# Experiment 2

This experiment uses a modified version of the lab-based word-meaning priming paradigm introduced by Rodd et al. (2013) in which participants hear individual prime sentences that contain an ambiguous word that is disambiguated towards its subordinate meaning by the context (e.g., “The pig PEN was muddier than ever.”). The impact of these primes on the target ambiguous word (e.g., PEN) is measured on a subsequent word association task. In the experiments reported by Rodd et al. (2013) the prime sentences were presented in a separate block from the test words, resulting in a relatively long minimum time between each individual prime sentences and its corresponding word association trial (3 minutes). In addition, individual randomisations of both the prime sentences and the target words within these blocks resulted in variable delays between each individual prime sentence and its corresponding word association trial, depending on whether these occurred towards the beginning/end of these two blocks. In order to reduce and the between-item variation in delay and to measure priming at a wider range of delays, Experiment 2 comprised three blocks of trials, which all contained both primes and targets, presented in alternation. In this modified version of the paradigm, participants only made responses to the isolated words, but were instructed to listen carefully to all the stimuli that they heard. Participants heard all prime sentences in Block 1, and the subsequent word association trials were positioned in either Block 1, 2 or 3 so that they appeared exactly either 1 minute, 20 minutes or 40 minutes after their corresponding prime sentence. Between the blocks participants completed a non-linguistic filler task in order to allow for the appropriate delay between prime and test.

## *Materials and Methods*

### *Participants*

51 native speakers of British English were recruited from the University College London online recruiting system and were each paid £6 for their participation. Nine participants were excluded due to technical problems (software crash or problems recording verbal responses). One participant was excluded for failing to adequately follow instructions and one was excluded for a high number of null responses on the word association task (49%).

### *Materials*

274 target words were selected for use in the word association task, of which 88 were ambiguous words (Appendix B) and the rest unambiguous filler words (e.g., bread, thief). The ambiguous words were all chosen to have a subordinate meaning (dominance range: 0-0.48; mean=0.24) that was semantically distinct from the word’s dominant meaning (dominance range: 0.42-1; mean= 0.70). These dominance scores were taken from a variety of pretests that used the standard word association method (Twilley et al., 1994) and the same participant population as the main experiment. Most of the ambiguous words were homonyms, which share both spelling and pronunciation (e.g. “BARK”), but eight were non-homographic homophones, which share only pronunciation (e.g., “FLOUR/FLOWER”).

88 experimental prime sentences were constructed in which the initial part of the sentence strongly disambiguated the ambiguous word towards its subordinate meaning (e.g., “The author put his memos in the APPENDIX of the book”). An additional 166 filler sentences were constructed, which contained none of the ambiguous experimental words. Another four pairs of sentences and words were constructed as practice items. All these sentences and words were spoken by a female speaker with a Southern English accent (HB). Four lists of materials were created for use in constructing the four versions of the experiment (see Design)

### *Design*

The experiment contained four conditions: three primed conditions that varied in the delay between the prime and target (1, 20 and 40 minutes) and an unprimed baseline. Four versions of the experiment were created with the 88 experimental items being assigned to the four priming conditions using a Latin-square design such that each word was assigned to each of the four conditions across the four versions. This ensured that each item occurred in every condition (across participants), that all participants contributed to all conditions, but that no participants encountered any item more than once.

The stimuli were presented in three blocks of trials. The first block contained all of the 88 experimental prime sentences in the same random order for all participants, except for the 22 sentences that were assigned to the no-prime condition for each version, which were replaced by filler sentences. The decision to keep the sentences for all primed conditions within the first block ensured that these prime sentences were equally well attended across conditions. These 88 sentences were followed by an additional 6 filler sentences at the end of the block, which were required to maintain the alternation of sentences and word association trials until all of the word association trials had been completed. The second and third blocks each contained 88 filler sentences in the same random order for all participants.

The word association target words were then positioned in such a way that a word always appeared exactly 1 minute (i.e., 6 trials, one trial lasting for 10s; see Procedure) later than its corresponding prime sentence if the word was assigned to the 1-minute condition, 20 minutes (a block) later if it was assigned to the 20-minute condition, and 40 minutes (2 blocks) later if it was assigned to the 40-minute condition (see Figure 3 for timing information). In other words, a target word occurred in Block 1 under 1-minute condition, in Block 2 in the 20-minute condition and in Block 3 in the 40-minute condition. The target words in the no-prime condition were spread across the three blocks (7 in Block 1 and 2 and 8 in Block 3). To ensure a strict alternation of sentence and word trials throughout the whole experiment, filler words were inserted into every slot within each block in which an experimental target had not already been positioned. Note that a target word never immediately followed its corresponding prime sentence.

### *Procedure*

Participants were tested individually in a cubicle and the experiment was run on E-Prime 2.0. After giving their informed consent, a participant began the experiment with a practice session. Each trial began with a screen with the symbol “= = =” lasting for 3.5s, during which a sentence was played via headphones (Figure 3a). The onset of the sound file was aligned to the start of the 3.5s period. After a short delay (0.5s) the symbol “+++” appeared for 5s, during which participants heard a word to which they verbally gave an associate. The onset of the sound file was aligned to the start of the 5s period. Participants were told to give the response as quickly as possible within the given time window and that responses beyond that time window would not be registered. The participants’ verbal responses were recorded as individual sound files. The screen was then replaced with a blank screen lasting for 1s as an inter-trial interval. Thus, each trial lasted for 10s in total.

As shown in Figure 3b, the whole experiment consisted of a practice session, Block 1 lasting for 15.7 min (94 trials), Filler task 1 lasting for 4.3 min, Block 2 lasting for 14.7 min (88 trials), Filler task 2 lasting for 5.3 min, and finally Block 3 lasting for 14.7 min (88 trials). After the practice, all trials were presented according to a fixed time schedule that did not vary across participants. The filler tasks involved colouring pictures. Right before the end of a filler task, participants heard beep sounds via their headphone, at which point they were required to stop colouring and get ready for the next block of the experiment.