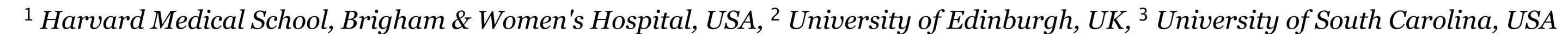


# The Dynamics of Gaze when Viewing Dynamic Faces

Melissa L.-H. Võ<sup>1,2</sup>, Tim J. Smith<sup>2</sup>, & John M. Henderson<sup>2,3</sup>







## Do the eyes really have it?

Studies using static images have shown a fundamental bias towards looking at other people's faces and in particular their eyes (e.g. Birmingham et al., 2009; Henderson et al., 2005; Yarbus, 1967). But faces out in the real world tend to move...

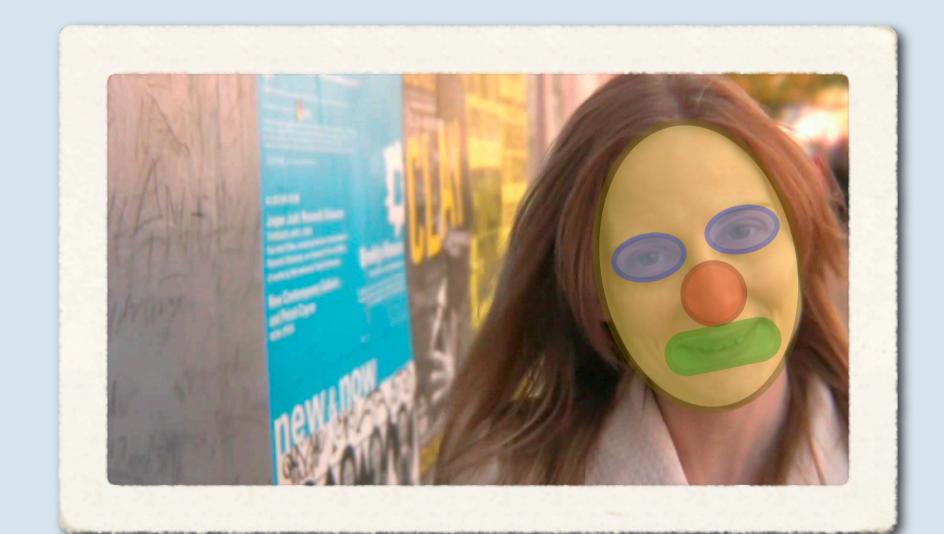
#### Questions:

How well do previous findings apply to dynamic images/ faces? How do social events modulate gaze behavior?

#### Methods

33 participants watched a 4 minute video clip taken from the Dynamic Images and Eye Movements (DIEM) database, in which pedestrians were asked where they would wish to wake up tomorrow. Eye movements were tracked using an EyeLink 1000 (SR Research) and analyzed as a function of

### 1) dynamic regions of interest





MOUTH

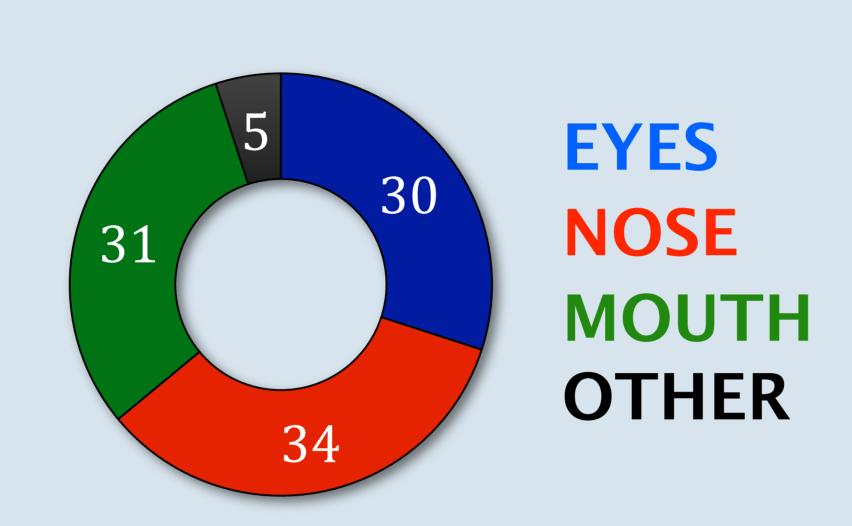
Dynamic Regions of Interest (dROIs)

#### 2) and social events, e.g.:

- Eye contact,
- Talking,
- Head movements, and
- Gaze cues

#### Results

87% of the time people look at faces. Gaze towards eyes, nose, and mouth were dynamically adjusted on the basis of social events.

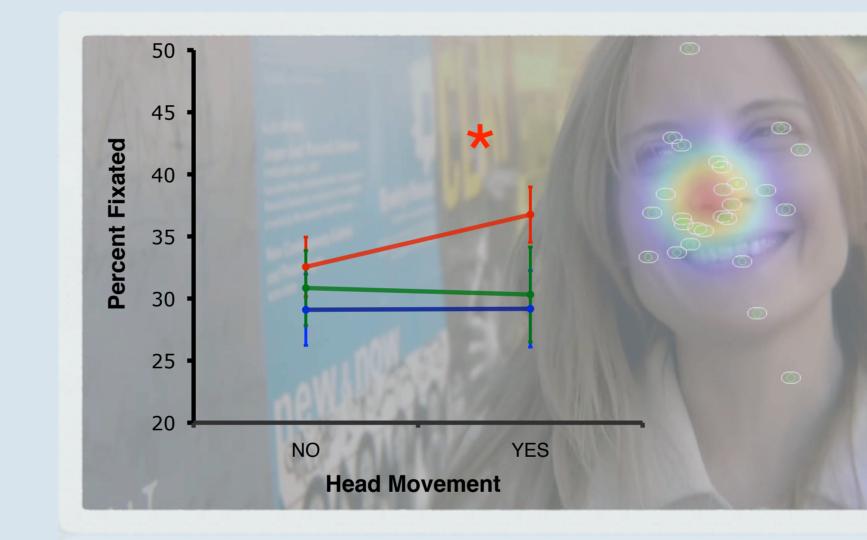


NO general gaze bias towards the eyes.

**MOUTH** bias when **TALKING** 



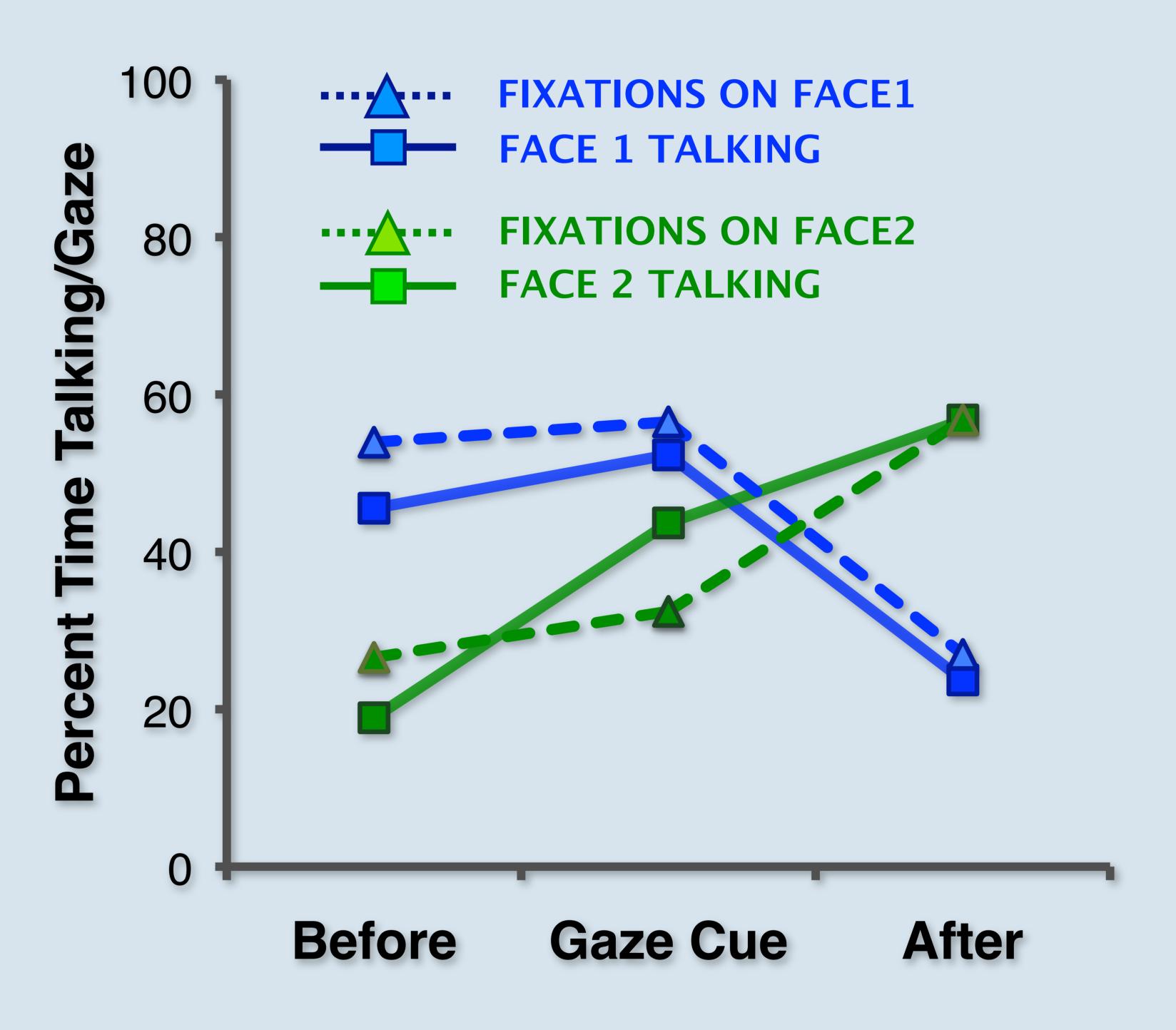
EYE bias during EYE CONTACT

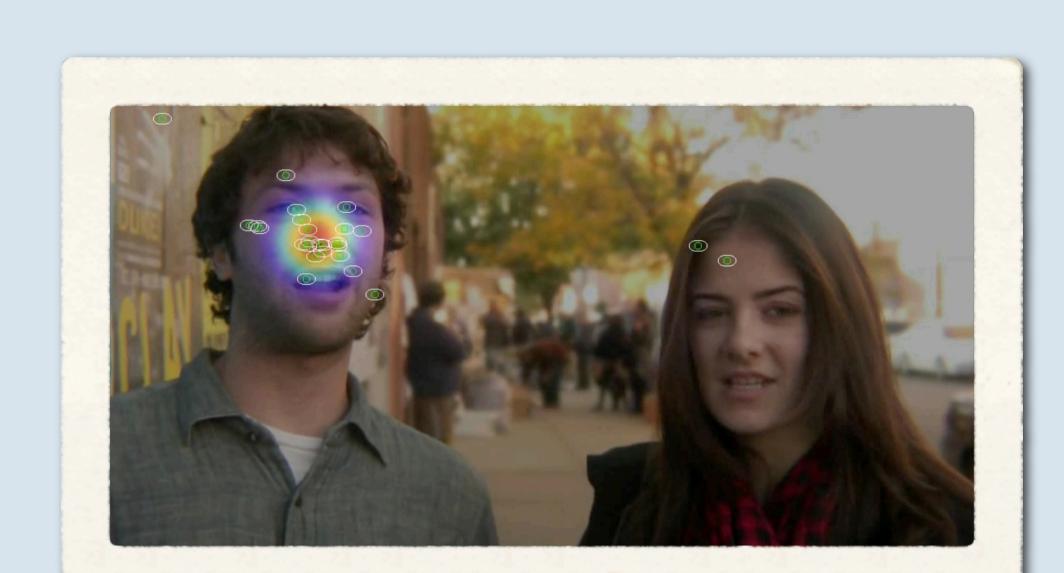


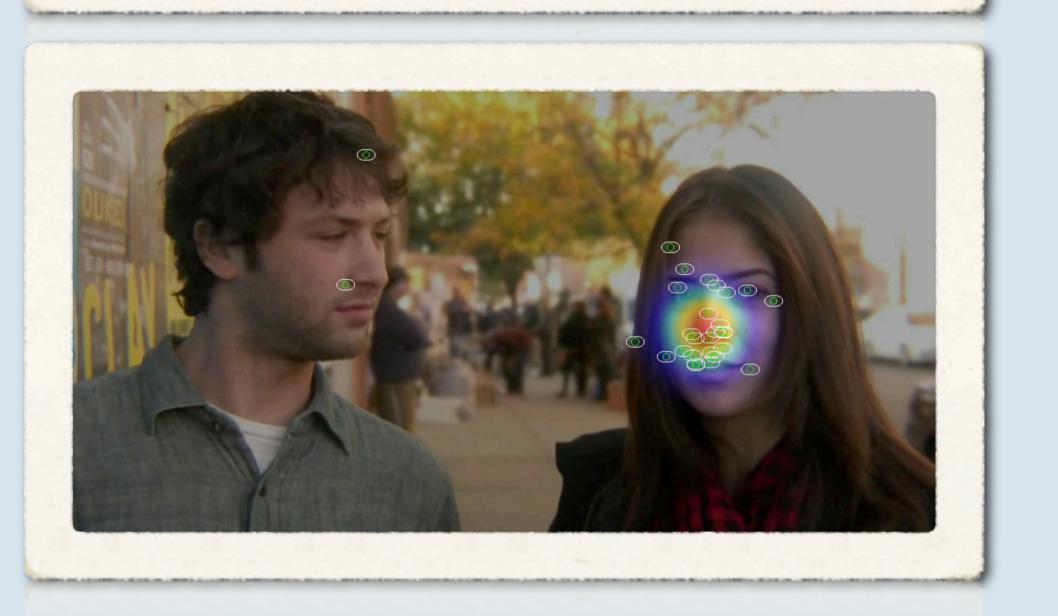


## Temporal dynamics of gaze following

Dynamic gaze cues that coincide with onset of speech lead to gaze following from one face to another.







FACE 1

FACE 2

#### FACE 2 TALKING FACE 1 TALKING FIXATIONS ON FACE2





Dynamic allocation of viewers' gaze as a function of gaze cues (face 1) and onset of speech among two faces.

## Conclusions

Not only the eyes have it (see Buchan et al., 2007). Gaze allocation is strongly modulated by social events when viewing dynamic faces: (1) Eye contact leads to increased fixations on the eyes. (2) During speech, the mouth receives priority for fixation. (3) The center of a face acts as an anchor point and receives fixation priority when moving. (4) Social gaze cues are strong predictors of both gaze following and shift in speaker.

#### Selected References:

Birmingham, E., Bischof, W. F., Kingstone, A. (2009). Saliency does not account for fixations to eyes within social scenes. Vision Research, 49(24), 2992-3000.

Buchan, J. N., Paré, M., Munhall, K. G. (2007). Spatial statistics of gaze fixations during dynamic face processing. Social Neuroscience, 2(1), 1-13.

Henderson, J. M., Williams, C. C., & Falk, R. (2005). Eye movements are functional during face learning. Memory & Cognition, 33(1), 98–106.

Yarbus, A. L. (1967). Eye movements and vision (B. Haigh, Trans.). New York: Plenum Press (Original work published 1965).

Acknowledgements: This research was supported by grant Ref F/00-158/BZ from the Leverhulme Trust to JMH. Out thanks also go to Parag Mital, Robin Hill, and Laura Speed.