

Processing the Semantic Distinction between Singular and Plurals -- ERP Evidence

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Main Research Question

Can we find any brain signature for the semantic difference between singular and plural nouns?

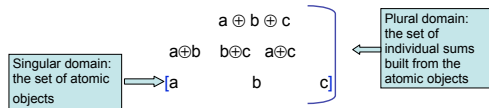
The Singular-Plural Distinction

➤ Syntactically, plurals are the marked form.

When plurals are marked by a plural morpheme, they could involve more processing cost due to morphological complexity.

➤ Semantically, however, it is not clear whether plurals or singulars are the marked form.

➤ Although the semantic representations seem to be more complex than singulars, one can also argue that plurals have a more inclusive representation, and hence the default.



Link (1993)

➤ Developmental literature has shown that children have difficult time mastering the concept of "more than one" (Barner, Thalwitz, Wood & Carey 2007).

Testing a Language without Morphological Plural Markings

- Mandarin Chinese doesn't have a plural morpheme.
- It is a classifier language. In the presence of numerals or demonstratives, classifiers are obligatory.

Singular: Na-liang tingzai lubian de qiche hen gui.

that-CL park street de car very expensive
That car that parked on the side of the street is expensive.

Plural: Na-san-liang tingzai lubian de qiche hen gui.

that-three-CL park street de car very expensive
Those three cars that parked on the side of the street is expensive.

• Plurals can also be expressed without numeral information, but with the help of a special classifier "xie". The number information is vague in this case.

Plural with non-specific numeral information:

Na-xie tingzai lubian de qiche hen gui.
that-CL(xie) park street de car very expensive
Those cars that parked on the side of the street is expensive.

An ERP Study

Without the interference of plural morphology, can we find a brain signature on the semantic difference between singular and plurals?

Materials

Three conditions:

Singular (that-CL modifier N)

Plural with specific quantity (that-two-CL modifier N)

Plural with non-specific quantity (that-CL(xie) modifier N)

Procedure:

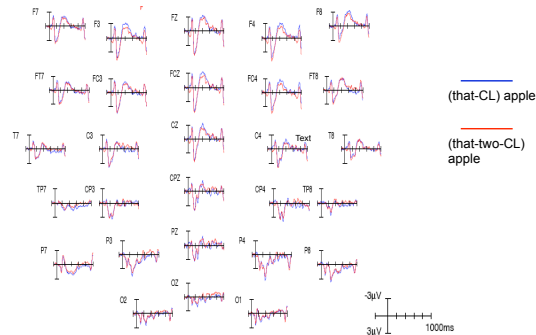
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Item = 150

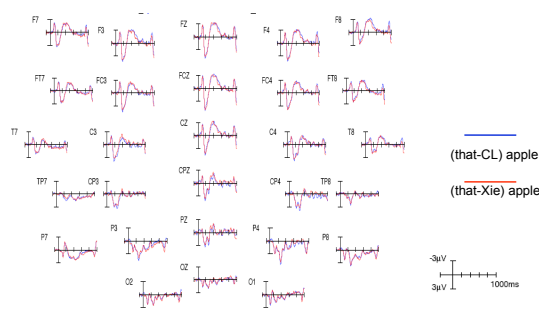
RSPV presentation

ERPs measured at the noun

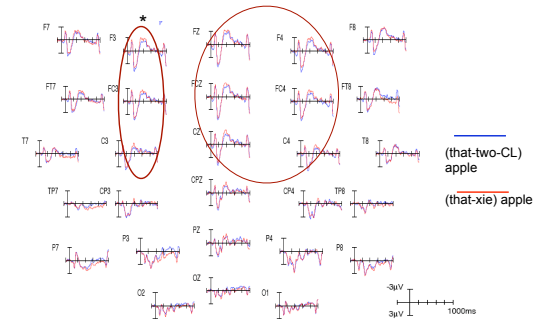
singular vs. plural with specific quantity



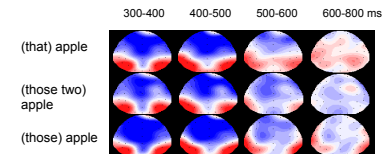
singular vs. plural with non-specific quantity



plural with specific quantity vs. plural with non-specific quantity



The difference is significant over the left anterior channels, but only marginal over the central and right anterior channels.



Discussions and Future Directions

• There is no ERP effect for a pure semantic singular-plural distinction per se, but plurals with vague number information seem to elicit negativity during the standard N400 time window, but only over the anterior site.

• The distinction between specific and non-specific number information is interesting. It could be potentially related to the distinction between counting and non-counting domains. Steinhauer et al. (2001) also observed a N400 looking effect prominently over the anterior site in a study on the distinction between mass and count nouns.

Acknowledgement

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