

FACULTEIT DER SOCIALE WETENSCHAPPEN

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Emotion Recognition and Visual Impairment

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Content of presentation

- Basic emotions
- Visually impaired children
- Effect presentation time
- Effect stimulus manipulation
- Photograph versus video
- Effect of perspective: frontal versus side view
- Preliminary conclusions


















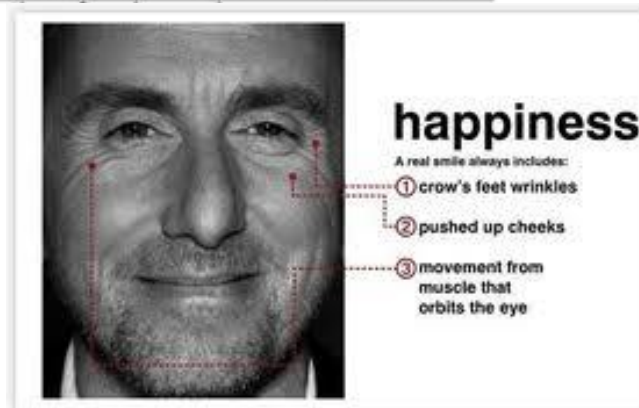
Facial expressions \neq Emotions





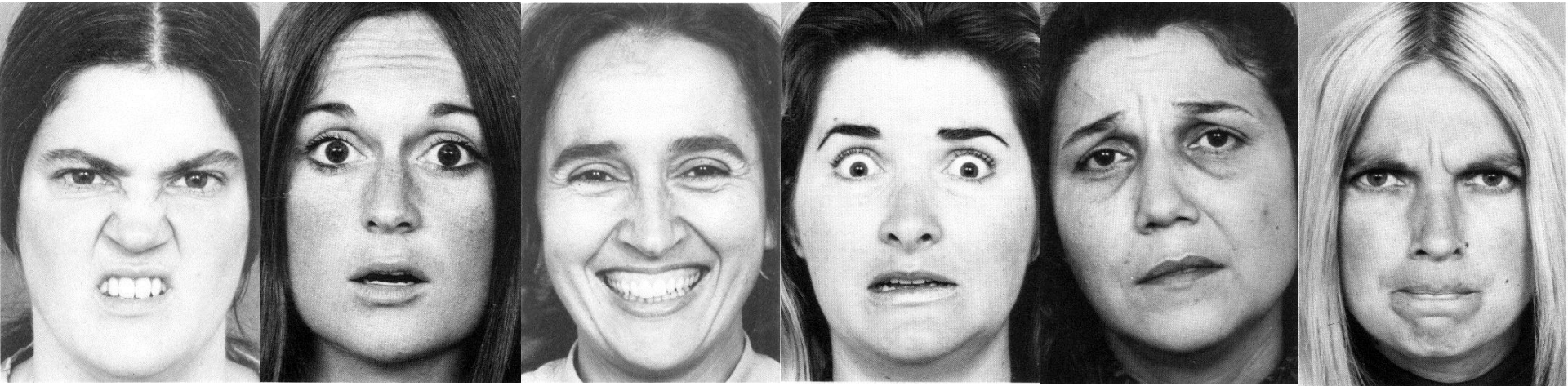
Basic emotions: Ekman & Friesen (1978)

AU1  Inner brow raiser	AU2  Outer brow raiser	AU4  Brow Lowerer	AU5  Upper lid raiser	AU6  Cheek raiser
AU7  Lid tighten	AU9  Nose wrinkle	AU12  Lip corner puller	AU15  Lip corner depressor	AU17  Chin raiser
AU23  Lip tighten	AU24  Lip presser	AU25  Lips part	AU26  Jaw drop	AU27  Mouth stretch





Basic emotions: Ekman & Friesen (1978)





Children 7-12 years of age

- Visually impaired children (n=36) less accurate in recognizing facial expressions than sighted peers.
- Visually impaired children needed significantly more time to recognize facial expressions when watching for an unlimited amount of time or with a maximum of 5 seconds. If presentation times were only 1 second there were no differences between the groups.
- **Participants not corrected for developmental level or intelligence**



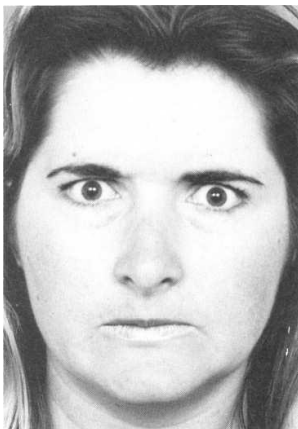
Children 6-13 years of age

sighted (N=44) versus visually impaired (N=28),
Visually impaired mainstream education (N=14) versus special
education (N=14)

Visual acuity 3/10 (N=14) versus acuity 1/10 – 3/10 (N=14).

Presentation time photo's: ½, 2 and 20 seconds

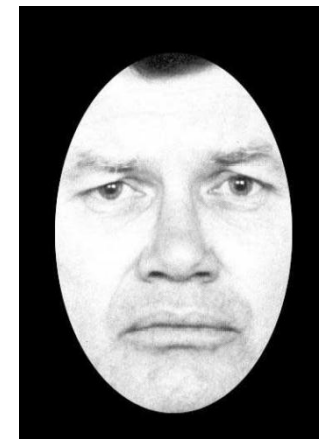
normal



Pure B-W



Relevant
parts





- For all children presentation times of $\frac{1}{2}$ s too short, 2 s optimal and 20 s unnecessary.
- All children seem to profit from enhanced contrast and leaving out irrelevant details with regard to accuracy for sadness and surprise.
- Degree of visual impairment irrelevant



- Manipulating pictures seem to help visually impaired children but at the cost of reaction time
- Visually impaired children in mainstream education more accurate than visually impaired children in special education for happiness, anger, sadness, and faster for happiness, anger and disgust.



Emotion recognition by adults (18 - 43 years)

- Presentation time 0,4 s and 20 s
- Stimulus manipulation (passe-partout & enhanced contrast)
- Visually impaired (N=15) visual acuity 1/10-2/10
- Simulated visually impaired (N=24) visual acuity 1/10-2/10
- Sighted (N=27)

- Simulation: problems with decoding visual information but intact visual memory



Emotion recognition by adults (18 - 43 years)

- Sighted participants more accurate than visually impaired and simulated visually impaired participants
- Visually impaired participants slower in recognizing emotions than sighted and simulated visually impaired participants
- No effect of presentation time 0.4 s versus 20 s



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No clear effect of stimulus manipulation, it differs per group and emotion.

- Sighted participants recognize non-manipulated photo's better than high contrast photo's.
- For simulated visual impaired participants results differed per emotion.
- No differences for visually impaired participants.
- Reaction times differed for surprise and disgust in photo's with less details (passe-partout) than non-manipulated photo's.



Photo's versus film (Cohn-Kanade dataset)



Photo versus film adults

- sighted (n=25),
- Simulated visually impaired (n=25)
- Visually impaired (n=22)





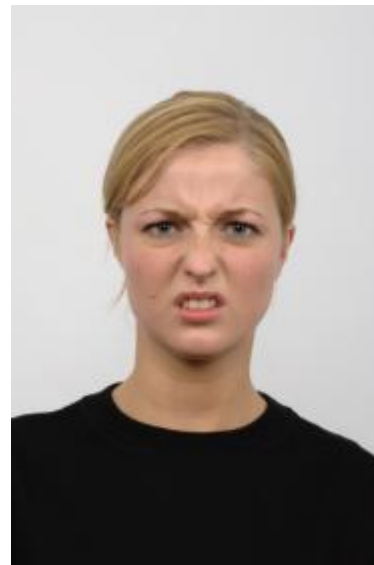
- Females almost always faster than men
- Happiness and surprise recognized best by every group and both media.
- Fear recognized least accurate and slowest.
- The other emotions scored in between the above mentioned emotions.



- Photo's recognized more accurate and faster than films by visually impaired participants. However results were not unequivocal and not always significant.
- The simulated visually impaired group mostly performed like the sighted group than the visually impaired group.
- Differences in performance explained by differences in visual memory more than by decoding visual information.
- Decoding visual information less important as long as you have visual memory and experiences.

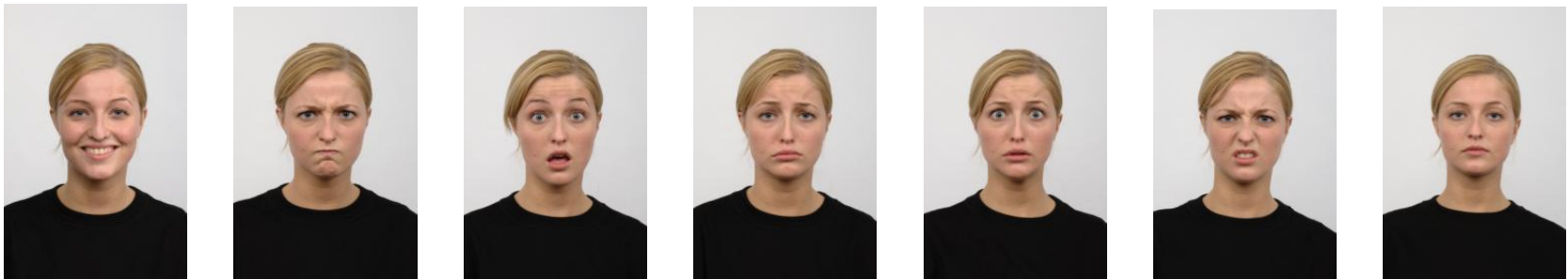
Frontal versus side view

- student participants N=32
- Cross over design: sighted and simulated visual impairment (mean nearby visual acuity = 0.17)
- Touch screen in stead of button box
- Stimuli: Radboud Faces Database



Frontal versus side view

- Emotions were recognized more accurate and faster in sighted condition than in simulated visually impaired condition.
- Perspective played a role for anger, neutral and sadness: frontal view better responses than in profile (180° left or right).
- Left or right in profile perspective did not matter.
- No gender differences were found.





Some preliminary conclusions

- Reaction times are slower in visually impaired children for some emotions. Reaction times depend on presentation times.
- Visually impaired children in special education made more mistakes than children in mainstream education. → caused by intelligence or social skills?
- Effect visual impairment seems to accumulate over the years. Simulating visual impairment does not lead to serious problems.
- Stationary pictures possibly easier for visually impaired people than film or video (and life action?).
- Minimum visual acuity for recognizing facial expressions not known.