VSS 2014 Abstract

Shuffling your way out of change blindness

Drew & Wolfe

The ability to identify differences between two images is an important task in a variety of real world settings. For instance, in diagnosing cancer, radiologists may compare a patient's prior and current images to determine whether an innocuous blip has grown into a malignant mass. This process is typically performed by displaying the two images side by side (SbS) and looking back and forth between the images. In settings like astronomy, it is much more effective to toggle between two images in the same location on the screen. However, while it is easy to take two identical pictures of the night sky to look for a planet, it is impossible to take two identical mammomgrams 6 months apart. Would this method, dubbed "shuffling", improve performance, even with imperfect alignment of the images? We created pairs of real world pictures where one object had been moved on half of the photos. Each image set was randomly viewed in either SbS or Shuffle condition. In Experiment 1, observers had a time limit. The percentage of changes detected was higher in Shuffle (57%) views than in SbS views (50%, $t(22)=2.6, p<.03$, cohen's $d=.4$). In Experiment 2, the time limit was removed. There was no longer a benefit in hit rate, but observers were markedly faster in the Shuffle (19s) than in the SbS condition (25s, $t(22)=6.1, p<.001$, cohen's $d=.8$). An eye-tracking follow up experiment replicated the speed benefit of the shuffle view and suggested that the benefit was primarily due to decreased decision time in the Shuffle condition: once a target had been fixated, observers in the Shuffle condition tended to take substantially less time (~6s) to identify it as a target. Shuffling is not a 'cure' for change blindness but the benefit may be large enough to have impact on some radiology exams.