UNIVERSITÉ DE FRIBOURG
UNIVERSITÄT FREIBURG

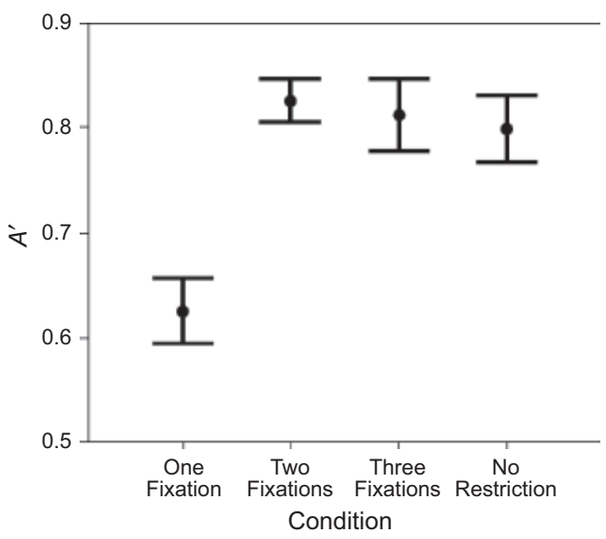
iBMLAB
Eye and Brain Mapping Laboratory

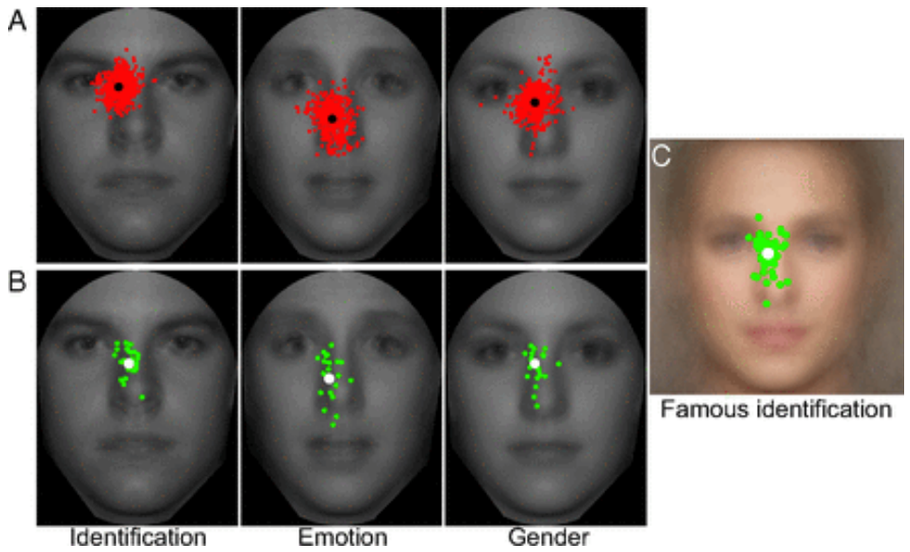
Idiosyncratic Visual Information Strategies do not Abolish the Face Inversion Effect

Junpeng Lao, PhD

Fribourg Day of Cognition
2015/10/07

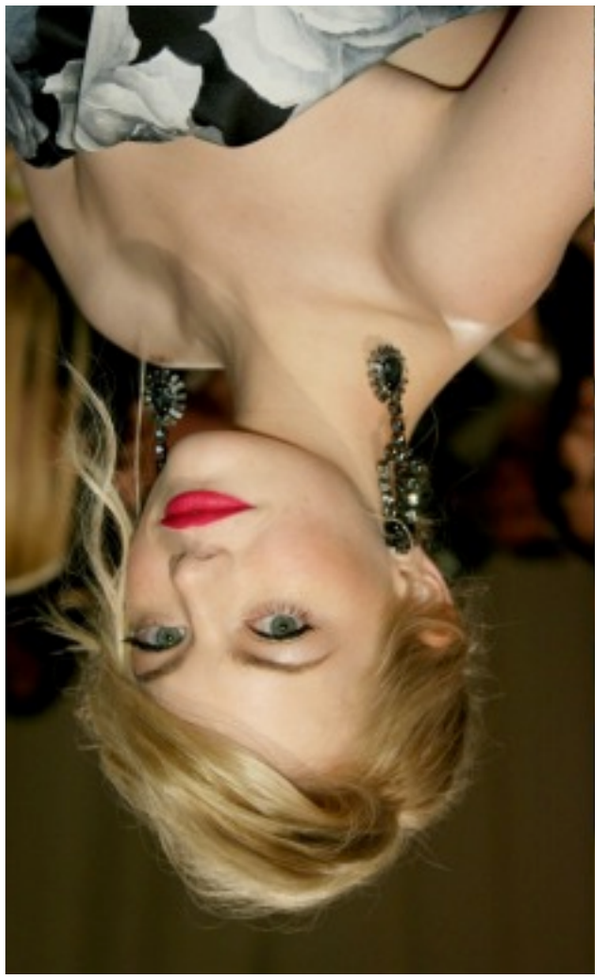
Face recognition: we are all quite good at it





The recognition of faces is disproportionately impaired by inversion relative to the recognition of most mono-oriented objects:

the Face Inversion Effect (FIE - Yin,1969)

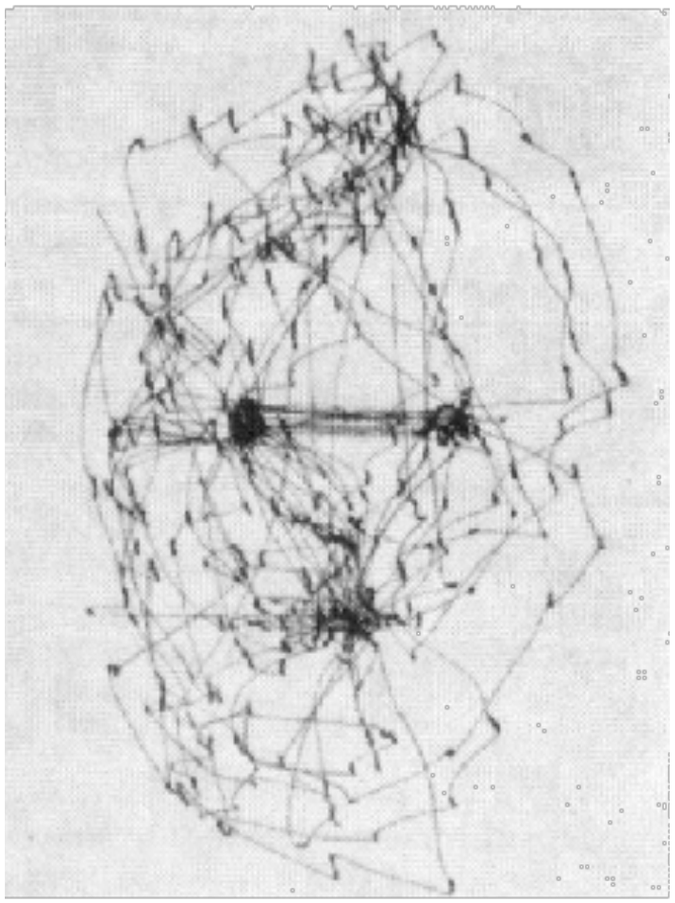


But why…

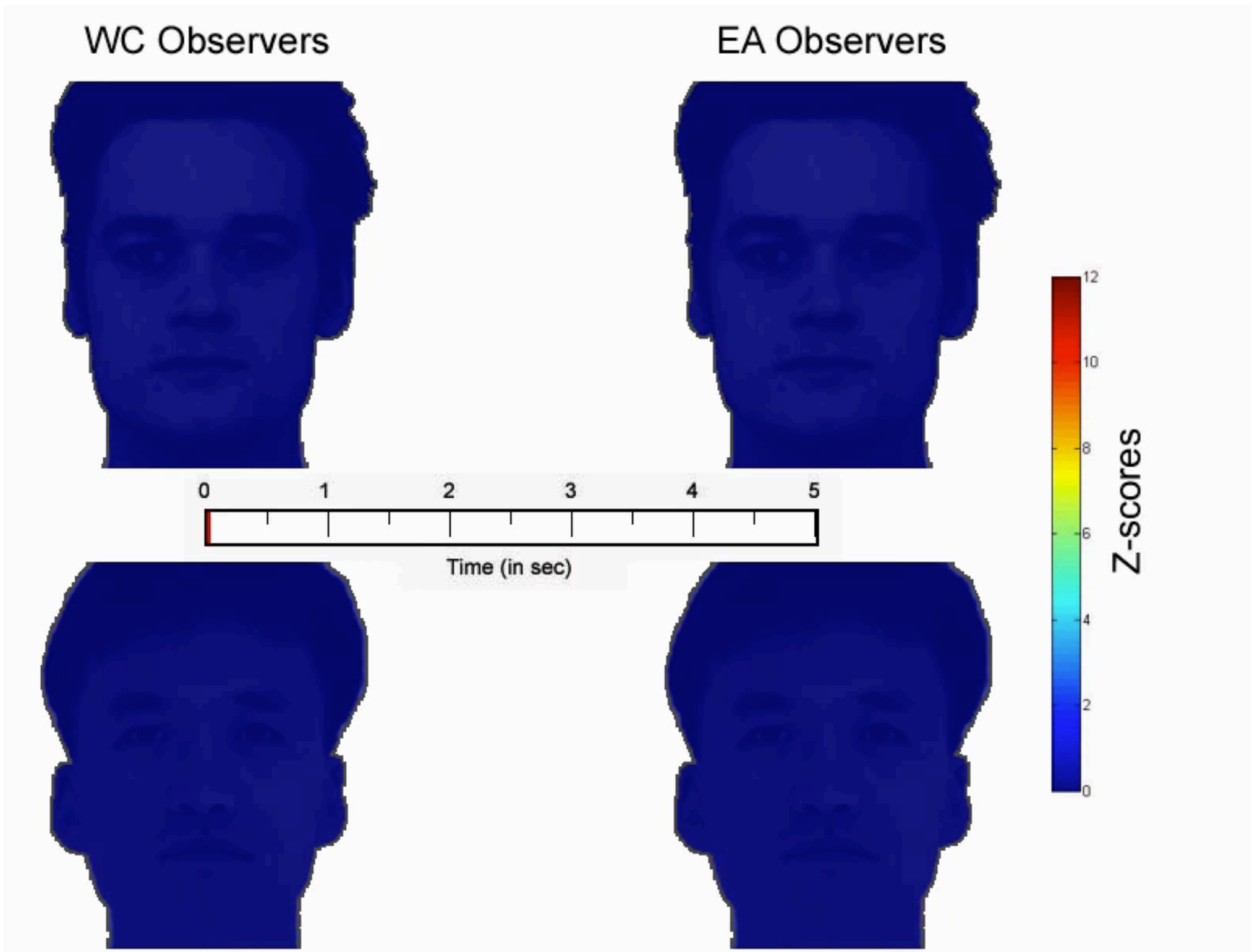
- **Qualitative explanation**: Inversion disrupts the holistic face processing (Farah, Drain & Tanaka, 1995; Tabaka & Farah,1993 & 2003)

- **Quantitative explanation**: Processing of upright and inverted face are the same except less efficient for the inverted faces (Sekuler et al., 2004)

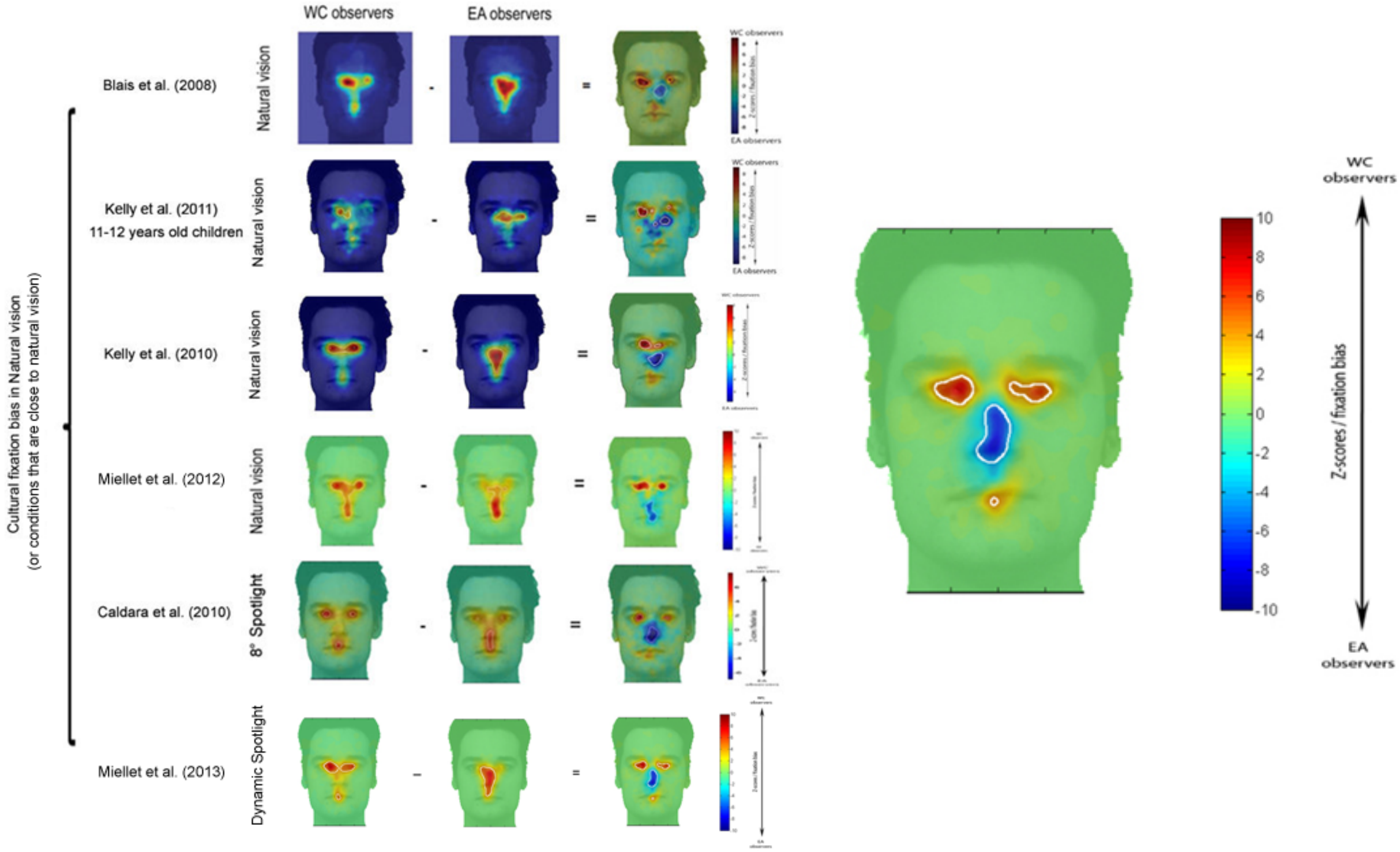
Still an ongoing debate…



Yarbus, A. L. (1967)


WC Observers
EA Observers
0
1
2
3
4
5
Time (in sec)
12
10
8
6
4
2
0
Z-scores

Culture shapes how we look at faces

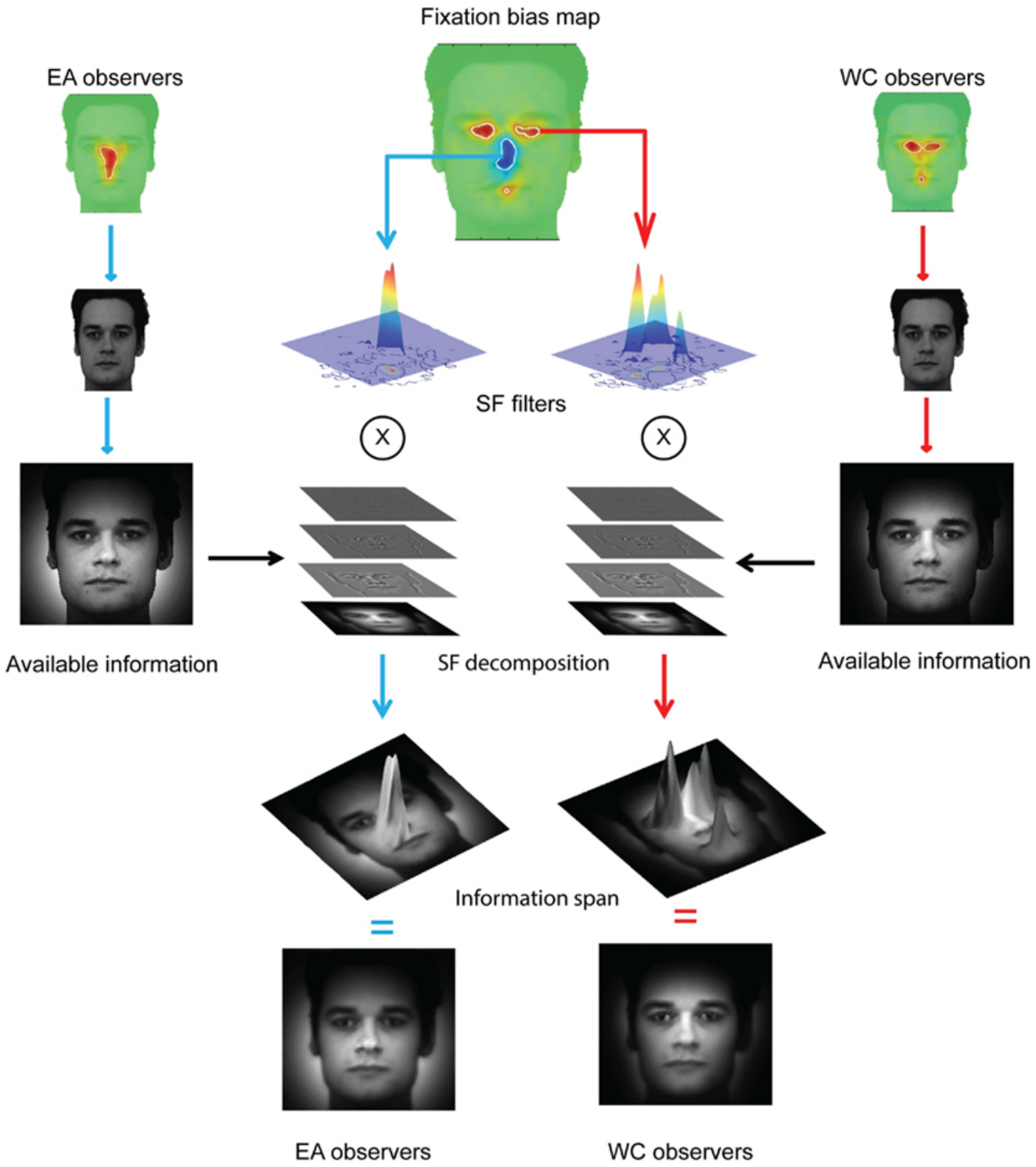


Modified from Miellet et al., 2012

Dynamic Spotlight

- A gaze contigent technique first employed by Miellet et al. (2013).

Different information sampling



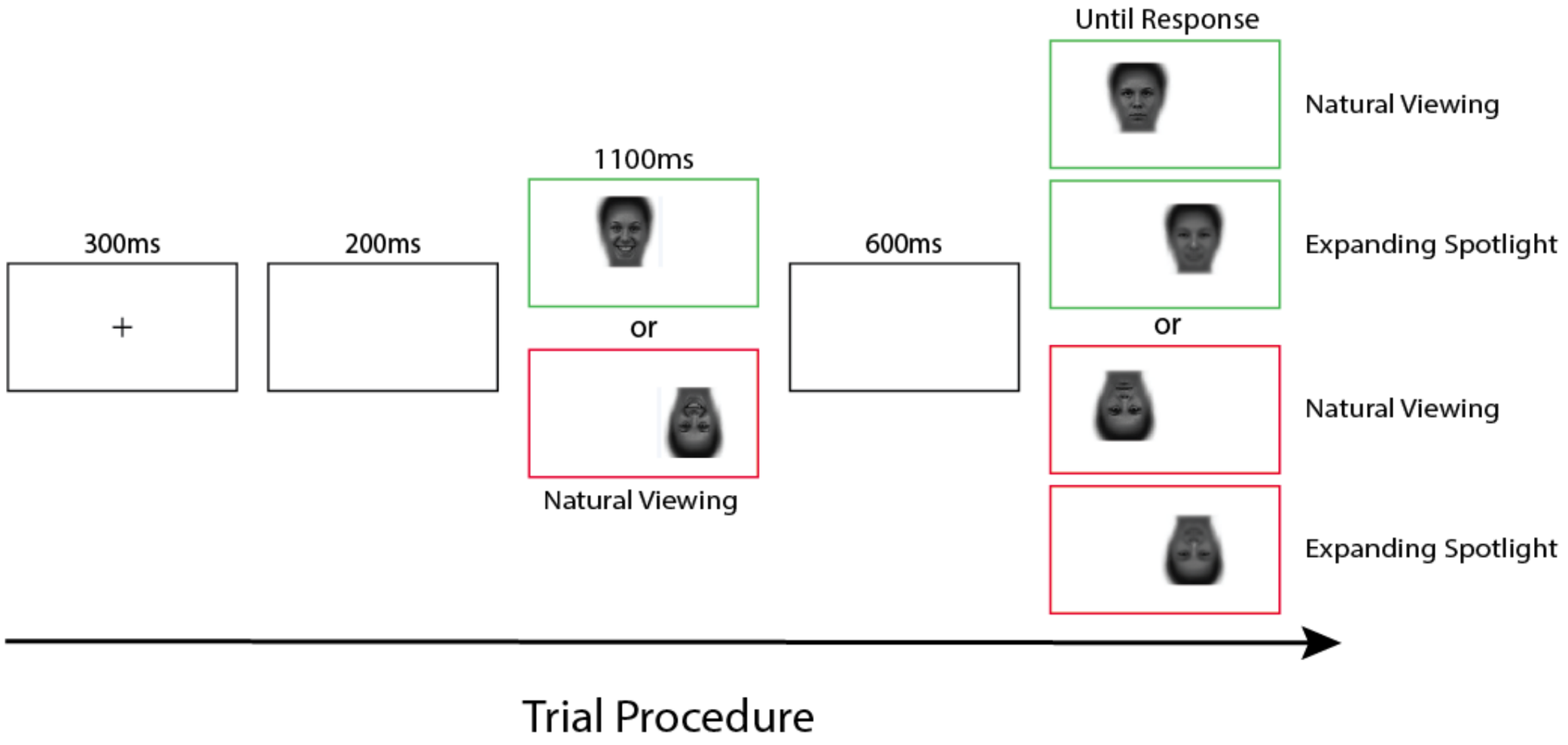
Miellet et al., 2013

Dynamic Spotlight

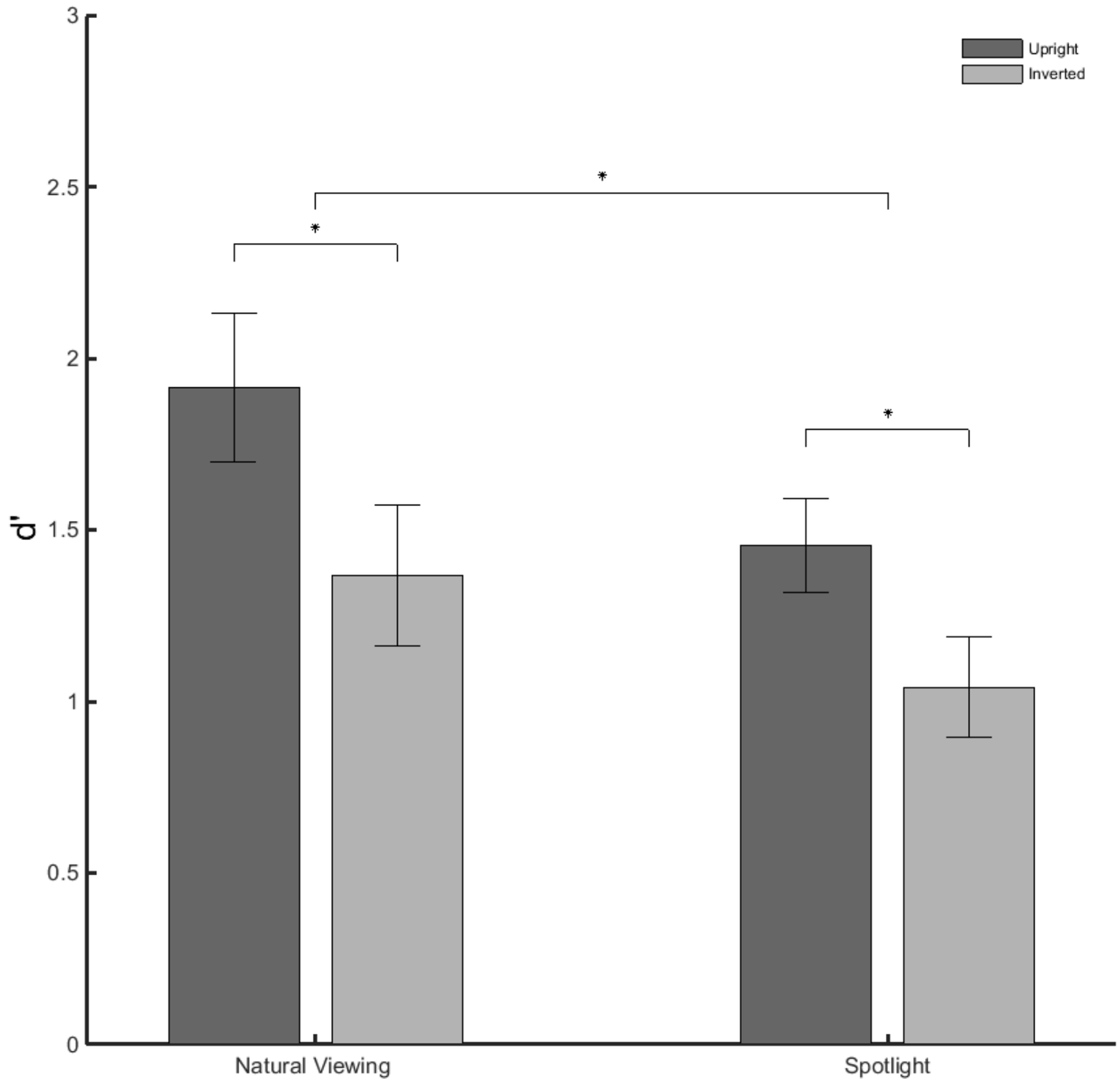
- A 2° Gaussian aperture with a zero alpha value(complete transparent) at the center was centered on the observer's fixation.

- The expanding rate is 1° of visual angel every 12 ms while the fixation lasts.

Delayed Matching Task



Behavioural Results



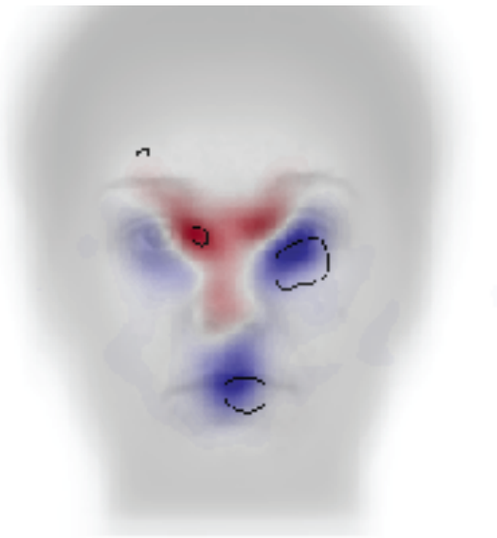
N=40

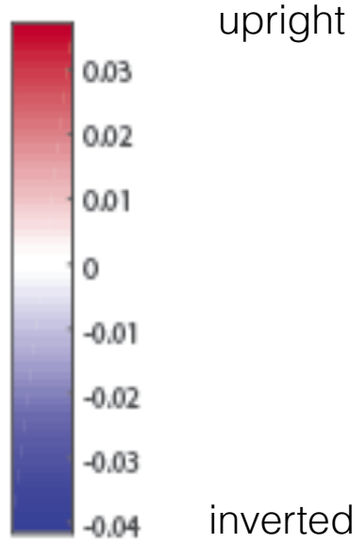
Eye Movement Results

Upright

Inverted

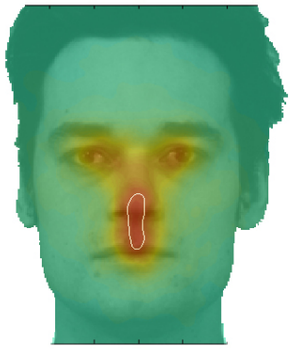
Contrast



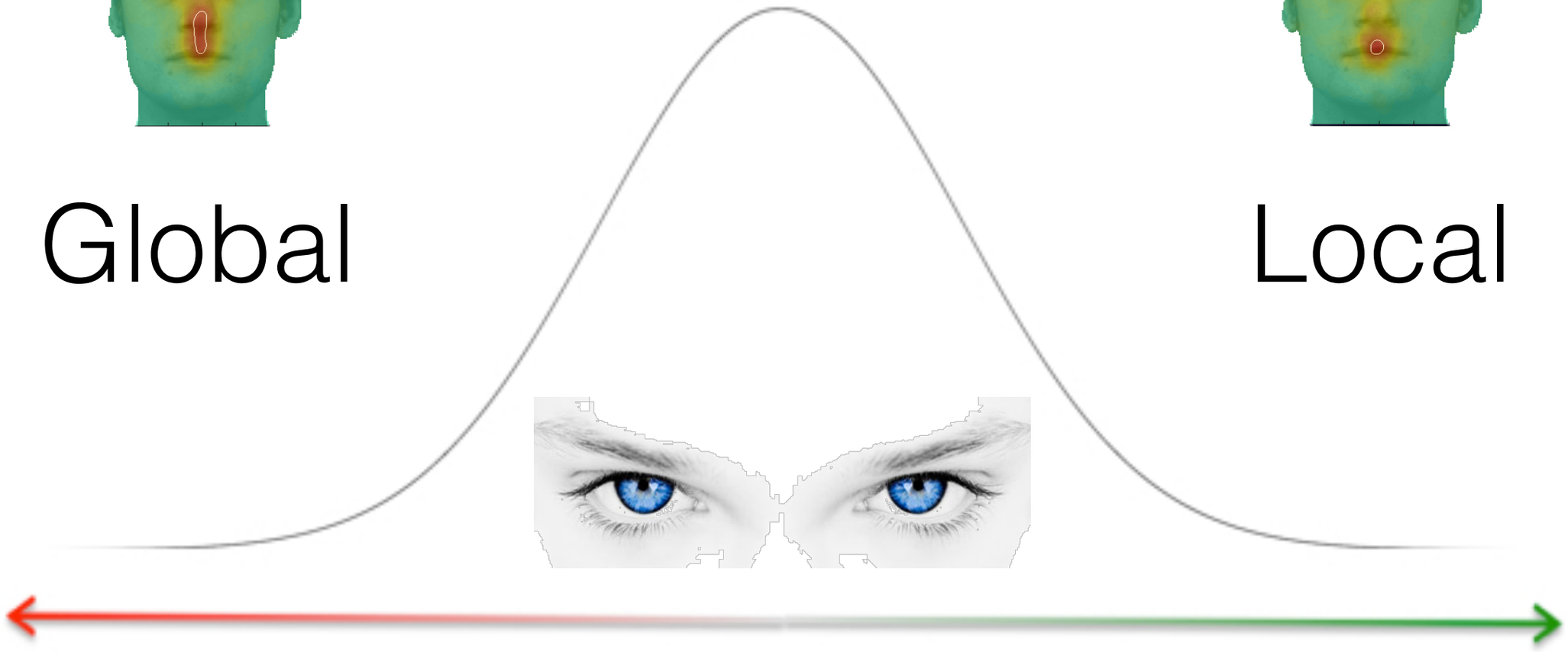


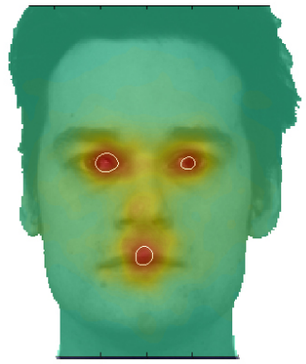
N=40

Flexible eye movement strategy



Global

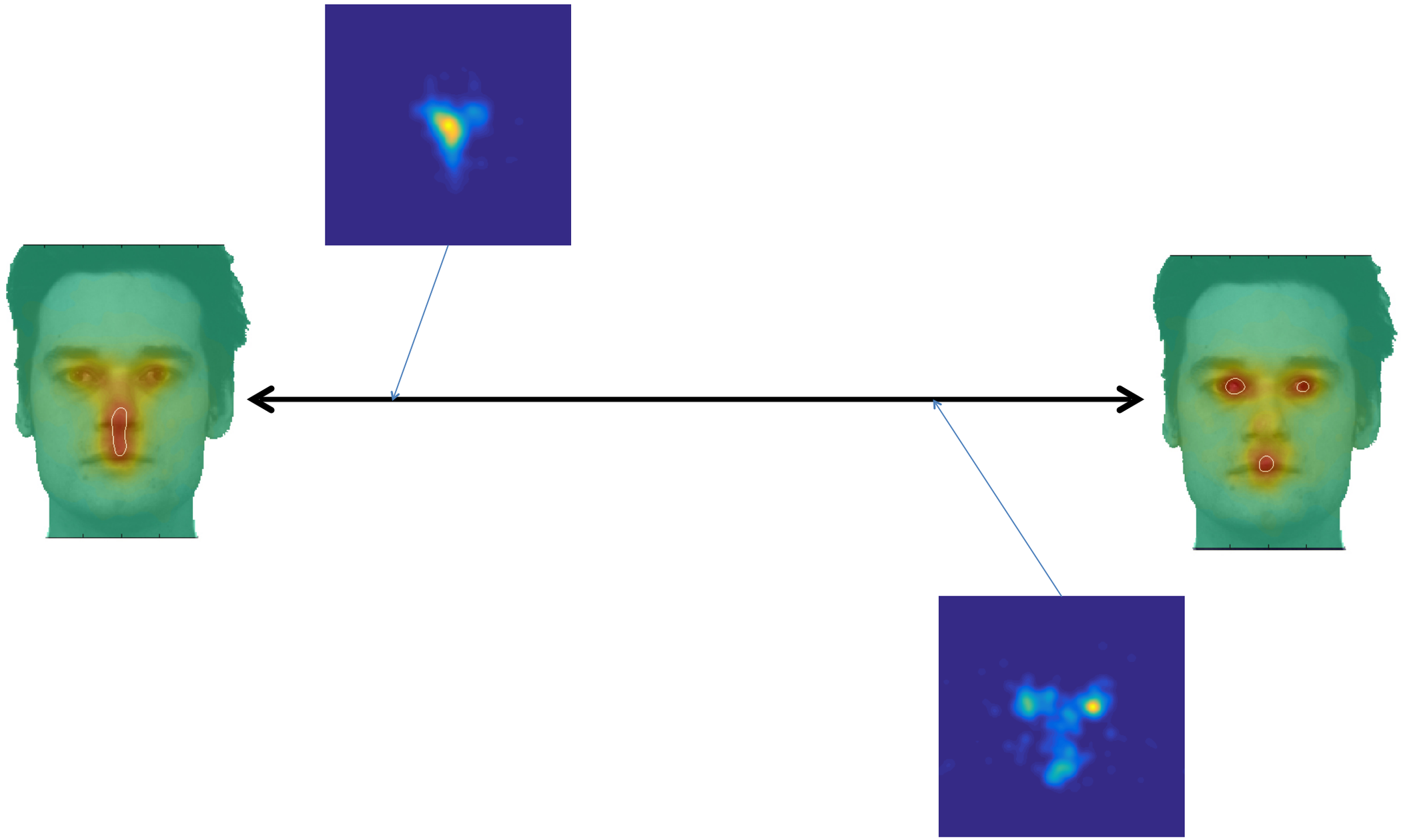




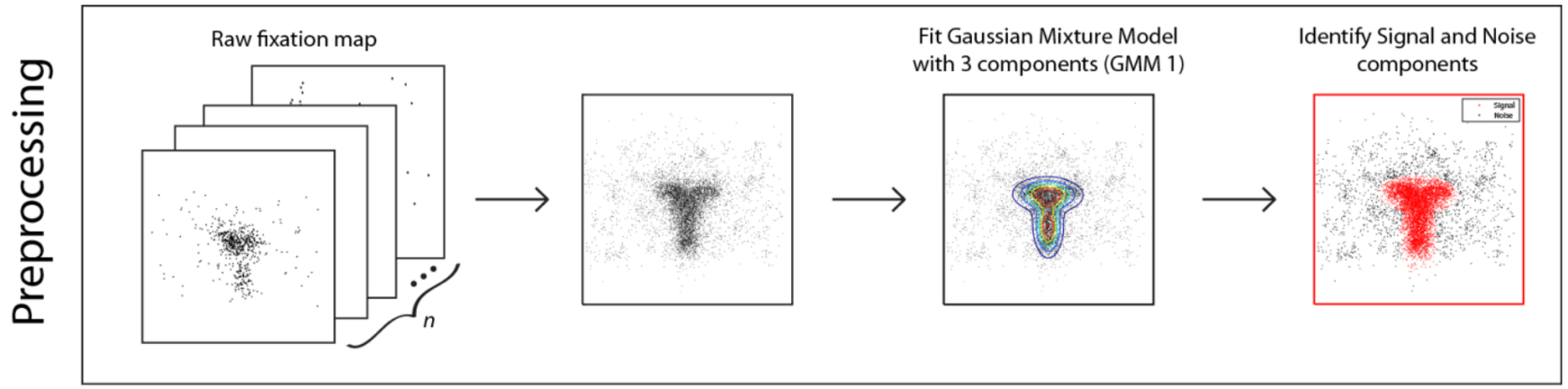
Local

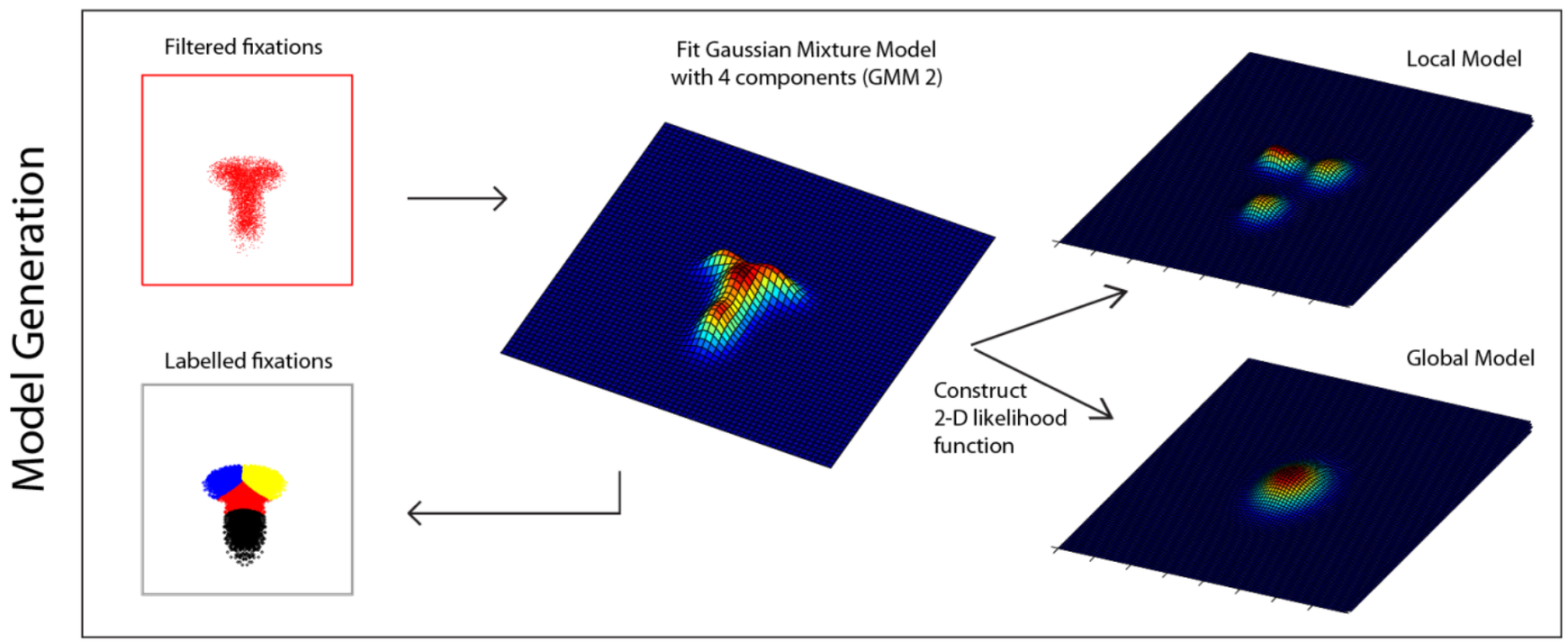
- Modulated by culture and not nature
- Modulated by the location of the first fixation (*i*Hybrid – Miellet, Caldara & Schyns, Psych Sci 2011)
- As effective for Face Recognition

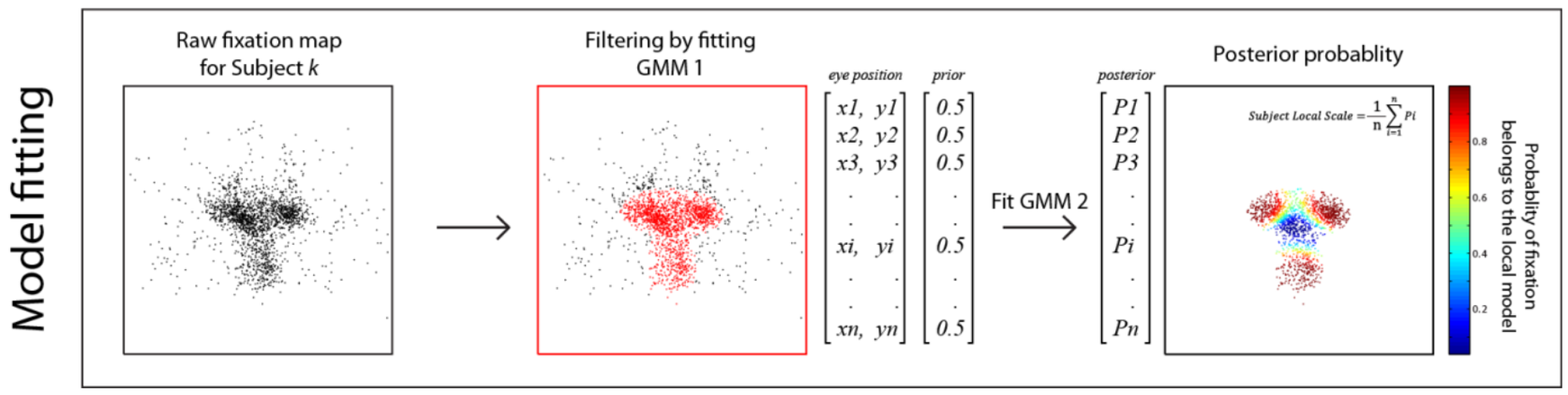
Flexible eye movement strategy



A Bayesian Generative model







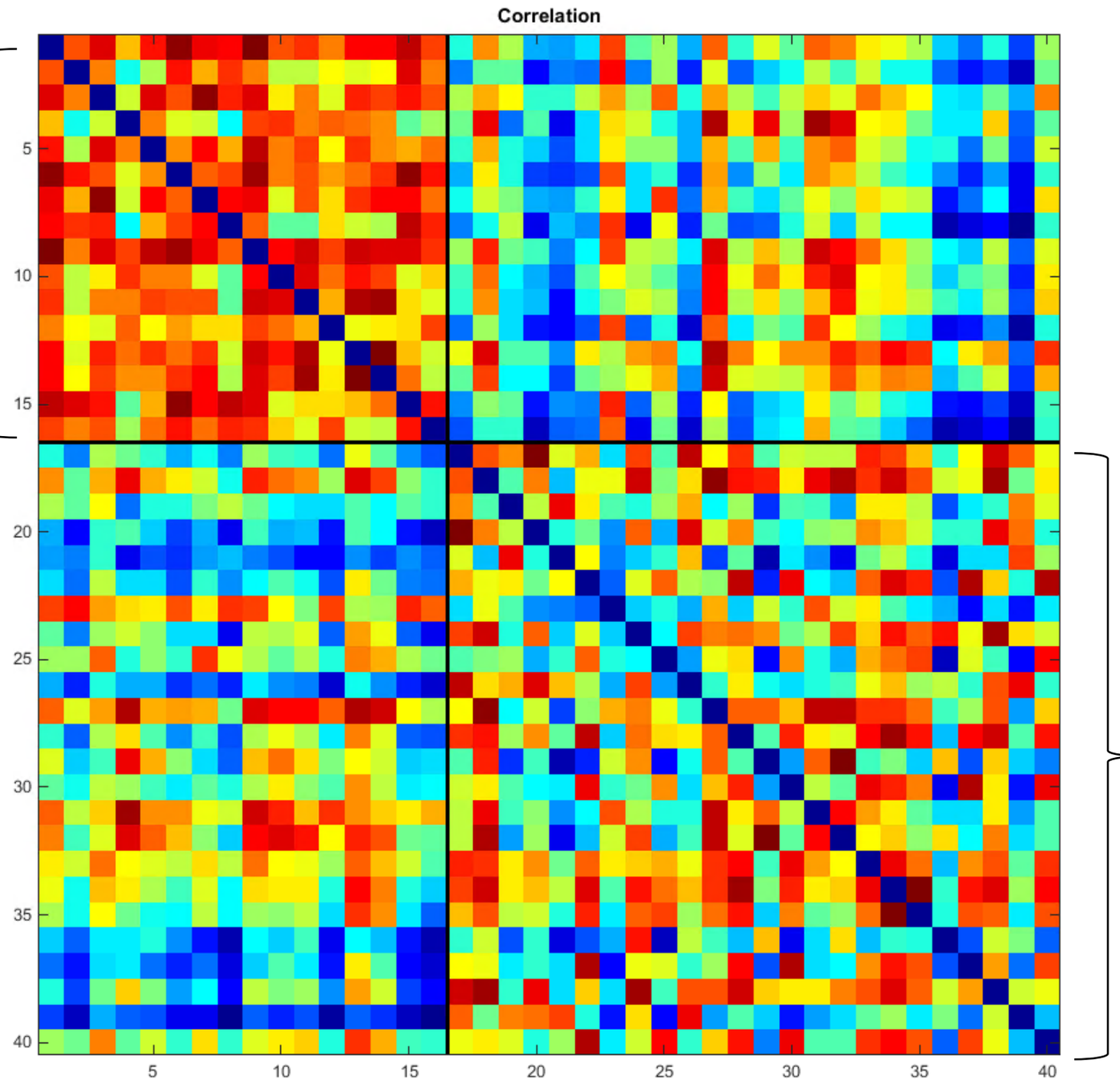
Defining Global/Local strategies

- Calculate the global-local index for each subject in the natural viewing upright condition.

- Using K-means to cluster all subjects into 2 groups (global & local)

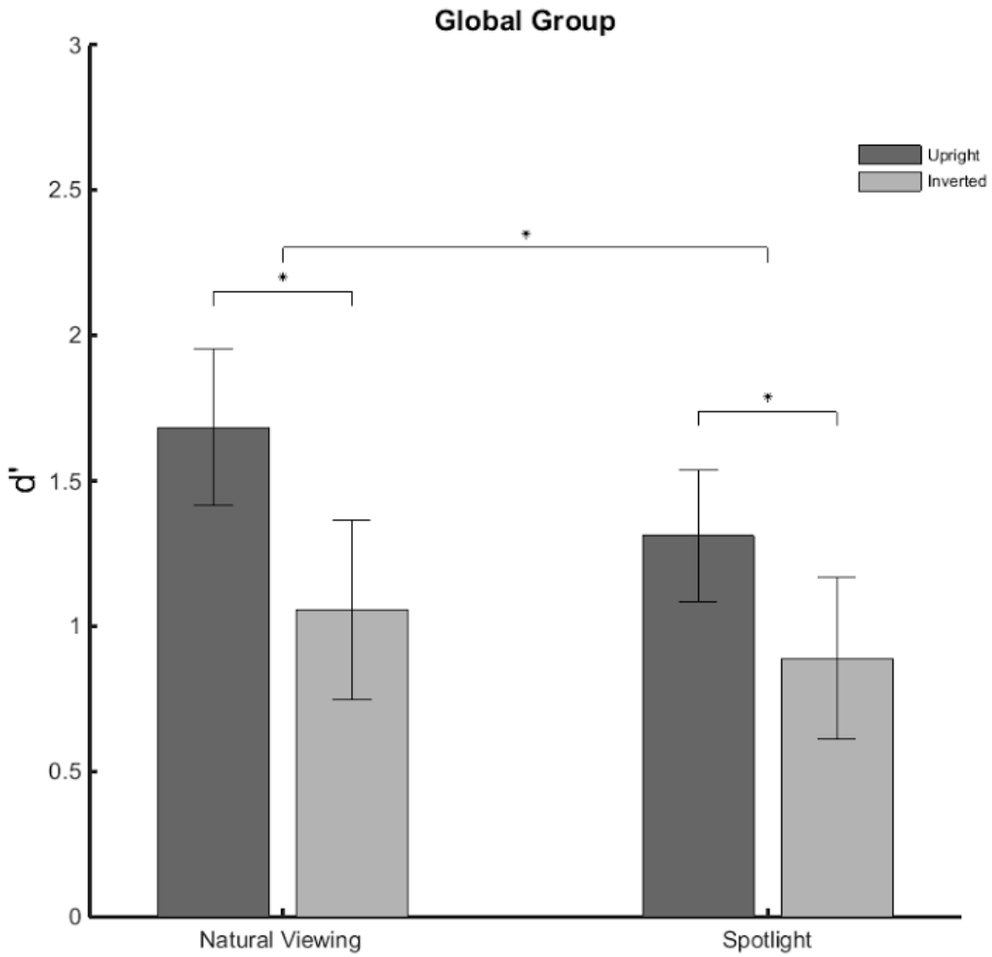
Similarity of eye movement pattern

Global
(40%)

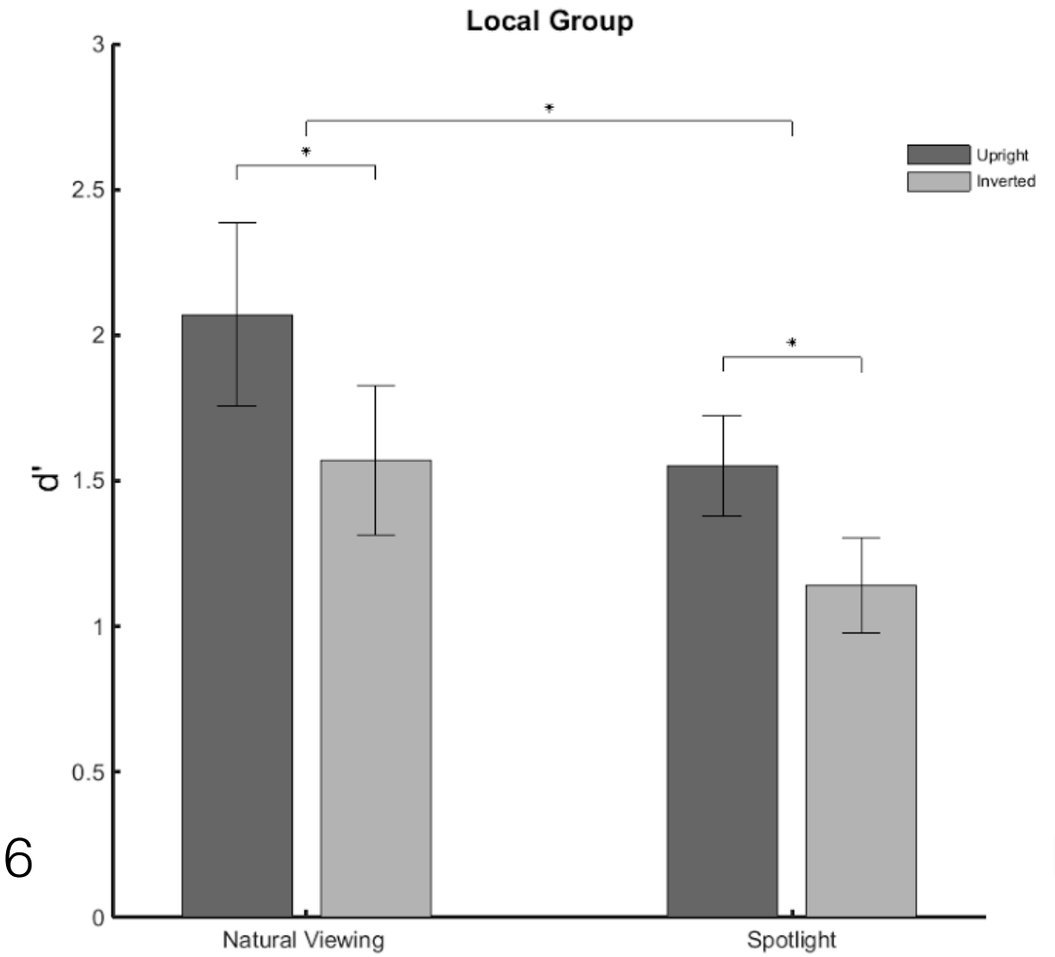


Local
(60%)

Accuracy: Global vs. Local



N=16



N=24

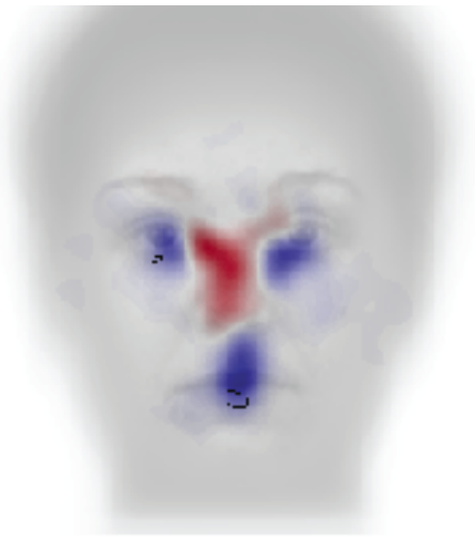
Global Group

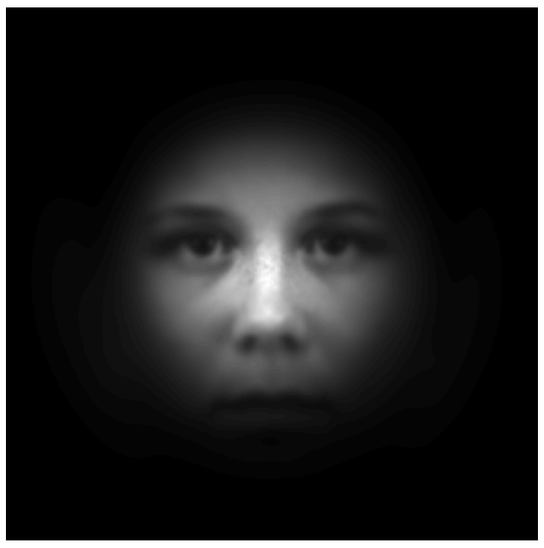
N=16

Upright

Inverted

Contrast





Qualitative shift

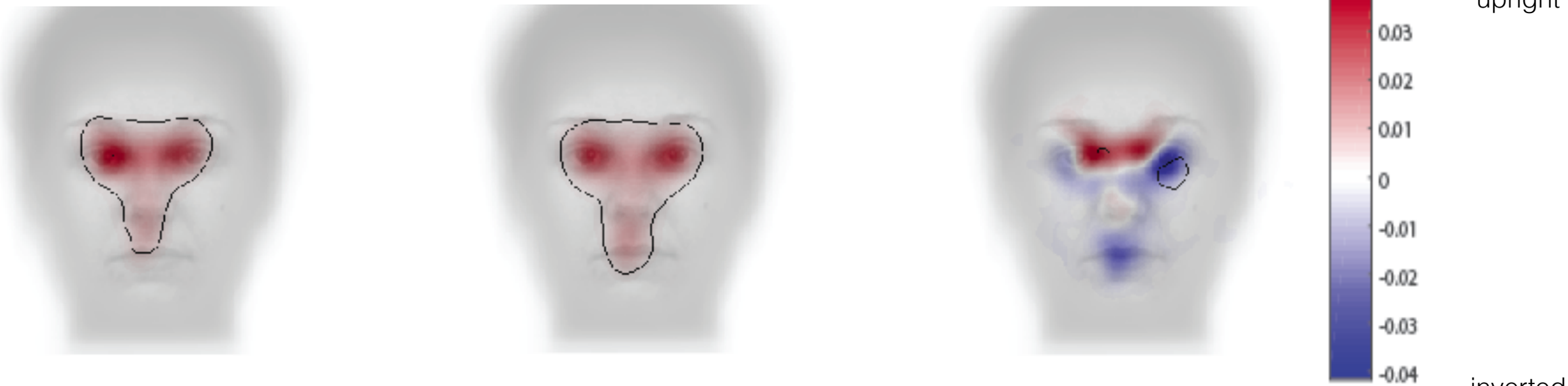
Local Group

N=24

Upright

Inverted

Contrast



Quantitative shift

Conclusions

- The face recognition system relies on flexible information sampling strategies to achieve effective face recognition (Global vs Local)

- The Face Inversion Effect is insensitive to idiosyncratic visual information sampling strategies

- Fixation density maxima showed both qualitative (global) and quantitative (local) changes in the information sampling

- Decrease of information use during face inversion

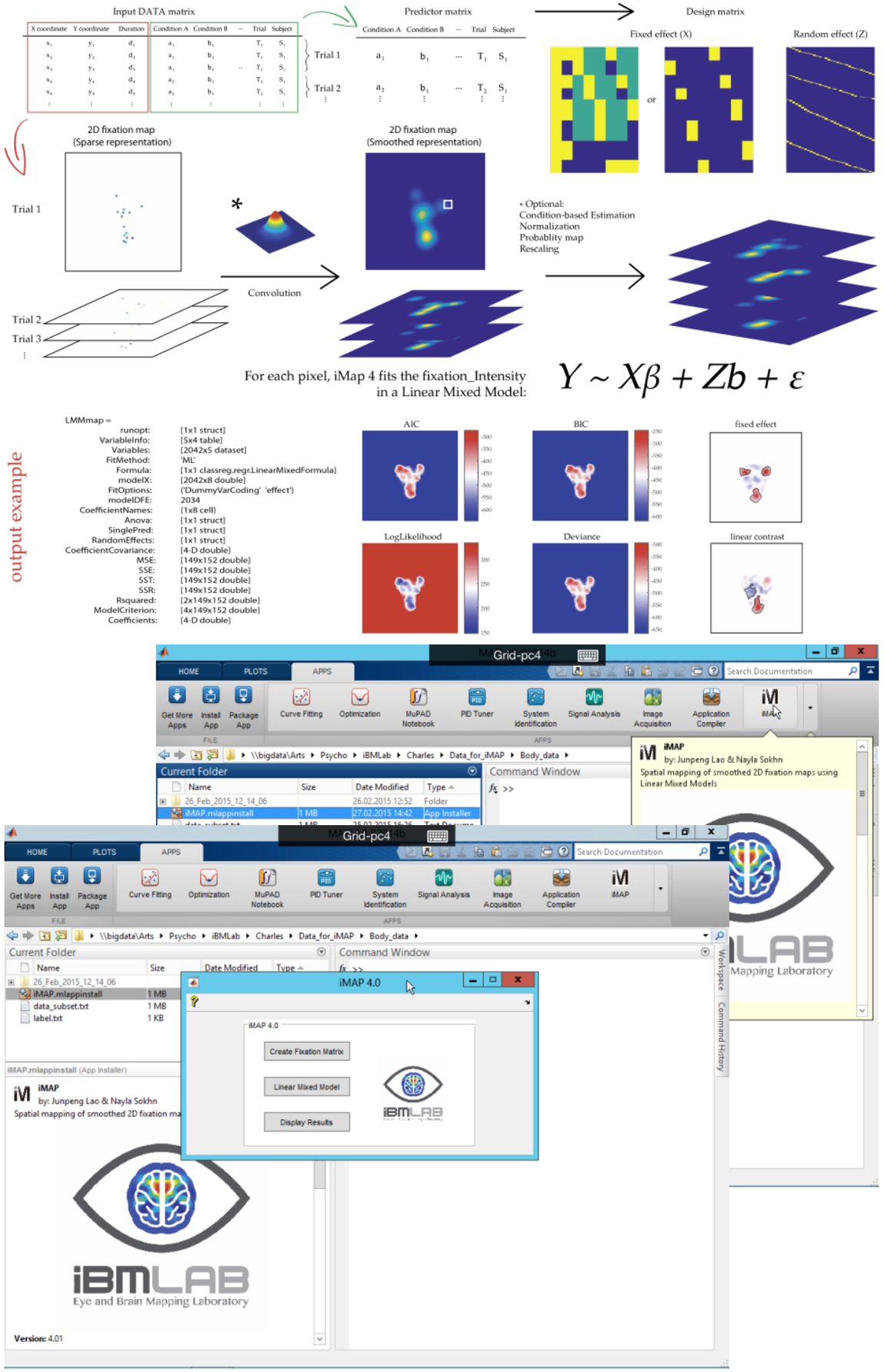
Thanks!

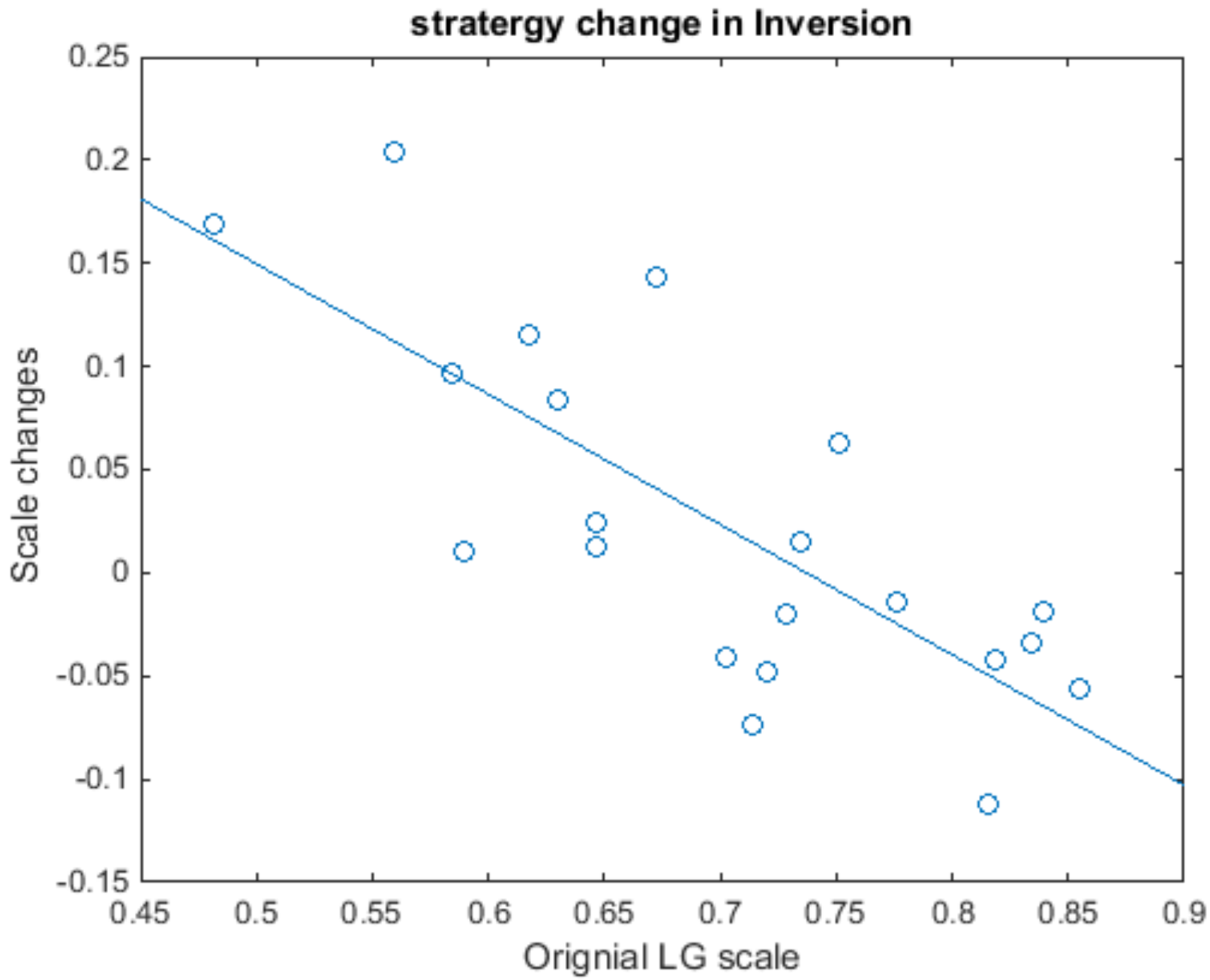
UNIVERSITÉ DE FRIBOURG
UNIVERSITÄT FREIBURG

iBMLAB
Eye and Brain Mapping Laboratory

iMap 4

Guidebook




stratergy change in Inversion
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
Scale changes
0.45
0.5
0.55
0.6
0.65
0.7
0.75
0.8
0.85
0.9
Orignial LG scale