Priming of visual attention by continuity editing in dynamic visual scenes

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Background

Research suggests that attention in dynamic scenes is biased towards content that differs from what was observed before [1]. While this may be prevalent in many situations, we propose that a preference for repeated information is as well observable.

Professional footage contains cinematic cuts, with either continuity editing or discontinuous editing. Continuity cuts repeat major elements from a pre-cut scene in a post-cut scene. Although such cuts constitute abrupt changes, they are often not realized by viewers. In contrast, viewers are more frequently aware of discontinuous cuts [2, 3]. We hypothesize that after cuts attention is captured by visual features repeated from the pre-cut scene.

Methods

20 viewers participated in an eye tracking study. (EyeLink 1000 Desktop Mount, monocular recording at 1000 Hz)

Materials

We edited sports movies using either continuity cuts, or discontinuous cuts (324 cuts in total). Example cuts are depicted in Figure 1.

Procedure and task

In each of 20 blocks, two different sports movies were shown silently side by side on a computer screen (see ‘example block’ in Figure 2).

Viewers were instructed to watch one of the movies while ignoring the other and keep their eyes on the movie they were watching.

Crucially, the movies switched positions at some of the cuts, so that viewers had to saccade to the new position.

Viewers reported by button presses whether the task-relevant movie continued at the same or at the different position.

Results

Continuity had an effect on manual reaction times (RTs) and manual response accuracy. When the movies continued at the same position, discontinuous cuts were reliably detected. With continuity, the fraction of missed cuts nearly doubled. When movies continued at the different position, performance did not differ between the two types of cuts.

However, saccadic reaction time (i.e., relocating gaze to the different position of the task-relevant movie after the cut) was reduced by 26 ms with continuity cuts as compared to discontinuous cuts.

Conclusion

Our results demonstrate that the classical technique of continuity editing achieves the desired result of perceptual continuity and a surprisingly large number of cuts is missed. This effect is however not additive with a change of spatial location.

We found differences in saccadic latency between continuity cuts and discontinuous cuts, which indicate that information from the periphery contributes to the decision process whether the movies switched positions or not.

We propose that re-orientation of attention and gaze after abrupt scene changes, like with cinematic cuts, is primed by repeating visual content from the pre-cut scene.

References


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Figure 1. Example continuity cuts and discontinuous cuts.

Figure 2. Example block (each block lasted until the end of the movies).

Figure 3. Results.