Detecting more than one event at a time in multiple event tracking.

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In many surveillance situations, observers have to monitor for an event (e.g. Did anyone pass a bag to someone else?). Our previous work shows that the capacity for event monitoring is more limited than for classic multiple object tracking. However, it is not clear if a capacity of K events means that people can detect K events simultaneously or only that they can successfully detect one event at a time while monitoring K out of N items. In the first experiment, observers tracked 4-8 moving, unique objects for up to 8 seconds. Two target objects experienced state changes (e.g. open bottle to closed bottle). In one block, changes were simultaneous. In the other, changes were sequential. In the second experiment, displays contained 4-8 identical disks, each "carrying" a black bag along with 4 disks carrying no bag. All items moved pseudo-randomly. In one block, two disks would drop their bags simultaneously. In the other, only one bag drop occurred. In both experiments, observers had to report the target event(s) within two seconds after the change(s) occurred by clicking on the target disk(s). Otherwise, the trial was considered a "miss". In Experiment 1, performance was similar in the simultaneous and sequential change conditions (mean accuracy 51.7% vs. 48.8%). There was no penalty for simultaneous presentation. In Experiment 2, the detection was essentially identical in single target condition and dual target condition (mean accuracy 59.6% vs. 59.7%) meaning that observers located two drops as readily as one. These data are more compatible with a model that includes an ability to detect two changes at once than with a model limited to only one detection at a time. Our results suggest that a capacity of K in multiple event tracking may represent the number of event people can detect simultaneously.

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