



# Eying the eyes in social scenes: Diminished importance of social attention in simultanagnosia

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**Simultanagnosia is a rare neuropsychological disorder that results from damage to the parieto-occipital junction.**

Patients can typically see only one object at a time, leading to piece-meal visual perception.

When patients with simultanagnosia describe social scenes they tend to allocate a low proportion of fixations to the eyes of the people in the scenes. This is unusual: healthy subjects tend to allocate extremely high proportions of fixations to the eyes of people in scenes.

The simultanagnosic tendency to not look at the eyes of people in social scenes can be modeled in healthy subjects by asking them to describe the scenes while looking at them through a computer generated restricted window of vision (a gaze-contingent display).

Gaze-contingent displays have been used to model other behaviours that are characteristic of simultanagnosia, such as local capture with hierarchical letter stimuli.

### Why don't simultanagnosics look at the eyes?

We hypothesized that seeing only a small portion of a scene at one time might decrease the informative value of the eyes, making fixations to that region inefficient when describing scenes.

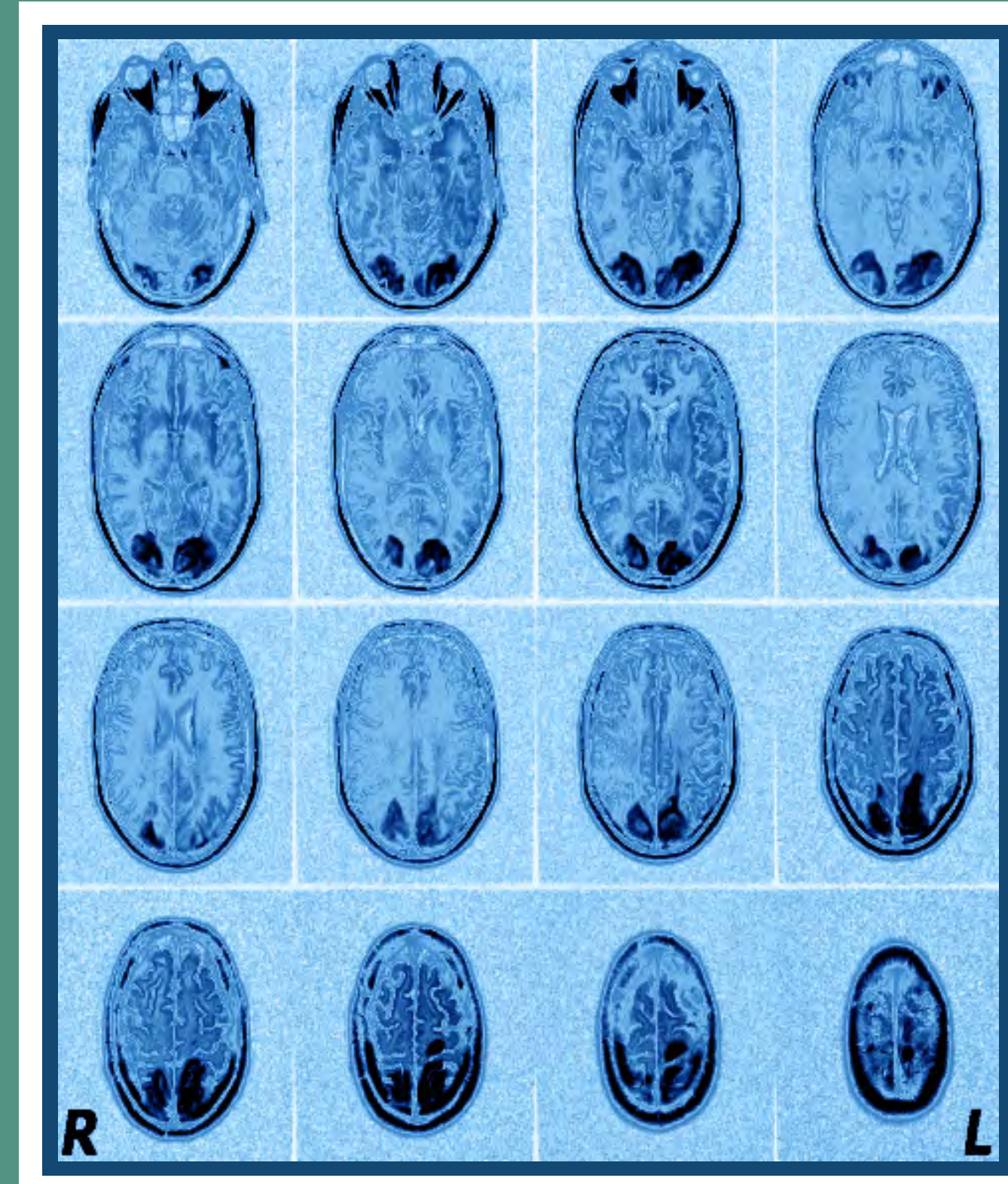


Fig 1. MRI Scans of patient GB

**We tested this hypothesis by increasing the importance of the eyes with a different task.**

Healthy subjects who viewed the scenes normally (Full-View controls), a group of healthy subjects who viewed the scenes through a gaze-contingent display (Gaze-Contingent group) and a simultanagnosic patient (GB) performed two separate tasks with the scenes:

- 1) Describe: Verbally describe the scene
- 2) Infer attention: Verbally infer where the people in the scene are directing their attention

Each task was performed twice. The order of the tasks was counterbalanced.

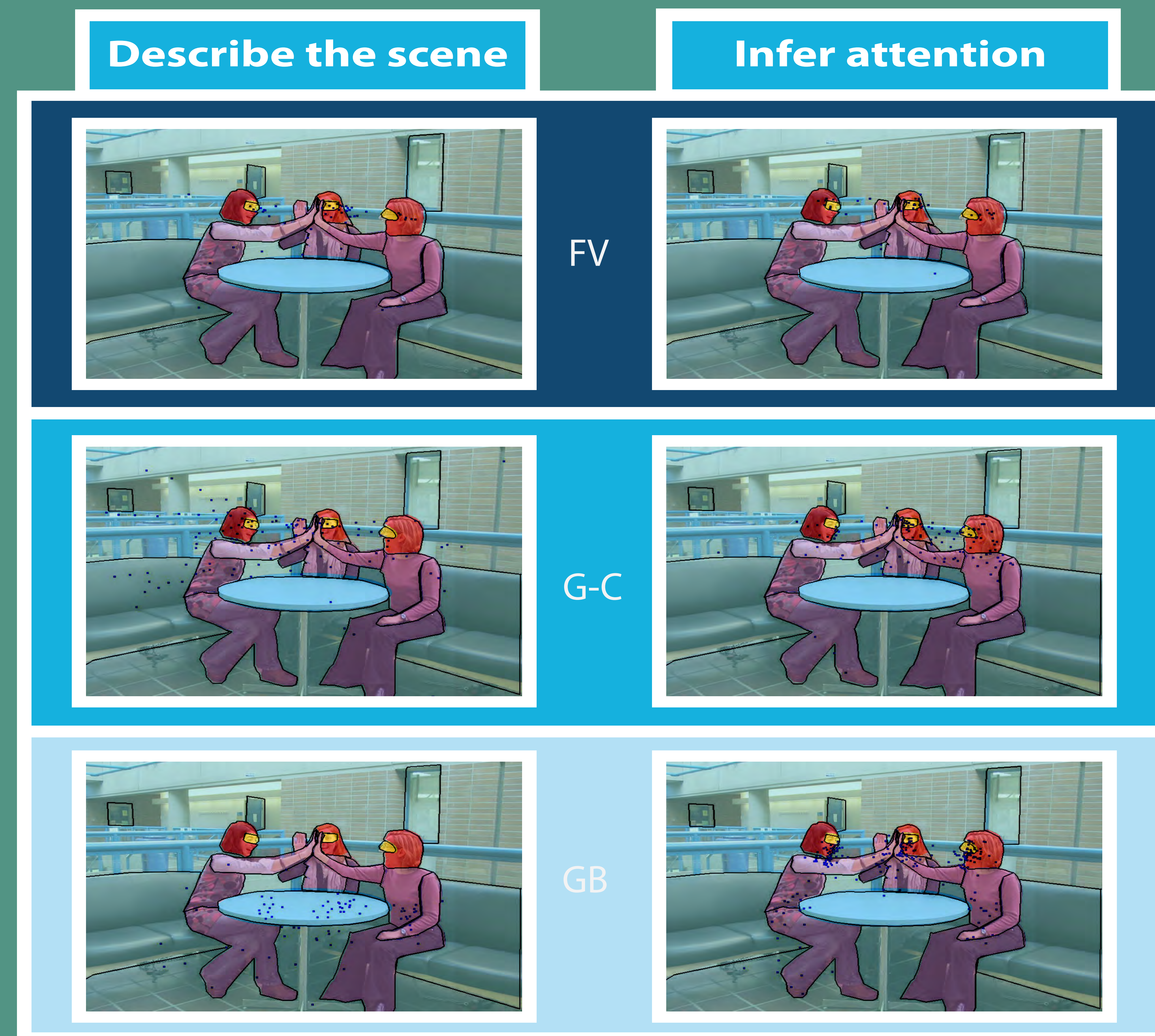


Fig 2. Representative fixation plots for each task for full-view controls (FV), gaze-contingent group (G-C), and GB. Fixations are represented by black dots. Eye region is highlighted in yellow

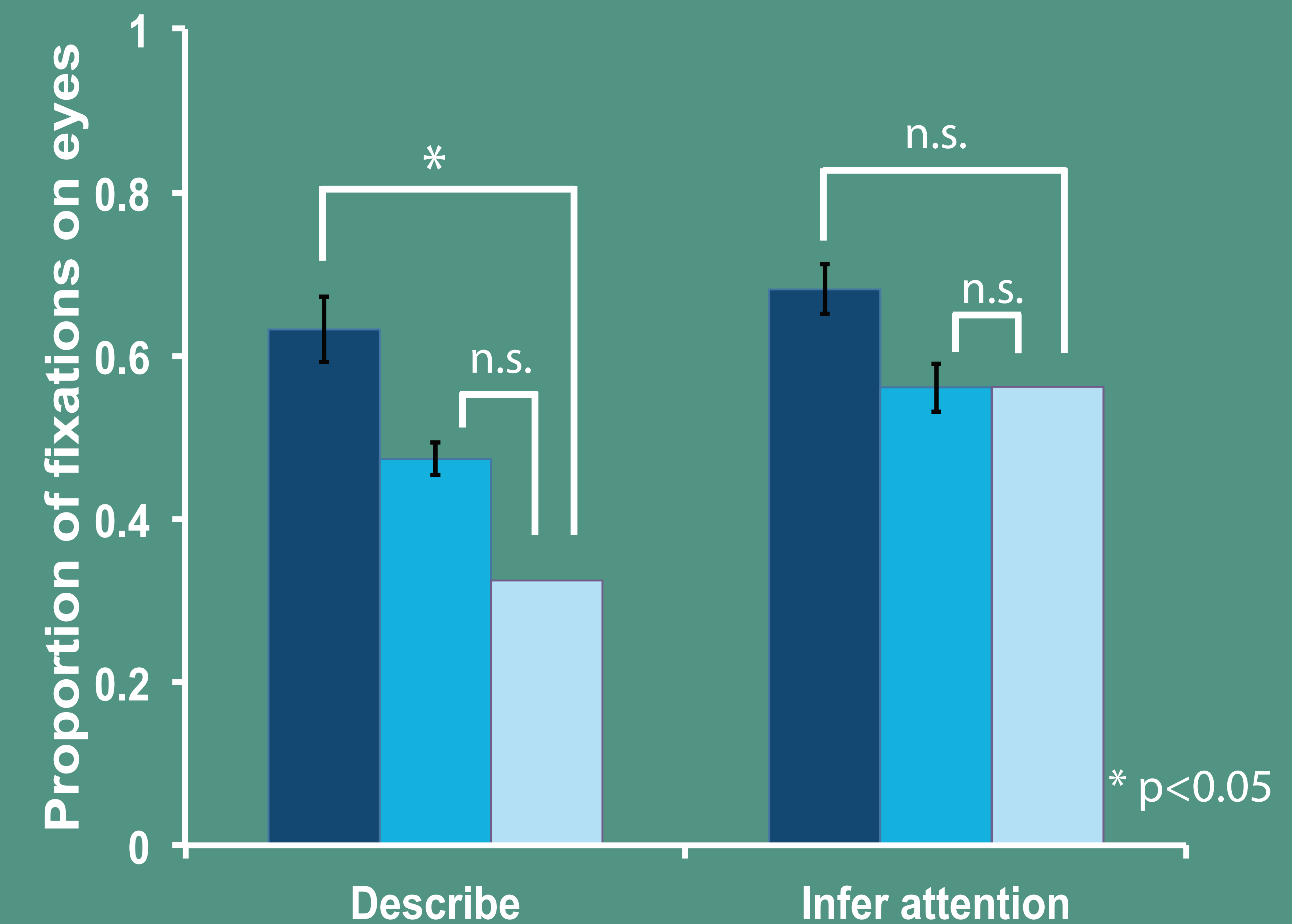


Fig 3. Proportion of fixations on the eye region of social scenes by task for controls who viewed scenes normally, healthy subjects who viewed scenes through a gaze-contingent display, and for simultanagnosic patient GB

**Full-view (controls)** **Gaze-contingent** **GB**

### RESULTS

GB and the gaze-contingent group made abnormally low proportions of fixations on the eyes when describing social scenes, but showed a significant increase in fixations on the eye region when inferring attention of people in the scenes.

**Both GB and the Gaze-Contingent group understand that the eyes are important (as indicated by the infer condition), but the value of the eyes is compromised when visual attention is restricted (as indicated by both the describe and infer conditions). In short, much of the informative value of eyes seems to be lost when the global picture is visually unavailable.**

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