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## Proceedings of the Annual Meeting of the Cognitive Science Society

**Title**

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**Journal**

Proceedings of the Annual Meeting of the Cognitive Science Society, 18(0)

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**Publication Date**

1996

Peer reviewed

# Frame-Shifting and Meaning Construction

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## Introduction

(1) A thoughtful wife has pork chops ready when her husband comes home from fishing.

Why? Because she knows her husband won't catch any fish. However, the knowledge that the husband is not likely to catch fish comes neither from the meanings of the individual words in the sentence, nor from the output of the parser. Rather, this knowledge results from the interaction of knowledge about fishing and the meaning evoked by the rest of the sentence.

Following Fillmore (1982), we suggest that words have meaning relative to a set of background assumptions known as a *frame* (see Rumelhart & Ortony, 1977 for review). Processing the joke in (1) initially involves the activation of a **good wife** frame – a stereotypical event-frame in which the wife prepares dinner so that it is ready when her husband comes home from work. However, the word *fishing* cues the reader to initiate a process we call *frame-shifting*: semantic reanalysis in which the previously established contextual representation is reorganized into a new frame.

Our proposal that semantic processing relies crucially on the activation of frames from background knowledge motivates distinctions between different categories of contextual facilitation and generates predictions as to context effects. If frame-based activation of background knowledge is a driving factor in semantic processing, scenarios which occasion frame-shifting should present a challenge to the processor which differs from the violation of lexical-level expectancies.

## Materials

Sixty one-line jokes were assembled from joke books and normed on an off-line Cloze task (Bloom & Fischler, 1980) to establish their default non-joke interpretations. Stimuli included High Constraint sentence fragments which led readers to expect a particular word, and Low Constraint fragments in which multiple lexical level expectations were possible. Sentence fragments were paired with one of two possible low-Cloze (0% - 5%) Ending Types: Nonjoke Endings congruent with the contextually evoked frame, and Joke Endings which required frame-shifting.

If frame-shifting associated with getting a joke induces a processing cost, Joke Endings should elicit (1) increased reading times relative to Nonjoke Endings on the self-paced reading task; and (2) enhanced N400 amplitudes relative to Nonjoke Endings in the event-related brain potential (ERP) measure.

## Results

In the self-paced reading study, participants took longer to read Joke than Nonjoke Endings, and longer to read endings of Low than High Constraint fragments. Whereas Nonjoke Endings benefitted from the more constraining contexts, Jokes did not. Faster reading times for Nonjokes, but not Jokes, in High Constraint contexts suggest that commitment to a frame facilitates integration of unexpected words congruent with the evoked frame, but not integration of words which initiate frame-shifting.

A different set of 18 participants read the stimuli for comprehension while ERPs were recorded from 26 scalp sites. A median split separated participants into Good (85%) and Poor (65%) Comprehenders, based on their performance on comprehension probes which followed Jokes. Good Comprehenders' ERPs displayed an enhanced N400 and a Late Positive Component relative to those elicited by Nonjokes. By contrast, Poor Comprehenders ERPs were not modulated by Ending Type. In Good Comprehenders, Joke Endings elicited more N400 activity in both High and Low Constraint contexts. As in the reading time study, the size of the Joke Effect was largest in the High Constraint contexts.

## Conclusions

Overall, results show that while both lexical violations and frame-shifting incur a significant processing cost, frame-shifting is more costly and relatively impervious to the effects of contextual constraint. These data highlight the flexibility of the language processor and suggest that frame-based activation of background knowledge is a driving factor in normal comprehension.

## References

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