Active Long Fixation Correlates with the Formation of Long-Term Memory

Lab Seminar

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Attention

Attention enables us to focus

Attention enables us to focus

be efficient

Attention enables us to focus
be efficient
and think more.

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Fixation Duration on Word Frequency

Table 1
A Sample of the Sentences Used in the Experiment

The slow music/waltz captured her attention.
The tired teacher/traitor left the room.
The captivating book/tale described his life.
A broken car/fir blocked the road.
The cold water/tonic tasted stale.
The handmade frame/quilt decorated the wall.

Note—Noun pairs of each sentence initial noun phrase depict high-/low-frequency target words.

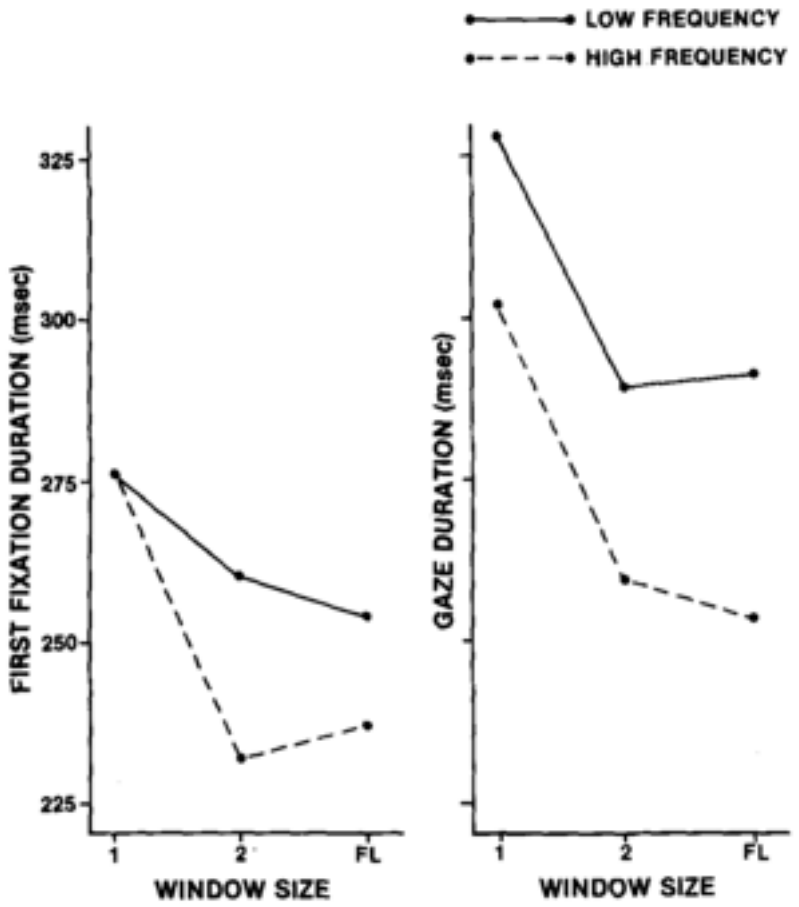
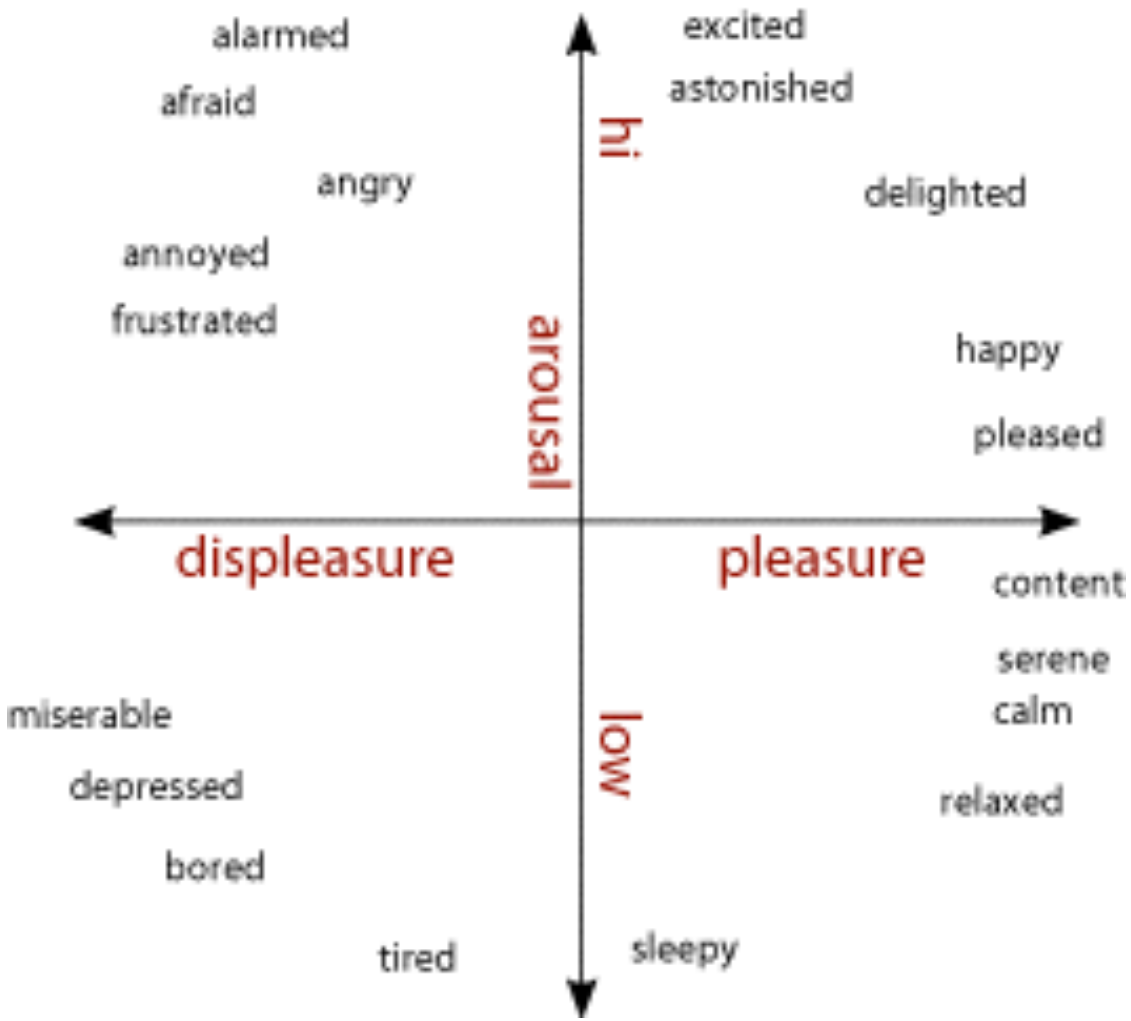


Figure 1. First-fixation durations (left panel) and gaze durations (right panel) as a function of window size and word frequency.

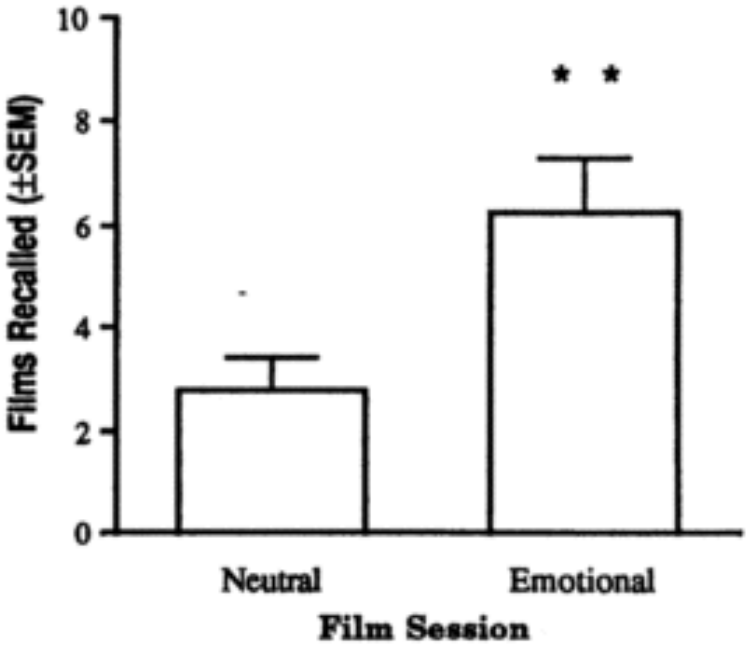
Inhoff & Rayner, 1986

Mental Space of Emotion



Russell, 1980

Arousal and LTM



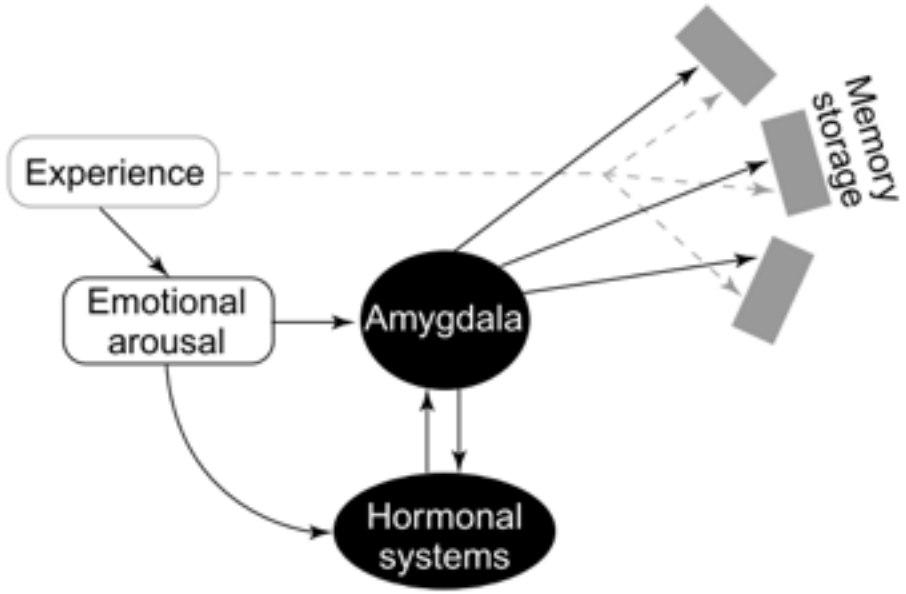
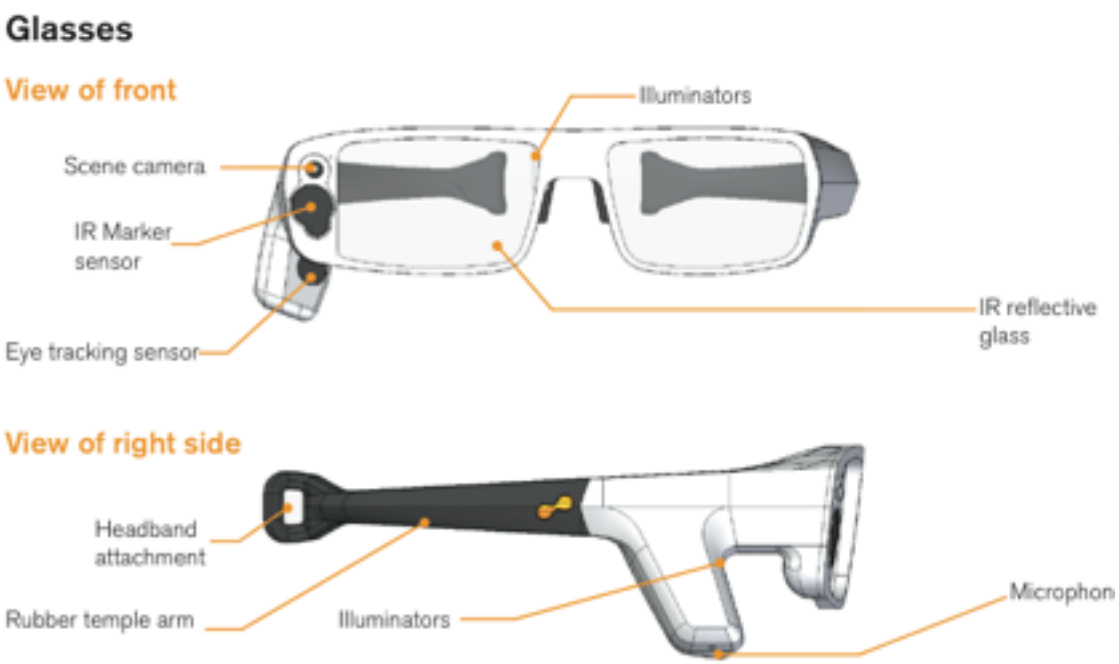
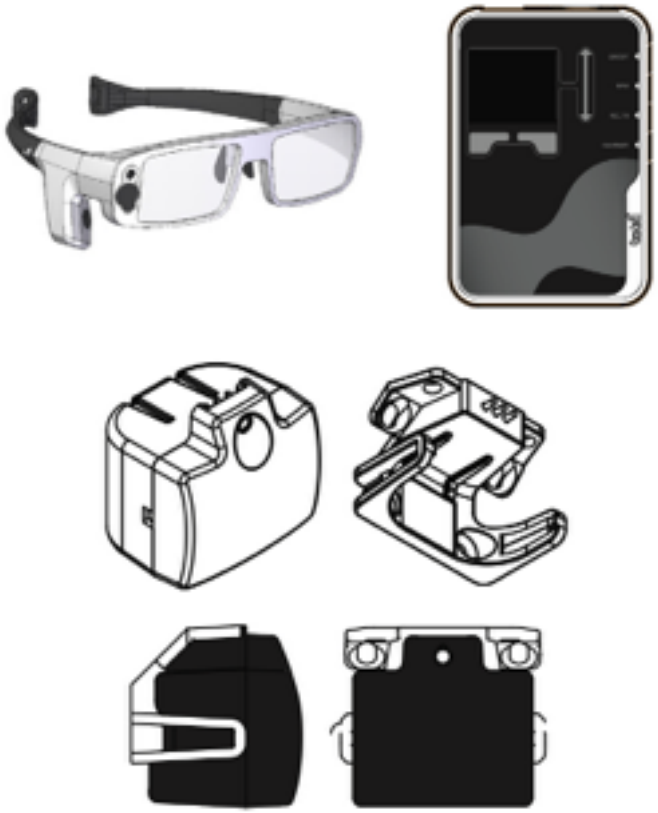


Fig. 5. ***Hypothetical memory-modulatory mechanism for emotionally arousing events.*** *Experiences can be stored in various brain regions with little or no involvement of either stress-hormone activation or the amygdaloid complex (AC). During periods of emotional arousal, stress-hormone systems interact with the AC to modulate memory-storage processes occurring in other brain regions.*

Cahill et al., 1996; Cahill & McGaugh, 1998

Tobii Glasses





http://www.tobii.com/en/eye-tracking-research/global/library/manuals/

Precedent Studies

1. The fixation duration is related to the presence of the cognitive process, for an instance, observing its correlation with linguistic attributes. (Inhoff & Rayner, 1986; Rayner & Duffy, 1986)

2. The sequences which potentially induce the emotional arousal are known for helping to recall the seen movie clips. (Cahill et al., 1996; Cahill & McGaugh, 1998)

3. The eye movement is a non-invasive and convenient indicator of the brain activities, the application of eyewear accelerates the study on the eye movement, especially beyond the reading task.

Research Hypothesis

1. **What the visual constraints induce the long term of the fixation duration?**

2. **Do the long fixations correlate with the formation of long-term memory?**

3. **Does the fixation duration indicate the effectiveness of the long-term memory formation for the emotionally arousing sequences?**

Long Fixation Types

Alerted

Successive

Stationary

HI

LOW

Emotional Arousal

Recall Test

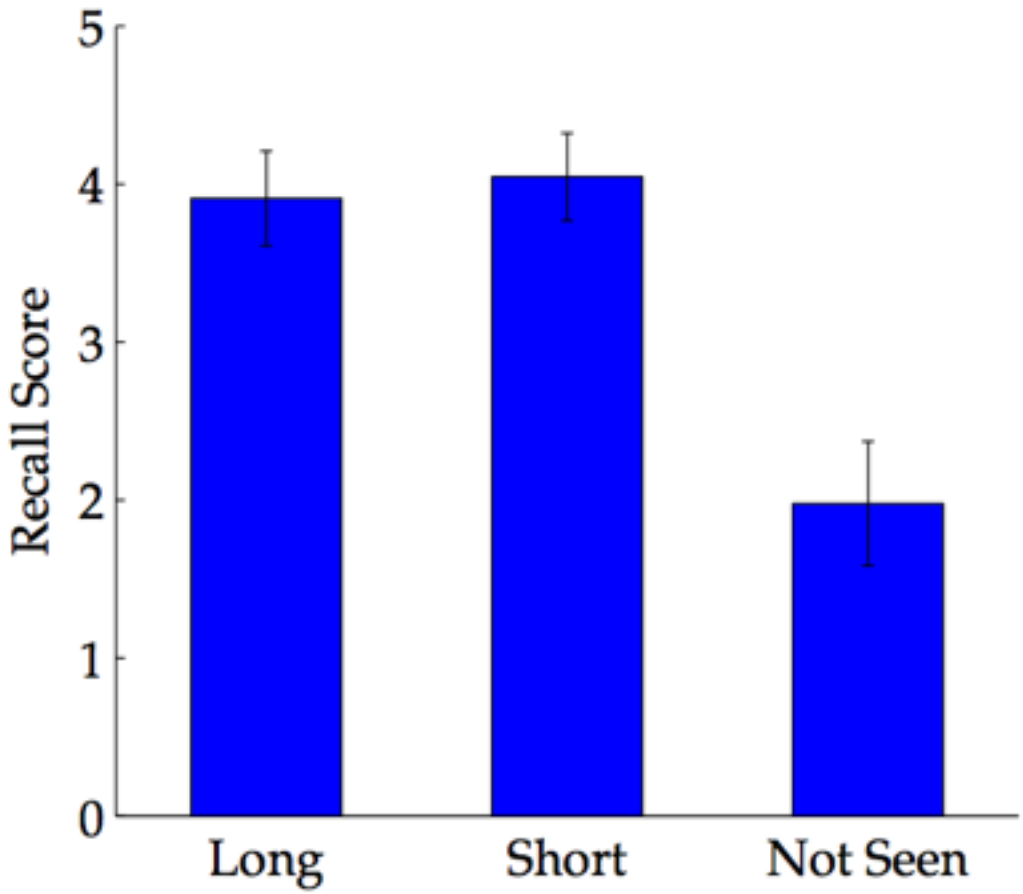
1. **Subject**

   - 11 participants who previously watched the video (> 3 months ago)

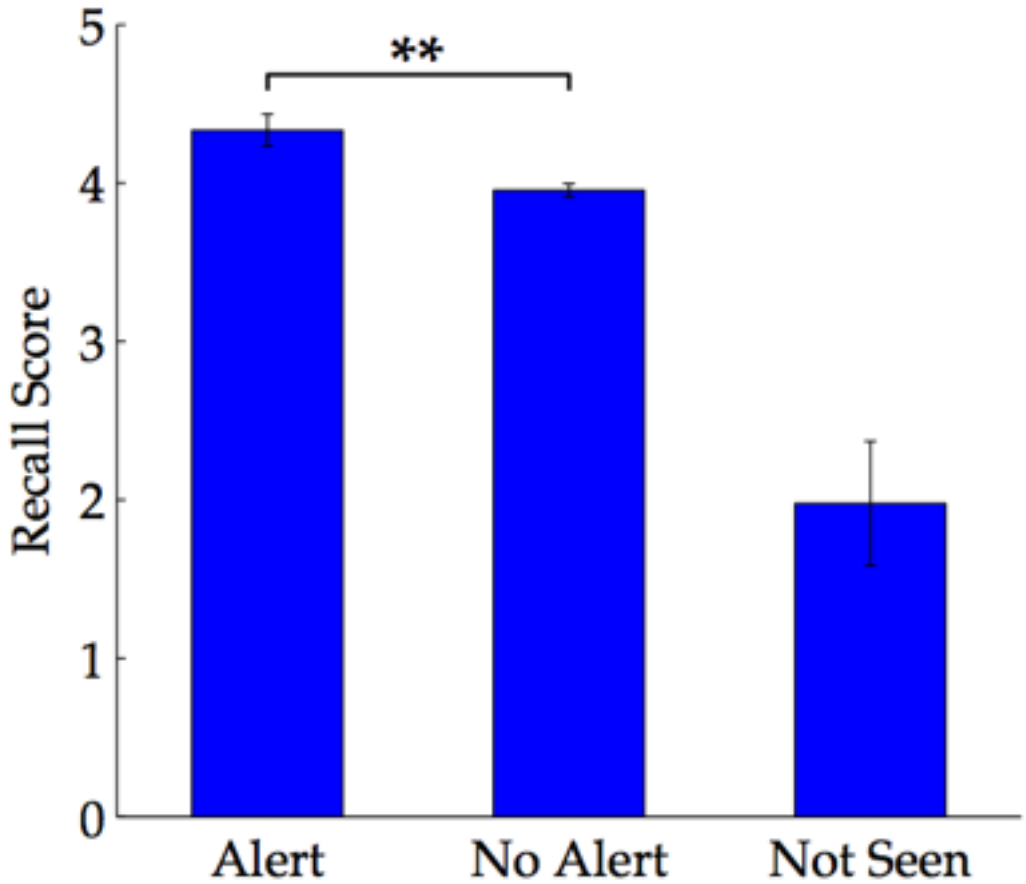
2. **Material**

   - Long fixated 8 sequences (> 1500 ms)
   - Short fixated 8 sequences (< 300 ms)
   - Not seen 4 sequences (other season episodes)

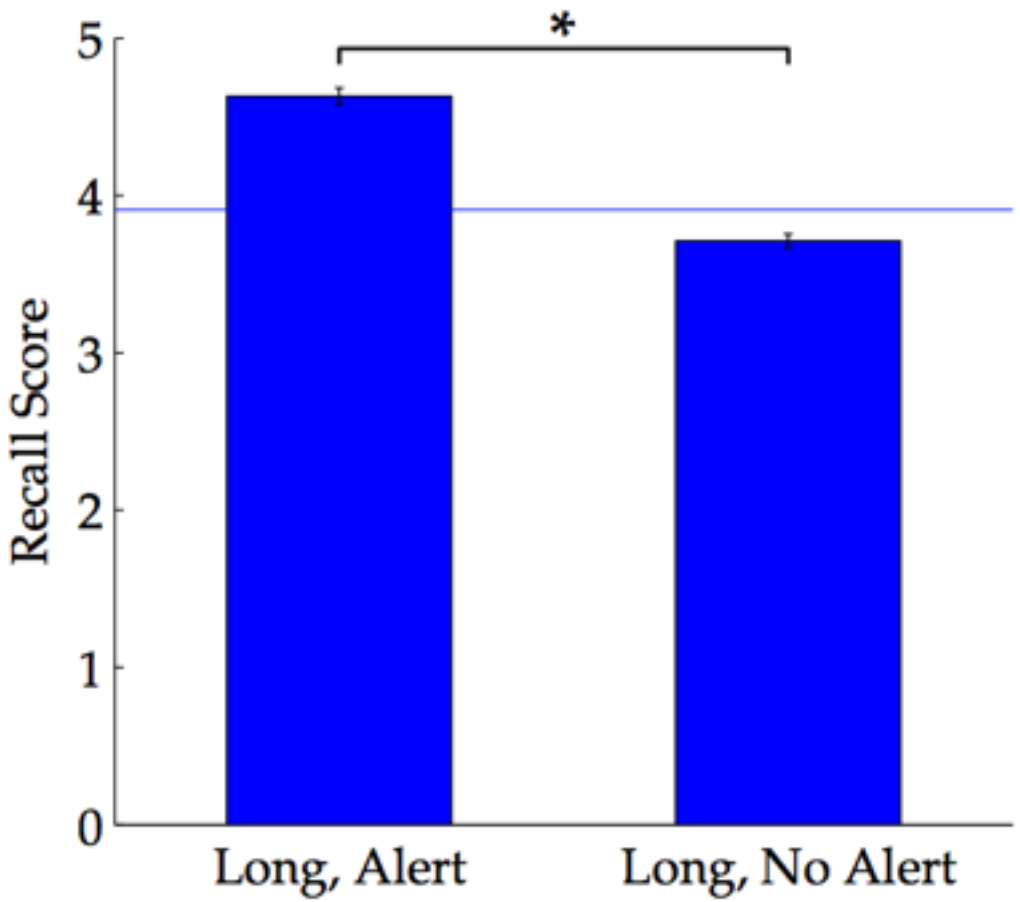
Results of Recall Test



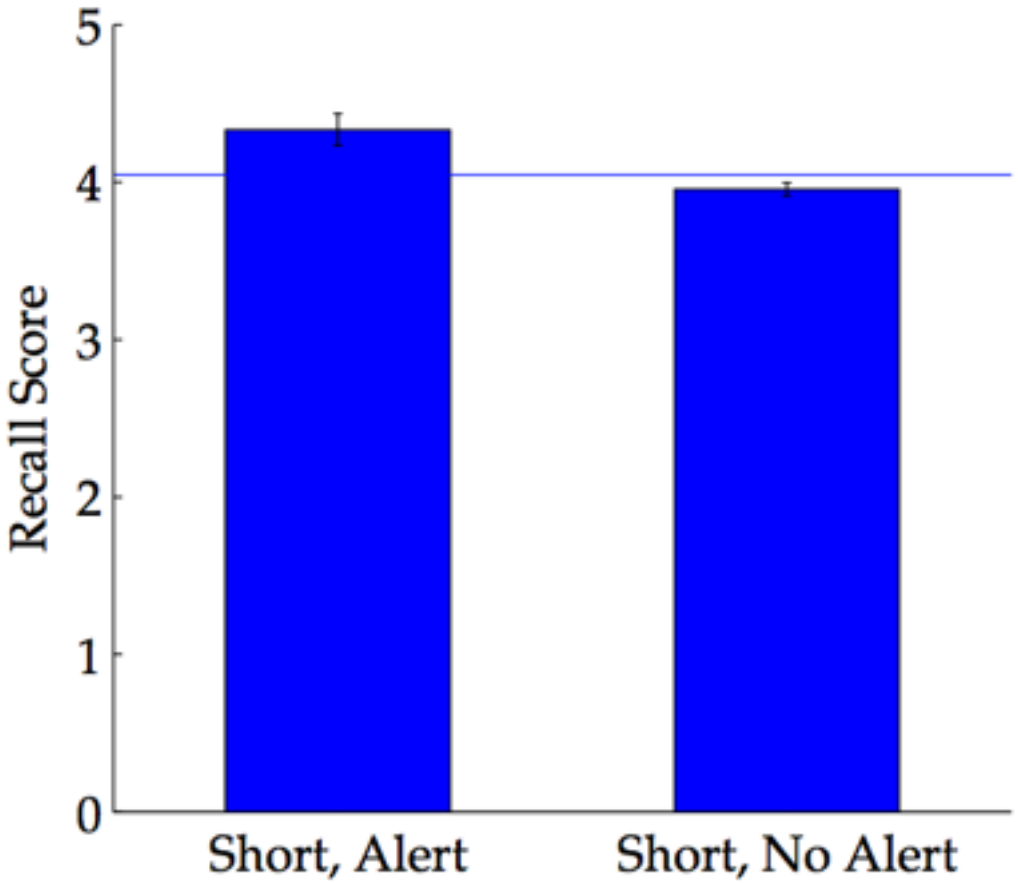
Results of Recall Test



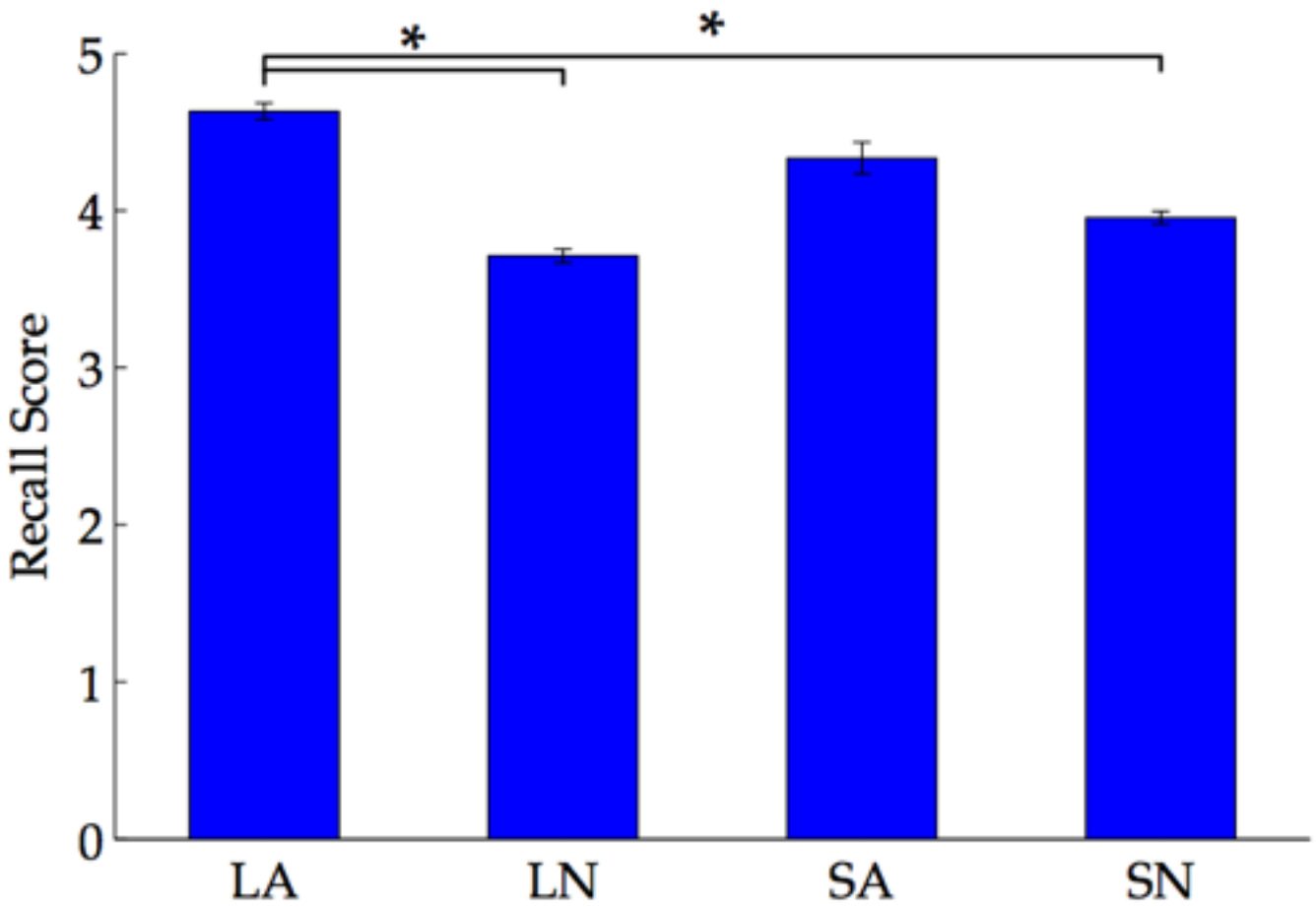
Results of Recall Test



Results of Recall Test



Results of Recall Test



Discuss

1. Short fixations relatively fail to memorize the emotionally arousing events than long fixations do.

2. There is no evidence that all long fixations associate with the formation of long-term memory. However, we can have a question that the emotionally arousing event may induce the active long fixations when it affects.

3. Though, other events can receive long fixations, in this cases, subjects hardly recall that events. It seems to be caused by looking passively or even blankly.

Conclusions

1. **What the visual constraints induce the long term of the fixation duration?** Alerted, successive, stationary

2. **Do the long fixations correlate with the formation of long-term memory?** No

3. **Does the fixation duration indicate the effectiveness of the long-term memory formation for the emotionally arousing sequences?** Active long fixation does

Further Works