How do people interpret implausible sentences?

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People may literally interpret an implausible sentence (e.g., treating *the candle* as the recipient of *the daughter* in *The mother gave the candle the daughter*) or re-interpret it (e.g., treating *the daughter* of the recipient) [1]. To arrive at a plausible re-interpretation, they might resort to *structural reanalysis* by revising their representation of its syntax and using that representation to derive its new interpretation (e.g., revising the sentence into *The mother gave the candle to the daughter*) [1-4]. Alternatively, they might resort to *semantic reanalysis* and revise its semantic representation directly (e.g., swapping the thematic roles of *the candle* and *the daughter*) [5,6]. We report two structural priming experiments to distinguish the two accounts. The structural reanalysis account predicts that participants represent re-interpreted POs as having DO syntax and re-interpreted DOs as having PO syntax; therefore, priming should be reduced following implausible than plausible primes. In contrast, the semantic reanalysis account does not have such a prediction.

In E1 (96 participants, 20 target items, 60 fillers), participants heard double-object (DO) or prepositional-object (PO) sentences that were plausible or implausible and answered a comprehension question (so that it was clear whether they reinterpreted the sentences or not; see Fig 1; cf. [4]).

Plausible DO/PO: *The mother gave the daughter the candle / the candle to the daughter.*
Implausible DO/PO: *The mother gave the candle the daughter / the daughter to the candle.*

Then they described a dative event (e.g., a pirate handing a boxer a cake). Question answering showed that participants re-interpreted plausible DO and PO 10% and 4% and implausible DO and PO 48% and 23% of the time, replicating earlier results [1]. LME modelling of picture descriptions (Table 1) shows that the structural priming was modulated by plausibility, with reduced priming following implausible than plausible primes, suggesting that implausible primes were somehow structurally reanalysed. In addition, priming was also reduced following a re-interpreted than literally-interpreted implausible primes, suggesting a greater extent of structural reanalysis when people re-interpreted than literally interpreted an implausible sentence. Indeed, a re-interpreted implausible prime led to reversed priming (e.g., numerically more PO descriptions following a re-interpreted than literally interpreted implausible DO prime).

Is it possible that participants are triggered to reinterpret by the comprehension question itself? To investigate this issue, E2 (96 participants, 20 target items, 60 fillers) had participants describe the picture before answering the comprehension question. Again, there was reduced priming following implausible than plausible primes, though here priming following implausible primes was comparable following (later) literally-interpreted and re-interpreted implausible primes. A between-experiment analysis showed some marginal evidence that structural priming was reduced following re-interpreted than literally-interpreted implausible primes in E1 but not E2.

The findings suggest that people consider a revised structure when interpreting an implausible sentence, resulting in reduced priming following implausible than implausible primes in both experiments. Note that such a result would not be expected if people only swapped the semantic roles of the two nouns in re-interpreting implausible sentences. There is also some evidence that people also further commit to a revised structure when they explicitly re-interpret an implausible sentence.

REFERENCES

1. Gibson, E., Bergen, L., & Piantadosi, S. T. (2013). *PNAS, 110*(20), 8051-8056.
2. Kim, A., & Osterhout, L. (2005). *J Mem Lang, 52*(2), 205-225.
3. Trueswell, J. C., Tanenhaus, M. K., & Garnsey, S. M. (1994). *J Mem Lang, 33*, 285-318.
4. Christianson, K., Luke, S. G., & Ferreira, F. (2010). JEP: LMC, 36, 538.

5. Kuperberg, G. R. (2007). *Brain research, 1146*, 23-49.
6. Bornkessel, I., & Schlesewsky, M. (2006). *Psychol Rev, 113*, 787-821.

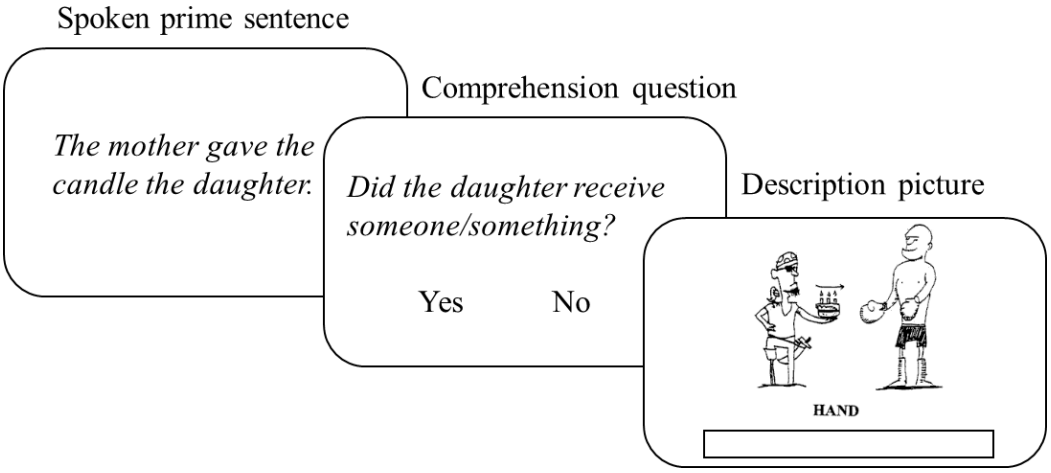

Fig 1. Trial structure in Experiment 1.

Table 1. DO, PO and "other" responses as a function of plausibility, interpretation, and structure in Experiment 1. Priming refers to difference in the proportion of DO responses between DO and PO primes.

			DO	PO	Other	Prop DO	Priming
Plausible	Literally interpreted	DO	122	247	27	0.33	0.16
		PO	65	326	30	0.17	
	Re-interpreted	DO	6	29	9	0.17	0.03
		PO	2	12	5	0.14	
Implausible	Literally interpreted	DO	56	155	20	0.27	0.04
		PO	72	238	31	0.23	
	Re-interpreted	DO	41	146	22	0.22	-0.01
		PO	21	69	9	0.23	

Table 2. DO, PO and "other" responses as a function of plausibility, interpretation, and structure in Experiment 2.

			DO	PO	Other	Prop DO	Priming
Plausible	Literally interpreted	DO	119	206	32	0.37	0.12
		PO	91	273	23	0.25	
	Re-interpreted	DO	15	39	4	0.28	0.11
		PO	4	19	5	0.17	
Implausible	Literally interpreted	DO	79	130	15	0.38	0.10
		PO	79	199	25	0.28	
	Re-interpreted	DO	44	133	14	0.25	0.05
		PO	20	79	13	0.20	