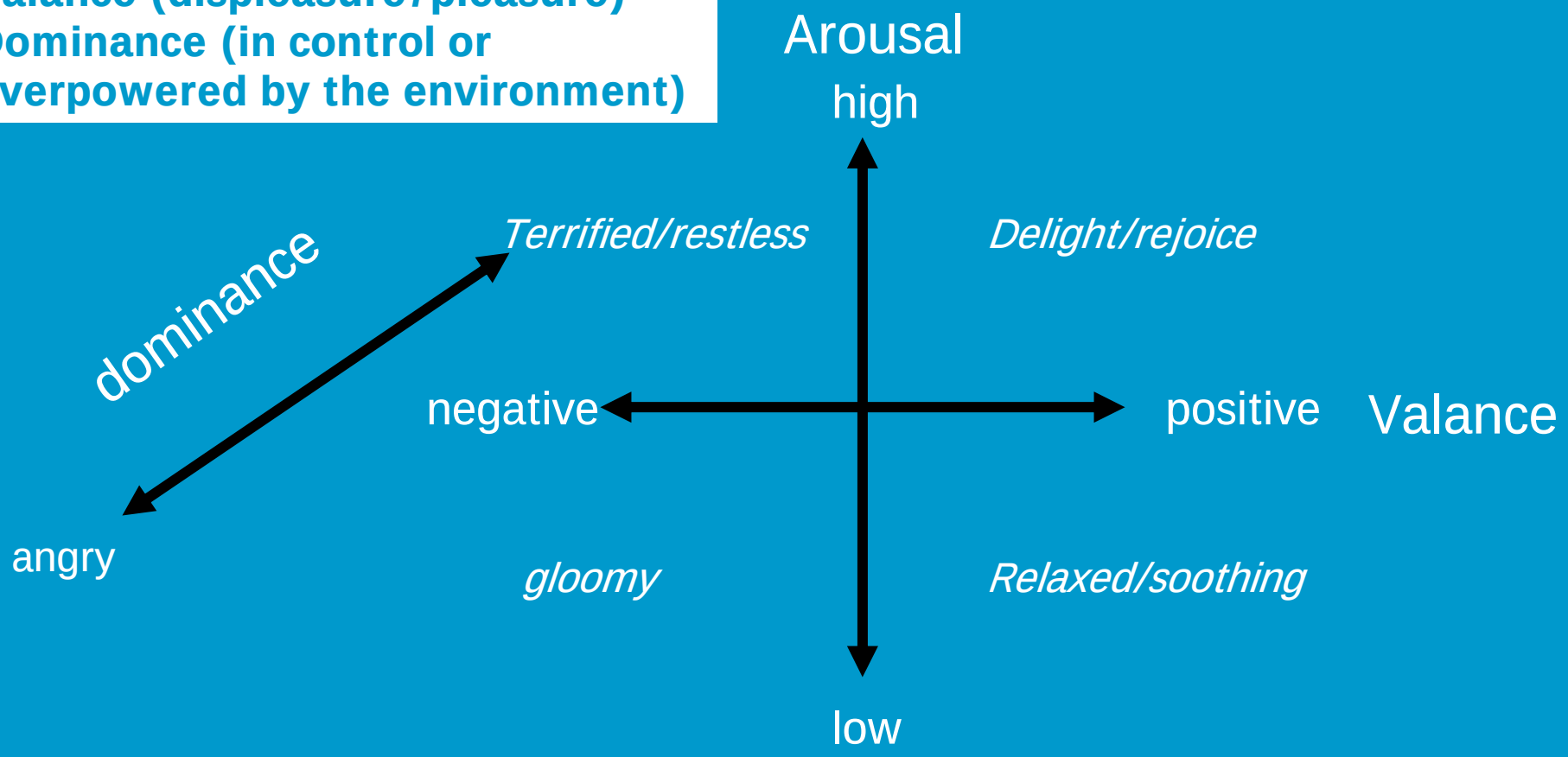
Ekman facial expressions of emotion:

- Not culturally determined
- Universal (biological origin Charles Darwin)

(Ekman and Friesen, 2003)

Valance, Arousal, Dominance model

Arousal (exciting/calm)
Valance (displeasure/pleasure)
Dominance (in control or overpowered by the environment)



TU Delft

Emotional Avatars

- Emotion:
  - Is used by humans as communication means
- Emotional Avatar
  - Simple model of emotion programmed
  - Expression based on emotional “state” (happy, sad, etc…)
  - Repeated emotions influence “mood”
- Why?
  - HCI: More intuitive human-machine interaction
  - Gaming: entertainment value
  - Training & Simulation: better training of trainees

Non-verbal communication

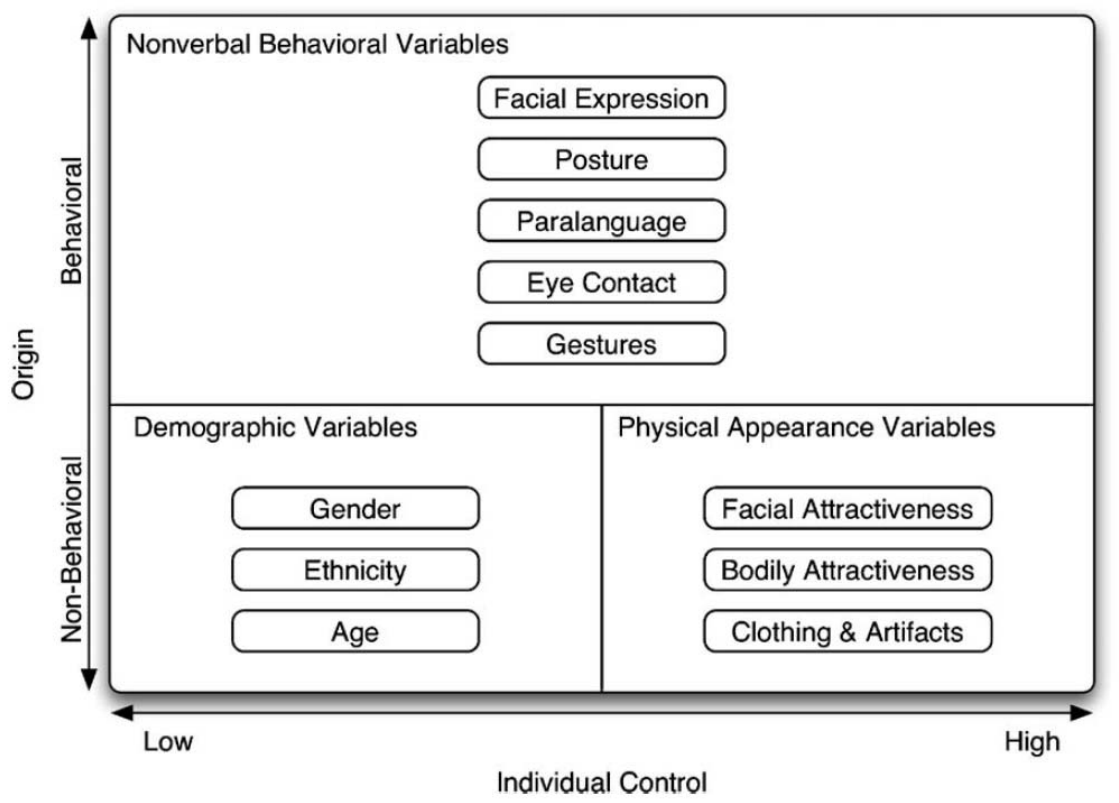


Fig. 1. De Meuse's taxonomy of non-verbal cues, adapted from De Meuse (1987).

(Cowell and Stanney, 2005, p. 284)

TU Delft

Functions that non-verbal behavior provides

- **Emblems**
- Illustrators
- Affect displays
- Regulators
- Adaptors

(Ekman 1973 as in Cowell and Stanney, 2005)

"Non-verbal behaviors that have a direct verbal equivalent (e.g. wave meaning "goodbye", tapping of a watch to indicate tardiness)"

Functions that non-verbal behavior provides

- Emblems
- **Illustrators**
- Affect displays
- Regulators
- Adaptors

(Ekman 1973 as in Cowell and Stanney, 2005)

"Non-verbal behaviors that are tied to speech patterns; portraying something analogically about what is being said" (finger moving pass the throat to indicate dead/kill)

Batons body (hand) movement to emphasize a word or phrase

Functions that non-verbal behavior provides

- Emblems
- Illustrators
- **Affect displays**
- Regulators
- Adaptors

(Ekman 1973 as in Cowell and Stanney, 2005)

"Non-verbal behaviors that display certain aspects of the referent's emotional and psychological state and are linked closely with facial expression...less awareness and intentionality than either emblems or illustrators"

TU Delft

Functions that non-verbal behavior provides

- Emblems
- Illustrators
- Affect displays
- **Regulators**
- Adaptors

(Ekman 1973 as in Cowell and Stanney, 2005)

"Non-verbal behaviors that maintain the back-and-forth rhythm of a conversation. Regulators are related to the flow of conversation (e.g. eye contact, body lean to indicate wanting to speak)."

Functions that non-verbal behavior provides

- Emblems
- Illustrators
- Affect displays
- Regulators
- **Adaptors**

(Ekman 1973 as in Cowell and Stanney, 2005)

"These are non-verbal behaviors that provide information about an individual's attitude, anxiety level, and self-confidence. Unlike the other functional areas, adaptors are used unconsciously and thus are a potentially rich source of involuntary information about the psychological state of an individual"

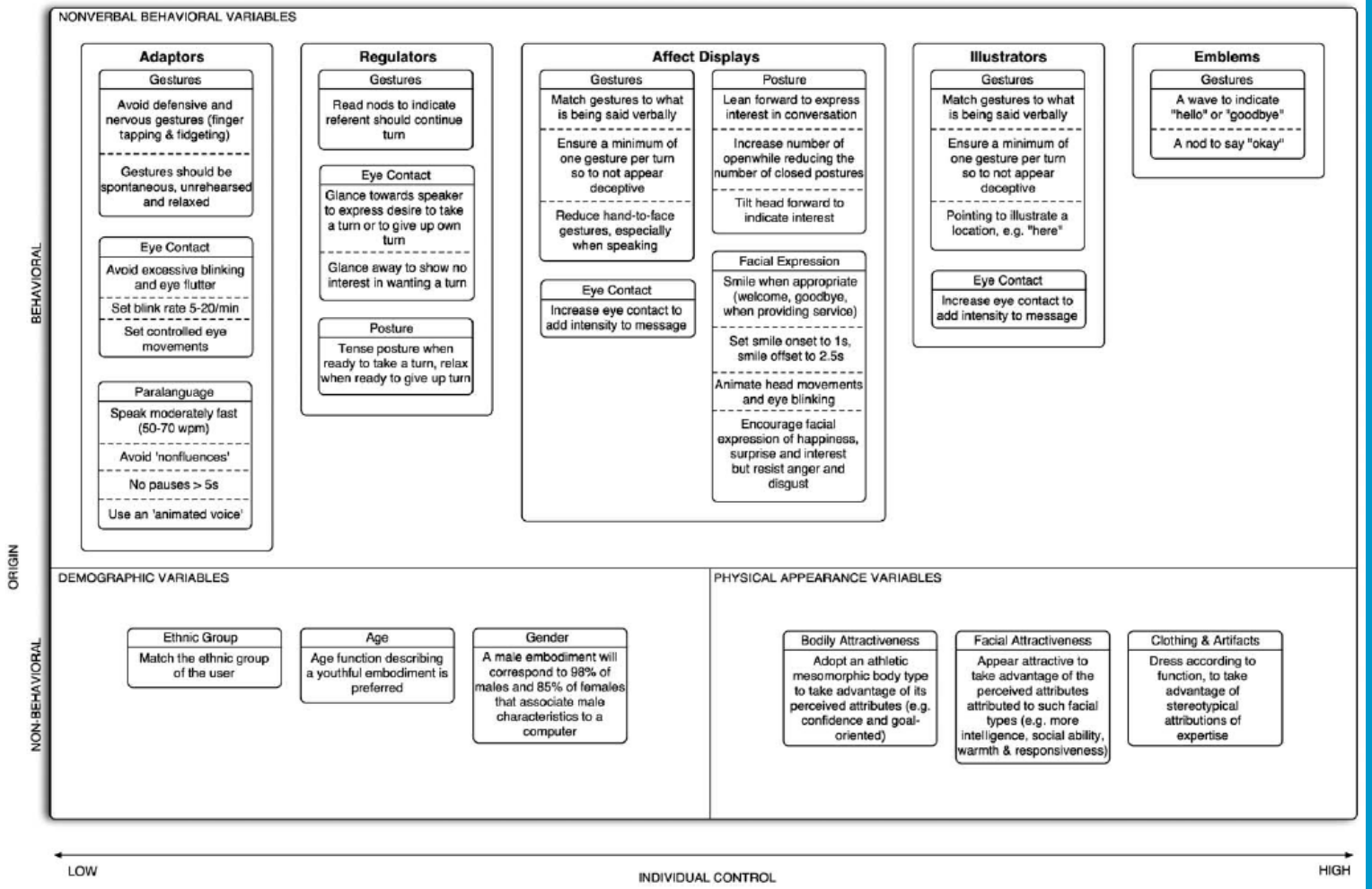


Fig. 2. Design suggestions for non-verbal characteristics that can lead to a credible facade.

(Cowell and Stanney, 2005, p. 290)

TU Delft

Regenerate social scene in VR that evoke natural human behaviour and attitude

Intimate distance:	Up to 0.5 meter
Personal distance:	0.5 – 1.25 meter
Social distance:	1.25 – 4 meter
Public distance:	4-8 meter

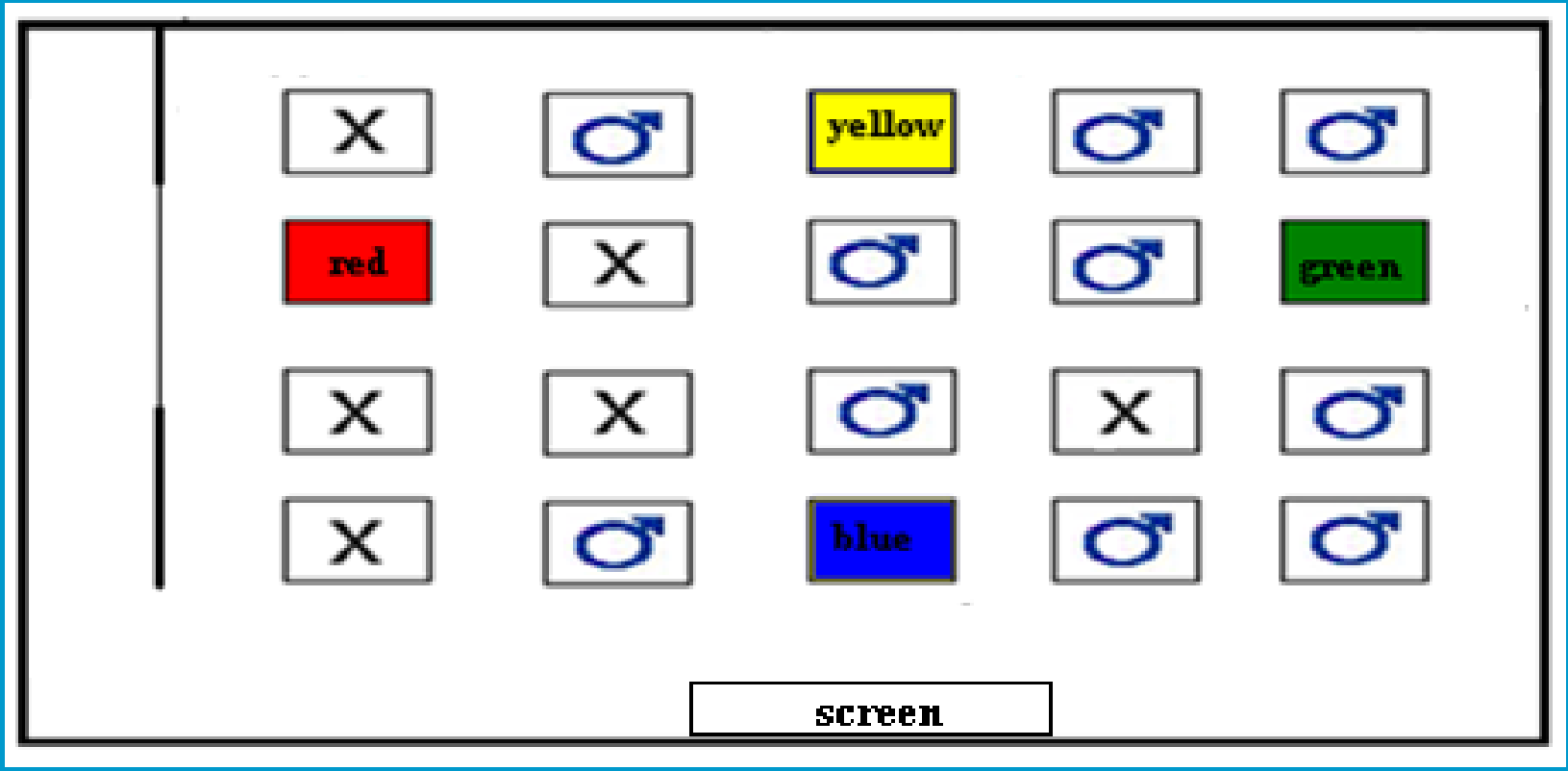
(Hall 1966 as cited by Hogg and Vaughan 2005)

(Brinkman at al., 2009)

TU Delft

The chairs

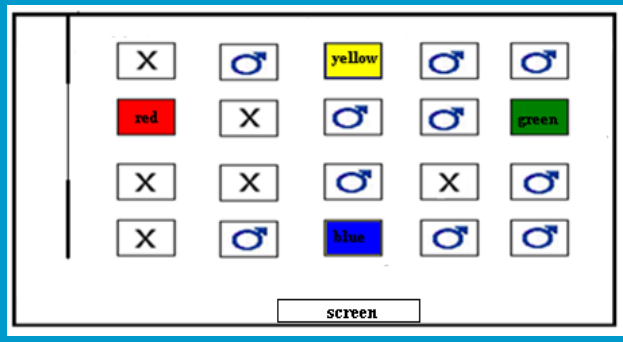
22 subjects
- 11 clockwise condition
- 11 anti-clockwise condition

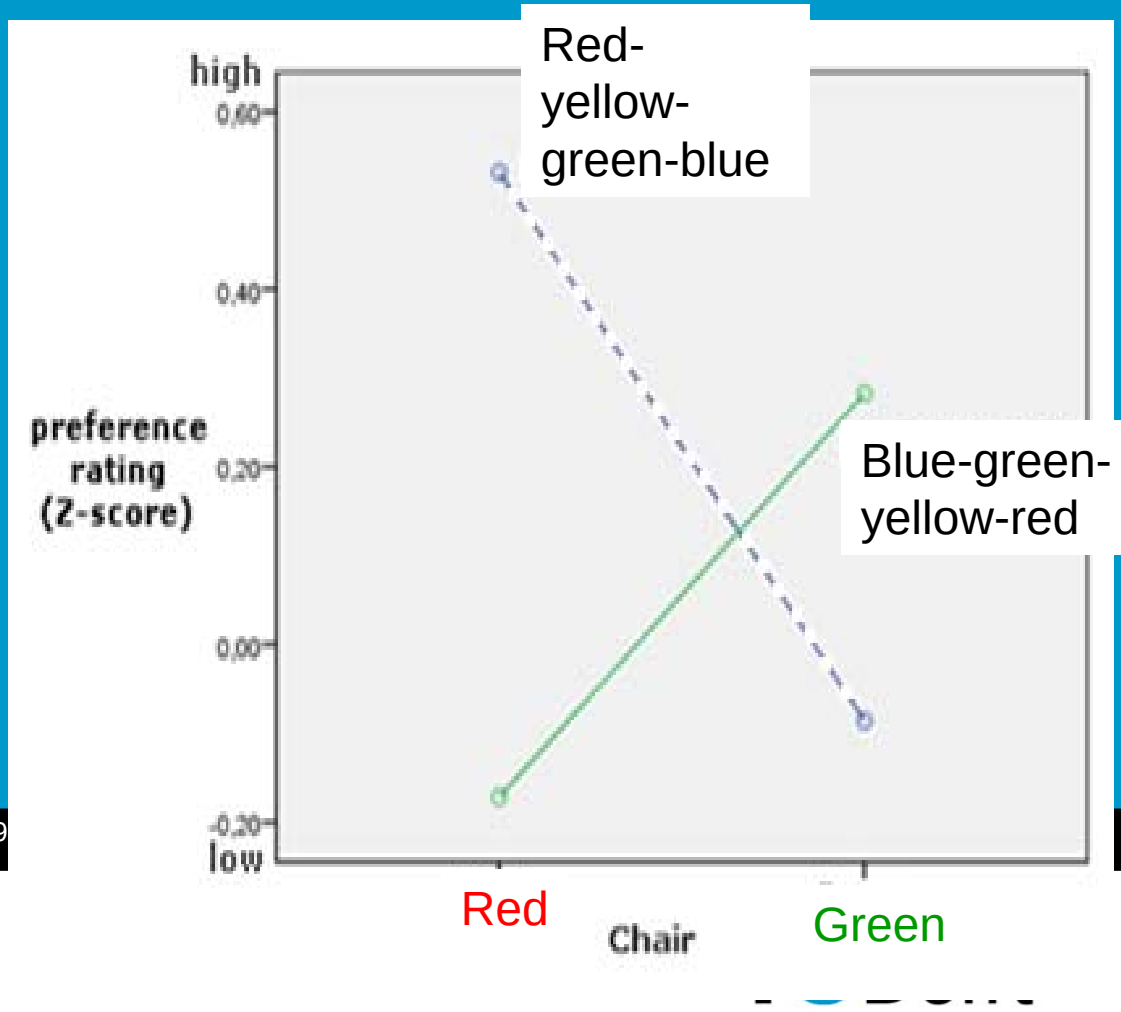


Results

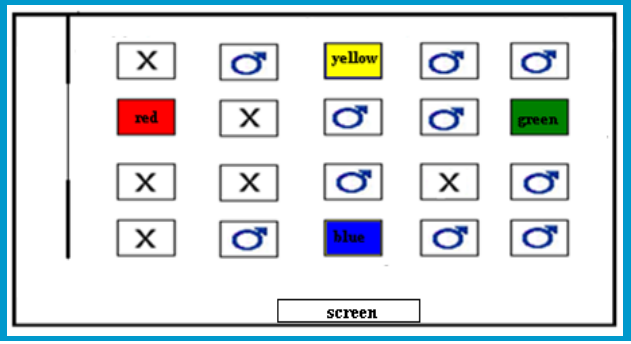
Chairs are graded higher when graded earlier in the path

The participants prefer to take a seat on the chair that is nearest to them



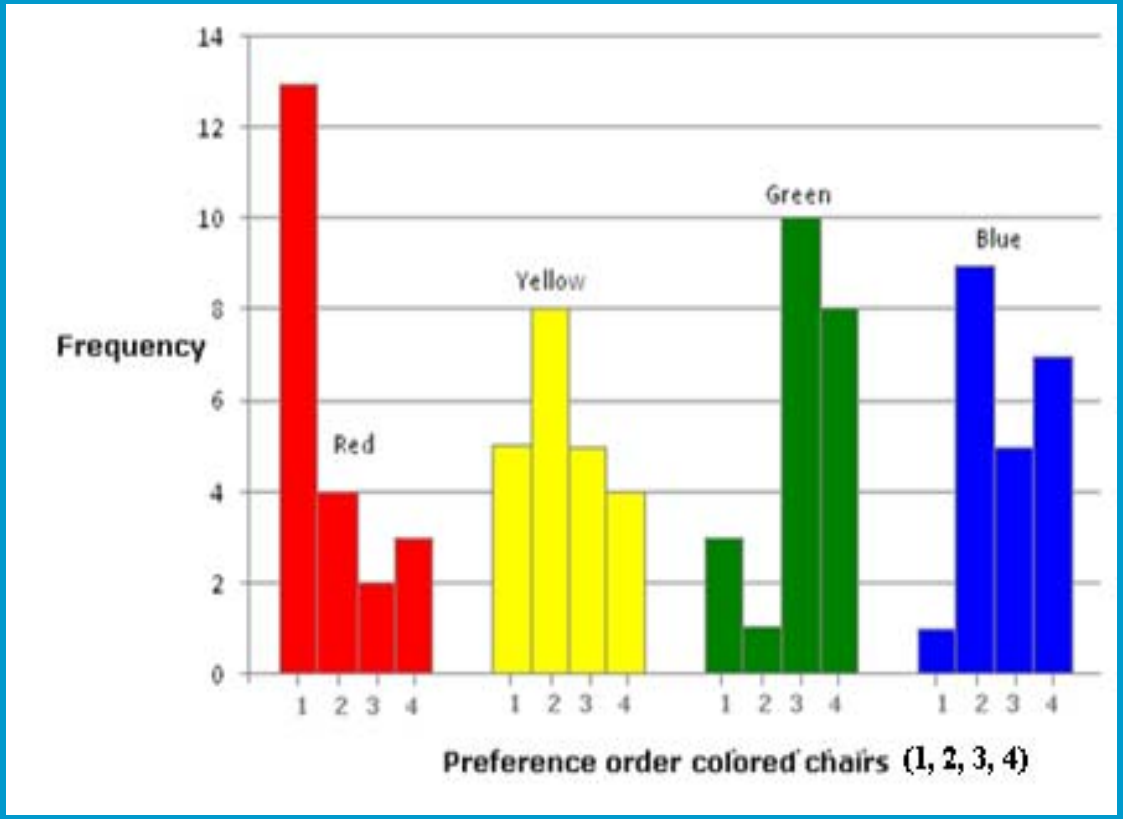


Results



Red chair significant more selected than the green chair

The participant prefer a chair with no avatars around them rather than with avatar surrounding it



TU Delft

Non-verbal communication

- Demo

Virtual Reality Exposure Therapy

- Anxiety disorder e.g. social phobia, specific phobias (heights, flying, animals), and agoraphobia.
- Fear is a response to a **known**, external, definite, or nonconflictual threat
- Anxiety is a response to a threat that is **unknown**, internal, vague, or conflictual.

(Sanock and Sadock, 2003)

TU Delft

VRET – social phobia -Demo

Reference

Brinkman, W.-P., Van der Mast, C.A.P.G., and Inan, F., (2009) A Virtual Environment to Create Social Situations: First Step to a VRET System for Social Phobi. *Proceedings of Euromedia*. 103-107

Cowell, A.J., and Stanney, K.M. (2005). Manipulation of non-verbal interaction style and demographic embodiment to increase anthropomorphic computer character credibility. *International Journal Human-Computer Studies*,62, 281-306.

Damásio, A.R. (1999). *The feeling of what happens: Body and emotion in the making of consciousness*. New York, NY: Harcourt Brace & Company.

Damásio, A.R. (2004). *Looking for Spinoza: Joy, sorrow and the feeling brain*. London: Vintage.

Ekman, P. and Friesen, W. (2003). *Unmasking the face: A guide to recognizing emotions from facial expressions*. Cambridge, MA: Malor Books.

Hogg, M.A., and Vaughan, G.M. (2005) *Social psychology* (4th ed) Harlow, Englang: Person.

Norman, D.A. (2004). *Emotional Design: Why We Love (Or Hate) Everyday Things*. New York, NY: Basic Books.

Picard, R. (1997). *Affective computing*. Cambridge, MA: The MIT press.

TU Delft