Predictive Computations underlie the N400’s Sensitivity to Thematic Role-reversals

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LEXICAL PREDICTION AND THE N400
Comprehenders can incorporate various sources of information to compute predictions for upcoming input on the fly. [1-3]

The N400 is sensitive to a word’s predictability. • More expected words → smaller N400s [4]

“He likes lemon and sugar in his tea/water/coffee”

N400 BLINDNESS PUZZLE
The N400 is blind to clize differences created by role-reversals.[5-7]

CopSUBJ thiefOBJ arrest... vs. ThiefSUBJ copOBJ arrest...

No N400 effect

Even when role-reversal creates a very strong cloze contrast, the N400 is blind. [8]

Small cloze difference (0.3 vs zero) Large cloze difference (0.62 vs zero)

⇒ Online verb-predictions seem completely blind to the arguments’ structural role.

A SUCCESSFUL ‘CURE’
Extra time between the arguments and the verb ⇒ The N400 sensitivity reemerged. [8]

Short Distance (600ms) Long Distance (1800ms)

No N400 effect No N400 effect

What underlies this reemerged sensitivity?

HYPOTHESES
Did the N400 become sensitive to role-reversals because comprehenders had more time to
• compute predictions for the verb [8]
• interpret the context and detect implausibility [9]

⇒ If the N400 is modulated by predictions, then role-reversals should elicit an N400 effect only when they create large cloze differences for the target verb.

RESULTS

LOW PREDICTABILITY

Target cloze

3.4 (3.3-21)

HIGH PREDICTABILITY

Target cloze

62 (41-97)

SUMMARY AND IMPLICATIONS

The N400 is sensitive to predictability, but not to semantic anomalies per se.
• Role-reversals were readily detected but did not elicit an N400 effect in the low-predictability condition.
• The N400 becomes sensitive to role-reversals only when the target verb is differentially predictable between conditions.

The N400’s (in)sensitivity to semantic anomalies should instead be captured in terms of the target word’s predictability.
• “If cats were vegetarians, families would feed their cats a bowl of carrots/fish.” [12] c.f. [13]
• “Farmers rarely grow worms/crops.” [14]

N400 as snapshots of predictions...

Can we look at what happens in-between??

The N400’s delayed sensitivity reveals that structural role has a delayed impact on comprehenders’ prediction.

REFERENCES

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