**Priming between universal quantifiers in negated scopally ambiguous sentences**

Sentences involving universal quantification and negation give rise to systematic scope ambiguities. For example, the English sentence *Every shark doesn't attack the surfer* can either mean that there is no shark that attacked the surfer (the *universal-wide* interpretation) or that not every shark attacked the surfer (but possibly some did; the *negation-wide* interpretation). Interestingly, quantifiers seem to differ in their scope preferences, even when they carry the same quantificational force. *Each*, for example, has a stronger tendency to take wide scope than *every* or *all.*[1,2] This observation, among other differences between quantifiers, has led to theoretical descriptions that posit distinct mental mechanisms and representations of scope-taking for different quantifiers.[e.g., 3-4]

The representation of scope can be experimentally tested using *structural priming*, a phenomenon in which the use of a linguistic representation is facilitated if the same representation was recently used. When structural priming between sentences occurs, these sentences therefore share some representational resources. Scope configurations are susceptible to such priming.[2,5,6] However, it is not clear whether this priming is dependent on the repetition of the same quantifier.[2,6] In the current project, we investigate this question by examining the representation of quantificational scope in the interpretation of French sentences with a universal quantifier vis-à-vis negation.

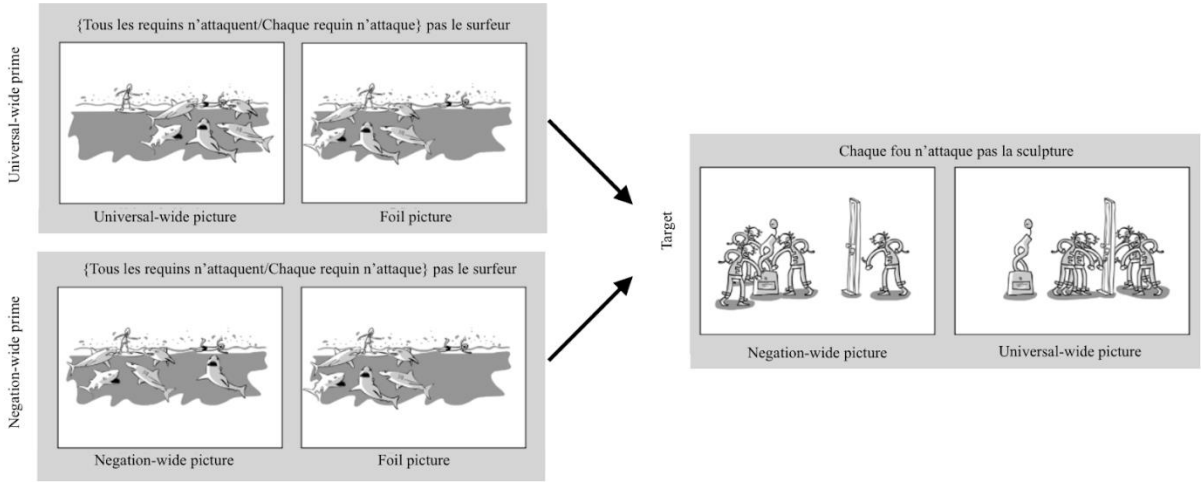


**Fig. 1** Procedure and conditions of our sentence-picture matching task.

We used a sentence-picture matching task to test priming of relative scope in French.[2,5] On each trial, participants matched a sentence with one of two pictures. In primes and targets, this sentence contained universal quantification vis-à-vis negation, e.g. *Chaque requin n'attaque pas le surfeur* ("Every shark doesn't attack the surfer"). In the primes, we forced participants to assign a particular reading, because they could choose between a picture depicting that reading and a picture that mismatched any possible reading. In the subsequent targets, participants could freely choose between two pictures matching the two different readings (Fig. 1). Priming occurs if participants' choice of reading on the target trial is affected by the reading they were forced to choose on the preceding prime trial.

In the prime trials, we varied the Prime Scope (between *universal-wide* and *negation-wide*) and the Prime Quantifier (between *chaque* 'every' and *tous les* 'all the') within participants. The target sentences always involved the quantifier *chaque*.[6] If the representation of the scope taken by *tous les* and *chaque* abstracts away from the differences between these words and their meanings, then there should be priming not only between sentences that share the same

quantifier (from *chaque* to *chaque*), but also across different quantifiers (from *tous les* to chaque). Native speakers of French took part in the experiment (n = 144).

Fig.2 shows the proportion of target responses compatible with the universal-wide interpretation for both primes. A Bayesian logistic regression model revealed that in both prime quantifier conditions, participants were less likely to select the universal-wide picture in the targets following a negation-wide prime than in those following a universal-wide prime (β = -0.240, 90%CI = [-0.35, -0.13], SE = 0.06, P(β<0)=1)). The model also revealed an interaction: priming was larger in the within-quantifier *chaque* condition than in the between-quantifier *tous les* condition (β = -0.11 , 90%CI = [-0.21, -0.02], SE = 0.06, P(β<0.97)=1; Fig. 2).

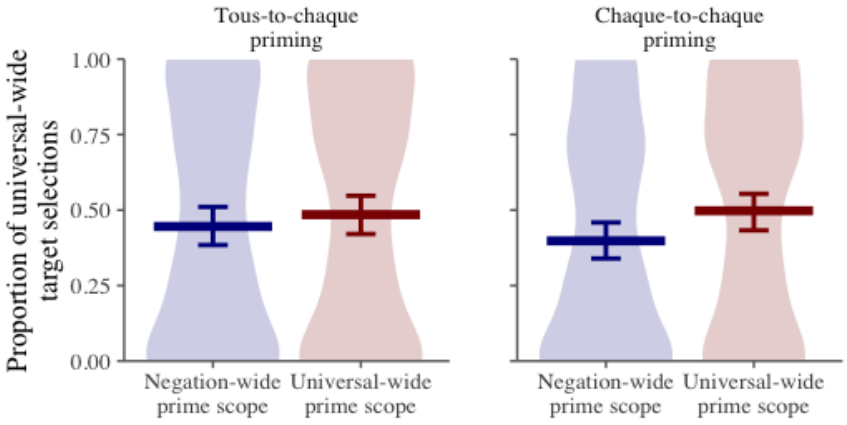


**Fig. 2** Results of our sentence picture-matching task. The horizontal bars denote the mean, and the outline of the shaded

Altogether, our results show that scopal configurations can be primed between different universal quantifiers (although we also find that priming within the same quantifier is larger than between quantifiers). This suggests that there are commonalities in the representation of scope between different quantifiers[8], which contradicts theories that posit quantifier-specific mechanisms for scope taking.[e.g., 3,4] Instead, our results suggest that people rely on more general mechanisms in the assignment and representation of relative scope.[6, 7, 8]

**References**


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