

Reconstruction of censored taboo words in sentence processing

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Natural language has characteristics that are not typically considered in traditional language processing research such as disfluencies, slips of the tongue, and taboo words. However, when a taboo word (damn) is censored (d@*m), this offers an opportunity to study lexical access where the underlying form of a word must be reconstructed before lexical access can occur. We hypothesize that this reconstruction process is costly for word processing, but ultimately provides the comprehender with a representation that is similar to the taboo version.

While censored taboo words have not received much attention in the literature, studies of uncensored taboo word processing provide evidence for an internal monitor in language production (Severens, Janssens, Kühn, Brass, & Hartsuiker, 2011), and reveal that taboo words produce Stroop-like effects, suggesting that they are processed automatically (Mackay & Ahmetzhanov, 2005). Although taboo words are automatically accessed, censored taboo words may not be, leading to slower lexical processing. If comprehenders reconstruct underlying forms, censored and uncensored sentences may be similar in memory, similar to the phoneme restoration effect (Warren, 1970).

We examined these predictions using an eye-tracking reading task followed by a memory recognition task. In the eye-tracking task, participants read a sentence containing a taboo ("damn"), censored ("d@*n"), or neutral word ("hard") which were contextually appropriate and matched in length. Subsequently, participants completed a recognition task in which half of the sentences were altered and half were unaltered. The critical word in the conditions was manipulated so all possible alterations were included and counterbalanced across subjects.

Results from the eye-tracking study showed that subjects process taboo words similar to censored and neutral words in early (first-pass) reading measures but faster in late (total) reading measures (Table 1). This suggests that subjects required additional time to process and reconstruct the censored word. Additionally, this reconstruction effect was mediated by a learning effect: processing time for censored words decreased over the course of the experiment relative to taboo words in both early and late reading measures.

The memory task revealed that while subjects were highly accurate on taboo-to-neutral and censored-to-neutral alterations, they were less accurate on taboo-to-censored and censored-to-taboo alterations (Table 2). Reading measures, however, did not predict performance in memory task. These results suggest that subjects could distinguish censored and taboo words from neutral words but confused censored and taboo words. Thus, while taboo and censored words were processed differently, they became similarly represented in memory.

This study provides the first evidence, to our knowledge, for mechanisms involved in the processing of censored taboo words. The faster processing of taboo words relative to neutral words suggests that taboo words are easier to process whereas censored taboo words are treated differently during processing. The comprehender spends time reconstructing censored items, resulting in their final representation being similar, if not identical, to those of non-censored taboo words. A second experiment is being run that matches taboo and neutral words on frequency and adds censored neutral words (mess → m**s) to examine reconstruction of censored neutral words as well.

Table 1

Reading Measures in Sentence Processing Task

Condition	First-Pass (ms)	Total-Time (ms)
Censor	300	387**
Neutral	286	385**
Taboo	276	306

** p < 0.01 in comparison to taboo

Table 2

Accuracy in memory task

Read Condition	Altered Condition		
	Censor	Taboo	Neutral
Censor	0.79	0.41	0.94
Taboo	0.26	0.74	0.88
Neutral	0.69	0.64	0.65

References

1. MacKay, D.G., & Ahmetzhanov, M.V. (2005). Emotion, memory, and attention in the taboo Stroop paradigm: An experimental analogue of flashbulb memories. *Psychological Science*, 16, 25–32.
2. Severens, E., Janssens, I., Kühn, S., Brass, M., and Hartsuiker, R. J. (2011). When the brain tames the tongue: covert editing of inappropriate language. *Psychophysiology* 48, 1252–1257.
3. Warren, R. M. Perceptual restoration of missing speech sounds. *Science*, 1970, 167, 392-393.