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The Roots of Plausibility:
The Role of Coherence and Distributional Knowledge in Plausibility Judgements

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Introduction

Plausibility plays a central role in human cognition, whether one is considering the alibi of a murder suspect in a crime novel, or assessing the answers of a candidate in a job interview. Other studies have mentioned plausibility judgements in the service of other phenomena (e.g. Reder, 1982), but often without being investigated in their own right. This paper presents evidence that plausibility judgements depend on inferential coherence and distributional information. In the first experiment, we show that the type of inference being made affects the plausibility of a sentence pair. The second experiment demonstrates that the distributional properties of the words in a sentence pair directly influence plausibility.

Experiments

Two experiments advance a novel paradigm in which people make plausibility judgements about sentence pairs. These sentence pairs are manipulated to invite different bridging inferences and to control their distributional scores (as determined by the Latent Semantic Analysis model LSA; Landauer & Dumais, 1997).

In Experiment 1, 40 participants were asked to judge the plausibility of sentence pairs on a scale from 0 – 10 that had been manipulated to support causal, attribual or temporal inferences, or not to invite any obvious inferences at all (i.e. unrelated pairs). The distributional information of each pair (the LSA score of the first sentence against the second) was controlled across inference types.

In Experiment 2, we manipulated distributional information across the causal and attribual sentences to look at the action of both factors together. 24 participants saw two versions of each sentence pair per page (see Table 1), one of which had a relatively high LSA score between the sentences (a strong distributional link) and the other of which had a relatively low score (a weak distributional link). Participants were asked to judge the plausibility of each pair as before, but to make certain that any perceived difference in plausibility between the two versions of each sentence pair was reflected in the scores.

Results & Discussion

Experiment 1's results demonstrate that different inference types differentially affect the perceived plausibility of a discourse. The causal pairs were rated the highest in plausibility (M=7.8), followed as predicted by attribual (M=5.5), temporal (M=4.2) and unrelated (M=2.0). An analysis of variance yielded a significant effect of inference type on plausibility scores, $F(3, 472) = 93.683, p < 0.0001$.

Table 1: Sample Experiment 2 sentence pair variants.

Sentence 1	Sentence 2	Inference X Distribution
The pack saw the fox.	The hounds growled.	Causal Strong
	The hounds snarled.	Causal Weak
	The hounds were fierce.	Attribual Strong
	The hounds were vicious.	Attribual Weak

Experiment 2's results show that the distributional information of a sentence pair affects how plausible it is perceived to be. We examined the proportion of times a participant judged either the strong or weak version of a sentence pair to be more plausible. This analysis shows that in both the causal pairs [M=59.4%, $t(10)=4.893$, $p<0.001$] and in the attribual pairs [M=60.3%, $t(11)=3.753$, $p<0.005$], the weak sentence pair was proportionally rated more plausible than the strong pair.

This gives rise to a very interesting explanation of the joint effects of coherence and distributional strength. We suggest that when there is a strong distributional link, there is an expectation that a coherent inference will be found, and this expectation suggests an initial level of plausibility. When the expectation is borne out – by finding a bridging inference for a strong link, or by not finding one for a weak link – then the level of plausibility suggested by the expectation remains unchanged. On the other hand, when the expectation is contradicted – by unexpectedly finding a bridging inference for a weak link, or failing to find one for a strong link – then the level of plausibility rises or falls accordingly. While distributional information plays an essential role in the judgement process, the degree of coherence is what ultimately validates the plausibility level.

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