Background
The face of an interlocutor draws eye fixations during interactions
• Primarily directed towards eyes or mouth (“Directed” eye movements)
  - Eyes: social cues, attention and intention
  - Mouth: facilitation of language processing[3]
However, we don’t “stare” at our conversational partners
• Directed away from face (“Avoidant” eye movements)
  - Due to:
    - Increased cognitive load[4]
    - Encoding new information[5]
Majority of literature on fixation behavior uses pre-recorded videos
• Fixation behavior may be altered if participants are aware they are watching a video
• Literature does not take into account social cues on cognitive load

Current Experiment
Question: How does being seen and heard by an interlocutor influence gaze behavior during a real-time interaction?

Two conditions: “Real-time” and “Pre-recorded”
• “Pre-recorded”
  - Participants are aware they are watching a pre-recorded video
• “Real-time”
  - Participants encouraged to believe they are engaging in a real-time interaction over the internet
  - Deception utilized

We anticipated several possible outcomes:
• Participants will exhibit avoidant behavior (i.e. reduced face fixations) more often in the real-time condition due to increased cognitive load of social interactions
• Alternatively, participants may exhibit directed behavior based on social cues such as gaze locking during real-time conversations.

• Participants will fixate the mouth more for pre-recorded videos due to decreased cognitive load with the same task of encoding verbal information
• Participants will fixate the eyes more for the real-time condition due to increased social saliency

Methods
Participants
173 undergraduate participants, 98 analyzed
• 75 excluded due to deception failure (36), low questionnaire score (24), tracking malfunction (15)
Stimuli
• Video lecture by male or female actor
• 4 minute lecture (“Breakfast influencing grades” / ”MSG myths”)
  - “Pre-recorded” condition:
    - Participants were instructed that they would be watching a previously recorded lecture
  - “Real-time” condition:
    - Interlocutor first asked participants “can you hear me?”
    - and to “recite the alphabet” in order to encourage belief in interaction
False “video conferencing” software used with dialing boxes

Task
• Participants asked 5 content questions per video
  - Excluded if score < 2
• Also asked questions to assess deception success
  - i.e. “Could the other person see and hear you clearly?”

Fixation Behavior Analysis
We defined three areas of interest (AOIs): the mouth, the eyes, and the whole face.
Dependent measures:
% time spent in the mouth or eye AOIs relative to the whole face AOI
% time spent in the whole face AOI over total running time of the video

Results
Participants exhibited significantly more avoidant eye movements for the real-time condition vs the pre-recorded condition, t(97) = 4.521, p<.001
Participants gazed significantly more towards the mouth for the pre-recorded condition compared to the real-time condition, t(97) = 2.566, p=.01

There was no significant difference in fixations directed towards the eyes between the real-time and pre-recorded conditions

Deception was successful at a rate of 79.1% (137/173)

Discussion
Our results confirmed that there is a difference in fixation patterns if a participant knows they are watching a video of a talking face vs. if they believe they are engaging in a real-time situation.

Increased avoidant eye movements in real-time condition likely due to increased cognitive load due to social cues, with static task (encode lecture information) Increased mouth fixation in pre-recorded condition likely due to decreased cognitive load from social cues with static mouth saliency due to task

Our findings suggest that much of the fixation literature should be re-examined as knowing a video is pre-recorded strongly influences fixation behavior. Use of deception and/or re-evaluation of methods may be necessary

References
Proceedings of the 8th International Conference on Multimodal Interfaces - ICM’06, 287.