

Reading pictures

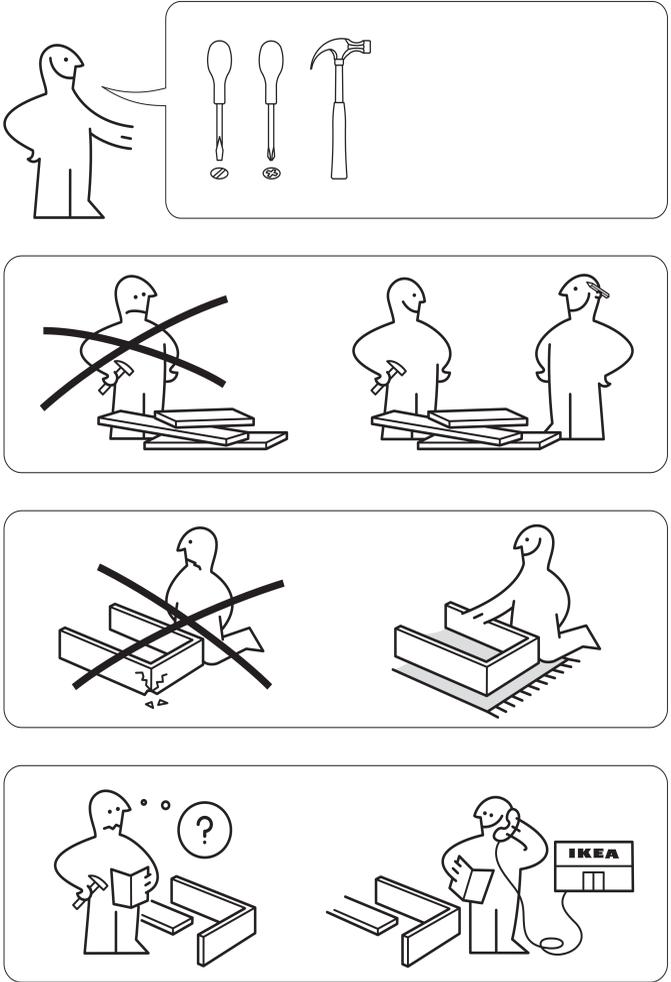
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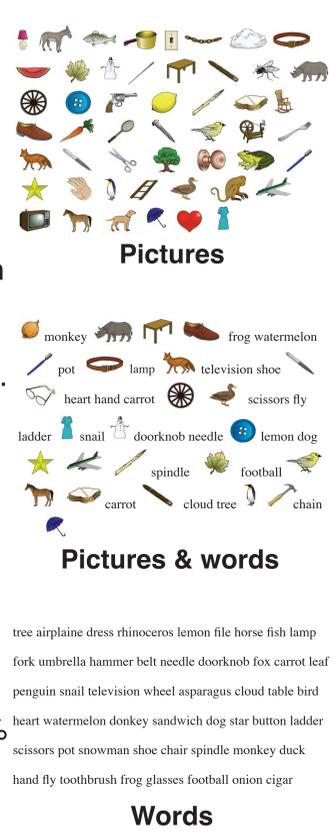
Illustration by Maggie Suisman
http://www.maggiesuisman.com



In special cases, like when assembling new Ikea furniture, we must read pictures (see above). But what about the ordinary case of recognizing an object in the world? Identification requires assigning a name to the image we see, much like looking up a word in a dictionary.

If we identify words like objects, can we read pictures like words? Why is naming pictures slower?

Method: Here we ask observers to read rebus stories, in which nouns are replaced with pictures (far right), or lists of random nouns displayed as words, pictures, or both (right). We measure reading rate for silent reading of words/pictures on paper (Fig. A). We also use RSVP (Rapid Serial Visual Presentation) to measure the threshold presentation speed at which the observer can read a series of words/pictures flashed at one location on a screen, with 82% accuracy (Figs. B-E).



Results 1:

Fig. A. We find that, compared with all-word stories, rebus stories are understood just as well, and are read only about 15% more slowly, on average.

Fig. B. When silently reading lists of random nouns on paper, observers spend 300-600 ms longer on a picture than a word. There is no cost for switching back and forth from words to pictures.

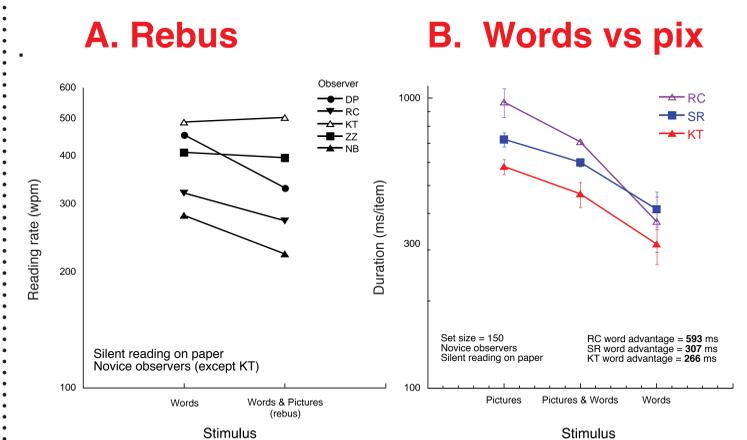
Fig. C. In RSVP, there is no effect of stimulus type (word vs pic) on required item duration, if the objects are chosen from a small set. For a large set, practiced observers show little to no effect of stimulus type. Observers require the same amount of time to process pictures as words.

Intro:

Reading and object recognition are usually studied separately, by different researchers who present at different conferences and publish in different journals. However, we have shown that reading can be modeled surprisingly well as serial object recognition, where each word is an object (Pelli & Tillman 2007).

How different are pictures and words?

Potter & Faulconer (1975) showed that it takes observers about 260 ms longer to verbally name a single picture than to read the corresponding word. However, in categorization, plausibility judgment, and other tasks that do not require overt naming, observers are just as fast and accurate in reading pictures as in reading words (Potter et al. 1975, 1986).



A rebus story

The sun was out when I left the house, wearing my sweater, pants, and hat. I got in the car and drove past a church on the way to the park. It was a beautiful day. A bird flew by, but there was not a cloud or an airplane in the sky. At the park, I sat under a tree near the fence. In the grass I saw a caterpillar and an ant that was eating a carrot someone had dropped. I took out the basket I had brought with me.

Results 2:

Fig. D. Novice observers (with no prior experience identifying these pictures) still get a significant effect of stimulus type in RSVP reading, if the set of objects is large. Pictures are read more slowly than words.

Fig. E. However, over the course of 800 trials, observers get substantially faster in reading pictures, but not in reading words. With practice, the difference between pictures and words goes away.

Conclusion: Pictures are sometimes read more slowly than words due to a difference in familiarity. We see common words thousands of times, but it takes practice to learn a specific set of pictures we have never seen. Reducing the set size or increasing observers' practice allows them to read pictures just as well as they read words.

