

24-month-olds (and adults) exploit negative sentences to constrain their interpretation of novel word meanings

Alex de Carvalho (University of Pennsylvania), Cécile Crimon (École normale supérieure),
Anne Christophe (École normale supérieure) & John Trueswell (University of Pennsylvania)
x.de.carvalho@gmail.com

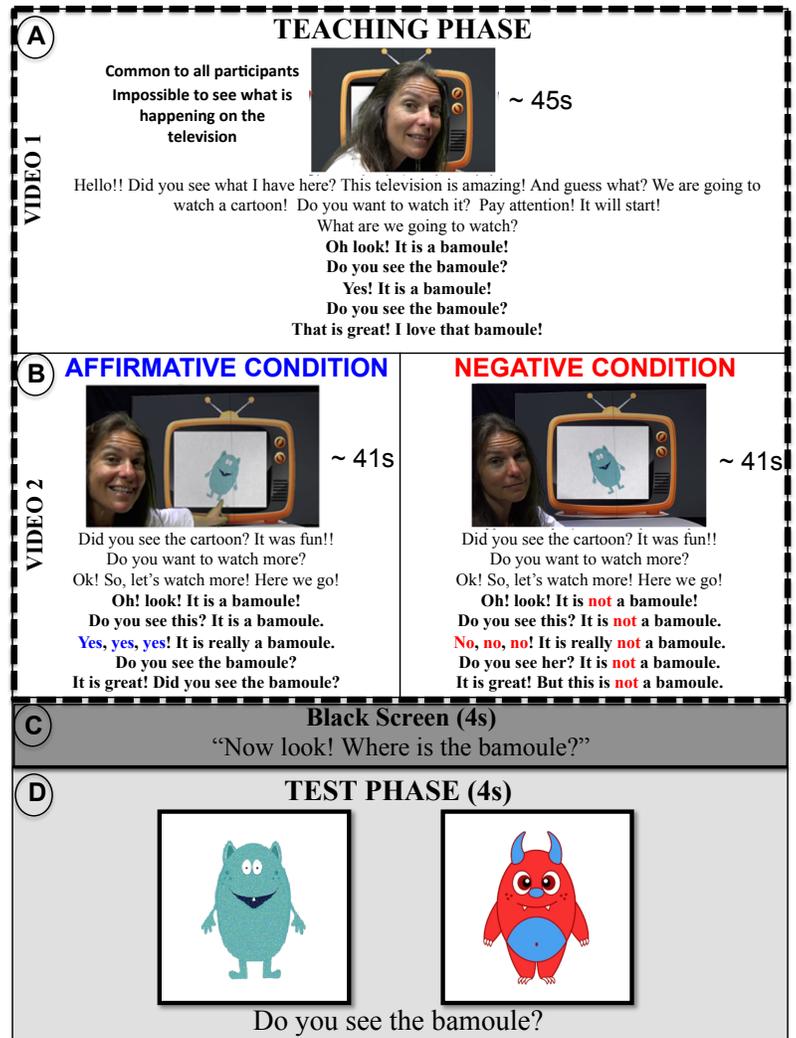
Although infants produce the word *no* from about 13 months [1], research investigating the comprehension of negation has found that 20-month-olds incorrectly interpret negative sentences as affirmatives [3, but see 6] and that even 2-to-4-year-olds have difficulty understanding negative sentences [2-5]. This inability to understand negative sentences before age 2 could dramatically affect language acquisition. For instance, if toddlers assign the same interpretation to sentences such as “*This is a dax*” and “*This is not a dax*”, they might make incorrect associations between words and their referents. To investigate this issue, the current study examined how 2-year-olds exploit affirmative and negative sentences to constrain their learning of novel word meanings in French.

In a preferential looking paradigm (Fig-1), French 24-month-olds ($n=48$) were first exposed to a teaching phase in which they saw two videos showing a woman talking about a new object/cartoon (*a bamoule*). In the first video (common to all participants), the woman “accidentally” sat in front of the television so participants couldn’t see the cartoon while listening to the sentences: “*Look! It’s a bamoule!*” (Fig-1A). For the second video, participants were assigned to either the affirmative or negative condition and were able to see what was on the television (e.g., a blue monster, Fig-1B). In the presence of this new object/cartoon on the television, participants in the affirmative condition listened to sentences like “*It’s a bamoule!*” and in the negative condition, to sentences like “*It’s not a bamoule!*”. After the teaching phase, all participants were exposed to the same test in which they were asked to find the *bamoule* while viewing two images side-by-side on the screen: the familiar object seen during the second video of the teaching phase (e.g., the blue monster) versus a novel object never seen before (e.g., a red monster). Adults ($n=16$) participated in the same experiment to provide a baseline. The results show that participants in the affirmative condition looked more to the familiar object during the test than participants in the negative condition (toddlers: $p=.02$, adults: $p<.001$). This suggests that both adults and children in the negative condition were able to understand that the familiar object was “not a bamoule”. However, while adults in the negative condition inferred that the novel object was the “bamoule” that they couldn’t see in the first video, toddlers did not show any preference for the novel object during the test.

This is the first study to investigate the impact of negative sentences in the acquisition of word meanings. We demonstrate that 24-month-olds do not process negative sentences as affirmatives. Rather, toddlers in this age range successfully understood negation (i.e., they correctly inferred that the familiar object was not a *bamoule*), although they did not make the additional inference of mutual exclusivity, namely, that the other monster must have been the *bamoule*, as adults did. This ability to understand negative sentences so early might support language acquisition, providing infants with a tool to constrain the space of possible referents for word meanings.

Experimental Design

Figure 1-A-B-C-D: Experimental Design. The entire experiment was conducted in French but for lack of space here we only provide the English translation of each sentence. The presentation of which monster was designated as the ‘bamoule’, the red or the blue one was counterbalanced within conditions.



References

- [1] Bloom, L. (1970). *Language Development; Form and Function in Emerging Grammars*. MIT Press.
- [2] Austin, K., Theakston, A., Lieven, E., & Tomasello, M. (2014). Young children’s understanding of denial. *Developmental Psychology*, 50(8), 2061–2070.
- [3] Feiman, R., Mody, S., Sanborn, S., & Carey, S. (2017). What Do You Mean, No? Toddlers’ Comprehension of Logical “No” and “Not.” *Language Learning and Development*, 5441(July), 1–21.
- [4] Nordmeyer, A. E., & Frank, M. C. (2014). The role of context in young children’s comprehension of negation. *Journal of Memory and Language*, 77(C), 25–39.
- [5] Reuter, T., Feiman, R., & Snedeker, J. (2017). Getting to No: Pragmatic and Semantic Factors in Two- and Three-Year-Olds’ Understanding of Negation. *Child Development*, 0(0), 1–18.
- [6] de Carvalho, A., Barrault, A., & Christophe, A. (2017). “Look! It is not a bamoule!” 18-month-olds understand negative sentences. *Presented at the 42nd BUCLD*

Results

(A) 24-month-olds

(B) Adults

(n=48, 24/condition; $M_{age} = 23.8m.o.$, range = 23.1 to 24.4m.o)

(n=16, 8 in each condition)

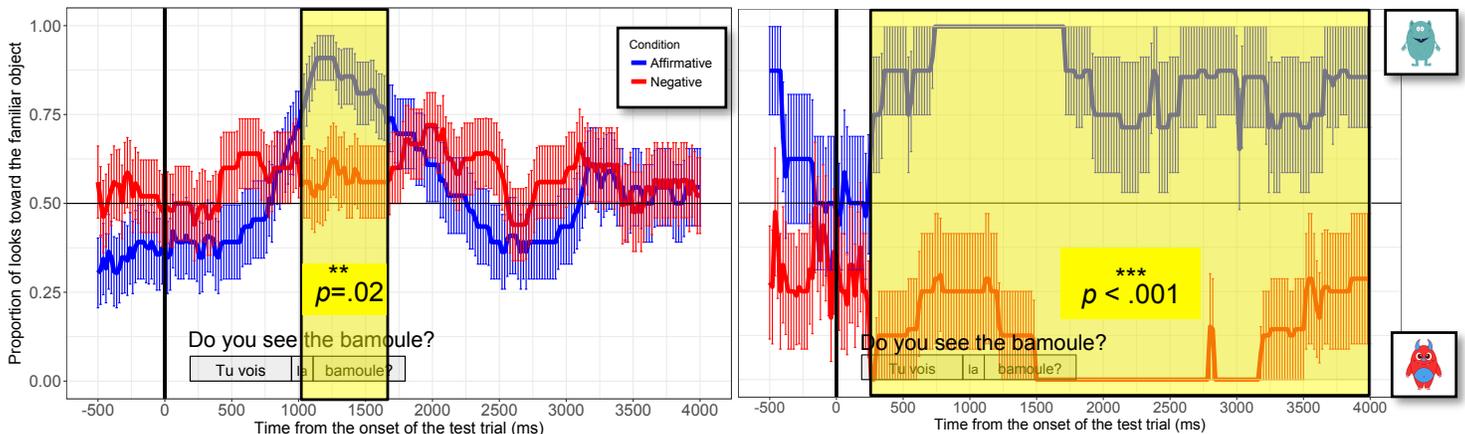


Figure 2-A-B: Results - Proportion of looks toward the familiar object, time-locked to the onset of the test trial (vertical black line) for (A) 24-month-olds and (B) adults, in the affirmative condition (blue curve) and in the negative condition (red curve). Error bars represent the standard error of the mean. A nonparametric cluster-based permutation test revealed significant differences between conditions (yellow time-window) for both groups.