The Influence of Picture Priming on Ambiguity Resolution During Reading

Brianna M. Eiter, Kristin M. Weingartner, and Vincent Brown - Hofstra University
David S. Gorfein – University of Texas, Dallas

Introduction

In investigations of the “subordinate-bias effect” (e.g., Duffy, Morris, & Rayner, 1988; Rayner, Pacht, & Duffy, 1994) participants read sentences that contained either a balanced or an unbalanced homograph. Typical results show that when the sentence gives no prior indication of which meaning of the homograph best fits the context, balanced homographs are fixated longer than equal-frequency unambiguous control words. In contrast, unbalanced homographs are fixated for about the same amount of time as equal-frequency control words.

When the prior context of the sentence favors the less common meaning of the homograph, the patterns change dramatically. Under these circumstances there is no longer a difference in fixation durations between balanced homographs and their matched controls, but unbalanced homographs are fixated longer than their control words.

The findings described above suggest that prior sentential context can serve to increase the activation of a homograph’s subordinate meaning. Recent studies (Gorfein, Brown, & Edwards, under revision; see also Gorfein, Brown, & DeBisio, 2007) provide converging evidence for this conclusion when a picture presentation was used instead of sentence context.

Experiment 1 – Questions and Predictions

Does the context presented during phase 1 picture priming influence meaning selection during phase 2 sentence reading?

• If picture priming influences meaning selection during sentence reading, activation of the subordinate homograph meaning in phase 1 should boost its activation when the same homograph appears in phase 2.

• During phase 2 reading, the subordinate meaning should be more strongly activated for unbalanced homographs that were primed in phase 1 compared to those that were not.

• Target reading times should be longer in the primed condition compared to the unprimed condition.

• Post-Target reading times should be faster in the primed condition compared to the unprimed condition.

Procedure

Experiment 1 and 2

Phase 1 – Picture Priming Task (56 unbalanced homographs were used)

Experiment 1 (28 pictures in total – subordinate meanings were primed). A spoken word was presented to disambiguate the meaning of each picture

Phase 2 – Sentence Reading Task

Eye-movements were monitored while participants read sentences that were contextually neutral prior to the target and contextually biased toward the subordinate meaning after the target. In both experiments, 56 sentences were presented. In Experiment 1, 28 targets were primed during phase 1; In Experiment 2, all 56 targets were primed during Phase 1. In the sentences below, the target is bolded and the disambiguating post-target region is in red.

Stephen made a large amount of dough at the race-track this past weekend. He searched for the ball by looking for the beautiful gowns and listening for music.

Procedure

Experiment 1 (28 pictures in total – subordinate meanings were primed). A spoken word was presented to disambiguate the meaning of each picture

Experiment 2 (56 pictures in total – 28 dominant and 28 subordinate meanings were primed). A spoken word was presented to disambiguate the meaning of each picture

We report first pass gaze and total gaze duration for the two regions of interest. Because the size of the disambiguating post-target region is different for each sentence, we report time per constituent character.

Experiment 1 - Results

Experiment 1 – Summary of Results

Target (homograph):
• Contrary to our prediction, reading times were faster (in total gaze) for primed homographs compared to unprimed homographs.

Post-Target (consistent with subordinate meaning):
• Reading times were faster on the post-target region when the homograph had been primed compared to when the dominant meaning had been primed. (Effect is marginal with data from 12 participants).

• Overall, the results show no reliable effect of meaning priming from the pictures in phase 1 to the homographs that were read in phase 2.

• However, the results suggest that the post-target region was easier to integrate when the subordinate meaning of the homograph had been primed in phase 1.

General Discussion