# Real-time comprehension of connectives by preschool children and adults

Elizabeth Swanson[1,2], Hugh Rabagliati[3], and Alex de Carvalho[1]

[1] LaPsyDÉ, Université Paris Cité [2] University of Maryland [3] University of Edinburgh

eswan@umd.edu

## Background

**How do connectives impact real-time interpretations of children and adults?**

- Connectives like ***so*** and ***but*** mark discourse relations

causal — contrastive (conventional implicature [1] or truth-conditional [2])

| Children | Adults |
|---|---|
| • Produce ***so*** and ***but*** fluently by age 3 [3]<br>• In comprehension tasks, struggle to infer contrastive relation from ***but*** as late as age 7 [4,5] | • Infer a causal relation for *so* and a contrastive relation for ***but*** [5]<br>• Draw the inference less reliably for ***but*** than ***so*** |

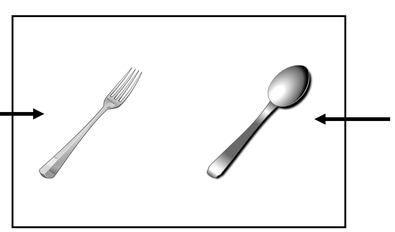
1) Do children lack a contrastive inference for ***but,*** or do they have difficulty identifying the dimension of contrast in a given situation?
2) How does having a clear QUD affect the inferences listeners draw from connectives?

## Method: Experiment 1

- Sentences in French with ***alors*** or ***mais*** (***so***/***but***) and a novel word
- Measures: eye gaze, explicit pointing responses

"Anna a eu de la soupe au déjeuner, [**alors**/**mais**] elle a utilisé une *bamoule*."

= "Anna had soup for lunch, [**so**/**but**] she used a *bamoule*."




**Participants**

- 4- to 6-year-old French-speaking children (n=71)
- French-speaking adults (n=24)

## Results: Experiment 1

How do children and adults process ***so*** and ***but*** sentences in real time?

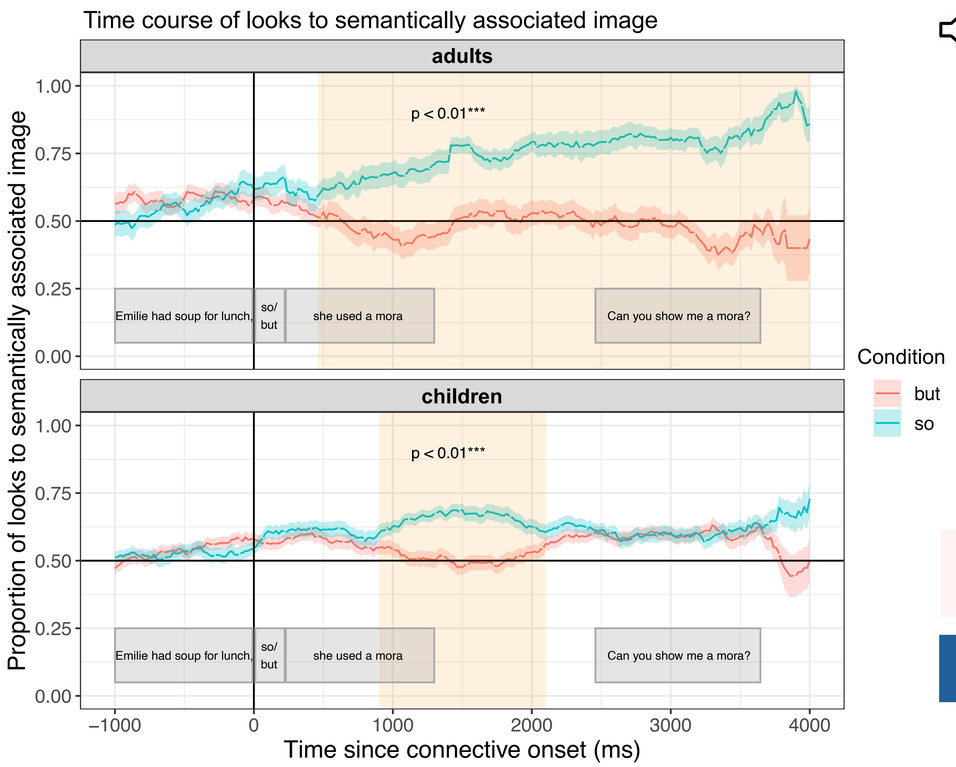



Figure 1. Children and adults differentiate ***but*** and ***so*** in their real-time eye movements, but adults do so more reliably.

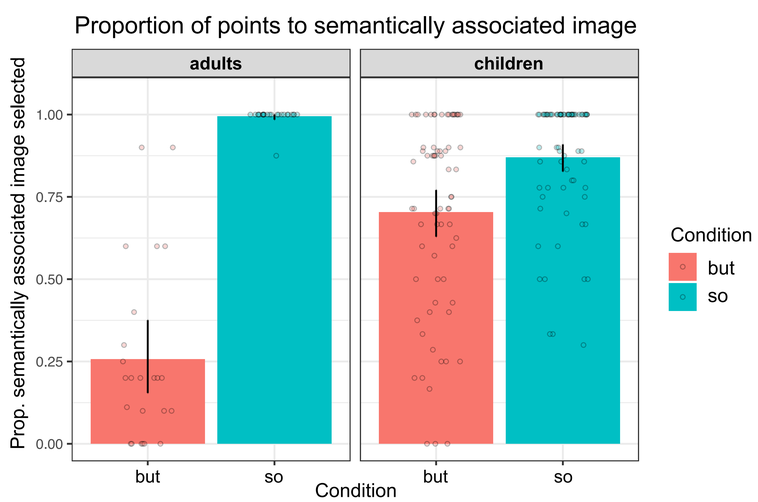



Figure 2. In pointing responses, children distinguish ***but*** and ***so***. Unlike adults, they point to the semantically associated image at above-chance rates in both conditions.

## Experiment 2 (English)

Does a clear QUD affect listeners' connective interpretations?

"Anna had soup for lunch. When you eat soup, it's easier if you use the right cutlery, [**so**/**but**] Anna used a *dax*."

↳ clear QUD; propositional content to contrast against [6]

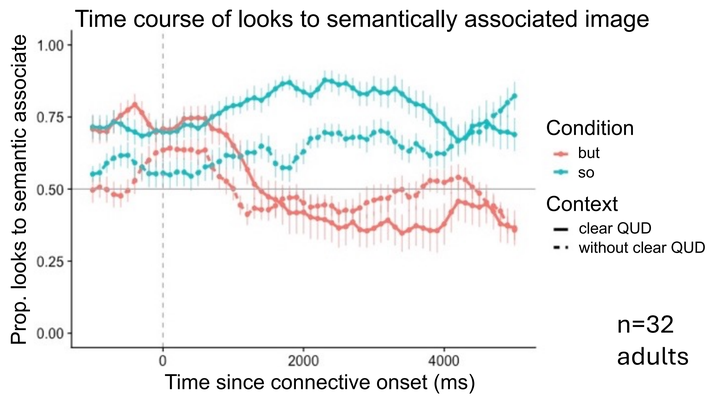



Figure 3. With a clear QUD, adults look more at the associated image in the ***so*** condition, with no effect in the ***but*** condition.

## Discussion

**Processing sentences with *but* comes with a cognitive cost for both children and adults**

1) Children differentiate ***but*** and ***so,*** but struggle to reliably draw contrastive inferences for ***but***

   → difficulty identifying specific dimension of contrast

2) An explicit QUD is linked to stronger causal inferences and does not impact contrastive inferences

- Inferring discourse relations can be difficult with partial knowledge; connectives have high substitutability [7]
- How do children come to be adult-like with ***but***?

  → role of socioeconomic status [8], formal schooling? [5]

## References & Acknowledgements

[1] Grice, P. (1961). The causal theory of perception. [2] Bach, K. (1999). The myth of conventional Implicature. [3] Bloom et al. (1980). Complex sentences: Acquisition of syntactic connectives. [4] Spenader, J. (2018). Children's comprehension of contrastive connectives. [5] Skarabela et al. (2023). Learning dimensions of meaning. [6] Toosarvandani, M. (2014). Contrast and the structure of discourse. [7] Rohde et al. (2017). Exploring substitutability. [8] Swanson et al. (2024). Preschoolers' real-time eye movements reveal sensitivity to connective meanings.

We gratefully acknowledge Glen Bartup, Louis Boussillon, Letícia Kolberg, LaPsyDÉ members, CNRS, & Fonds Investissements d'Avenir.