

screen for 50 milliseconds (one-twentieth of a second) and then asked subjects to report what letters they had seen. Even with such a brief exposure, subjects could consistently report three or four letters accurately.

Although this result seemed to indicate a limited processing capacity, Sperling was able to show that, in fact, all of the letters had entered sensory memory. He did this by using a partial report technique. That is, he used a high, medium, or low tone to signal to subjects which row of the array they were to report. Instead of a relatively poor performance (three or four of twelve letters), subjects showed remarkably good performance, reliably reporting three or four letters in the row (so, three or four of four) no matter which row was signaled. It appears, then, that sensory memory is temporally, rather than visually, limited. In other words, a great deal of visual information registers, but it decays very rapidly without further processing, within a quarter of a second, according to Sperling's experiments.

Relatively little is known about the sensory memories corresponding to the other senses, but they are presumed to function in a similar way. Darwin, Turvey, and Crowder (1972) replicated Sperling's results with the auditory system. They found, however, that the auditory sensory memory (or echo) lasted longer than the visual sensory memory (or icon), typically up to 4 seconds under partial report conditions. An explanation for this difference is thought to lie in the requirements for speech perception. In other words, sounds must remain in sensory memory long enough for them to be combined with other sounds so that speech may be understood.

Sperling's use of the partial report technique also illustrates the effect that attention has on information processing. The tone served as a cue to focus attention on a particular part of the display so that it could be processed further and recalled. Attention is a process that has been conceptualized in a variety of ways. Instructors admonish students to pay attention in class, but they also adopt measures to focus students' attention on particular features of instruction. Either way, a student who is not attentive misses some of the information to be learned.

Cognitive psychologists, noting that some information always seems to be lost in processing, initially thought that attention acted as a bottleneck or

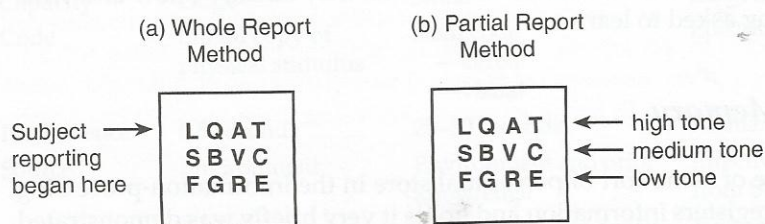


FIGURE 3.2 Visual Displays Similar to Those Used by Sperling (1960)

filter preventing information. Treisman (1960) showed, however, that attention is selective and suggested that it is not a filter. His ideas are easily illustrated. You may be attending to one person being said around you. But you are also talking about a topic that you have enough information was to pay closer attention to the second person.

Researchers have come up with the idea of capacity to be allocated and used (Treisman, 1973; Grabe, 1986). This suggests that the process and may selectively attend to one thing, however, that some tasks are accomplished effortlessly and automatically are important. Let us consider an example.

### Selective Attention

Selective attention refers to the ability to focus on one source of information while simultaneously ignoring other information (individuals can spread their attention over multiple sources of information) or focus on one source of information upon a number of factors. For example, if you are in a room catches your attention.

Second, similarity between stimuli makes a difference. It is hard to focus on one speaker when both speakers are the same volume. Imagine the poor student who is trying to study classical music is played.

Task complexity or difficulty also affects selective attention. Simple tasks, such as watching a comedy and are easily done automatically. For example, putting on a TV comedy, putting on a family about tomorrow's success. But when it is something about a business or assembling an intricate object, complete and focused attention is required. For example, a post-baccalaureate