

## Interface between conceptual and syntactic perseverance in noun phrase production

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Much evidence indicates that speakers reuse syntactic structures encountered earlier (e.g., Bock, 1986). Yet representations underlying such an effect remain debated; different syntactic representations vary in other aspects (e.g., thematic role orders). Here we examined (1) whether syntactic priming interacts with conceptual order priming and (2) how syntax and conceptual order are represented during noun phrase production.

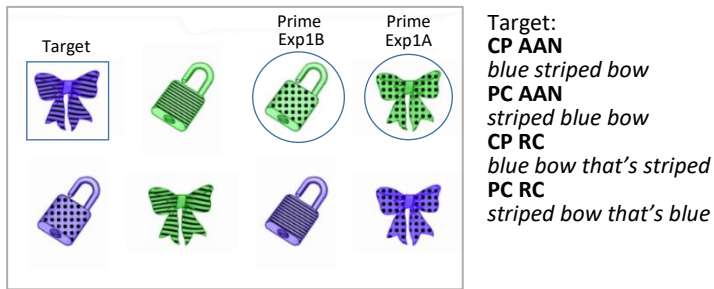
In a web-based referential communication task, participants identified an object in a visual display (Fig.1) in response to auditory descriptions (*prime*), before describing the target object. In Experiment 1, the prime descriptions had either a Color-Pattern (CP) or Pattern-Color (PC) conceptual order, and they had either an AAN (Adjective-Adjective-Noun) or a RC syntactic structure (Adjective-Noun-Relative Clause). If syntactic priming is independent from conceptual order priming, CP RC primes (*green bow that's spotted*) should prime PC RC responses (*striped bow that's blue*) as much as PC RC primes (*spotted bow that's green*). To maximize the chance of finding a syntactic priming effect, in Experiment 1A, the prime and target objects shared the same noun (Cleland & Pickering, 2003). Experiment 1B involved no such repetition. Fig.2 reports the rates of the target responses (CP RC, CP AAN, PC RC, PC AAN) for both experiments, showing that each target response occurred most frequently when the prime and target had the same syntax and conceptual order. In both experiments, logit mixed effects analyses confirmed that overall, syntactic priming was stronger when prime and target had the same conceptual order than otherwise (and vice versa) and this interaction was stronger in Exp 1A than in Exp 1B (all  $ps < .05$ ).

Experiments 2 and 3 examined whether and the extent to which the representations that underlie syntactic priming and conceptual order priming are integrated. Cleland and Pickering (2003) showed that syntactic priming is enhanced by the repetition of the head noun, but not by the repetition of the adjective (i.e., non-head). If conceptual order is integrated with syntax (i.e., CP AAN and PC AAN have separate entries at the syntactic level), conceptual order priming should be enhanced by noun repetition only. Experiment 2 thus manipulated (1) the conceptual order (CP vs. PC) of the prime, which always had an AAN structure, and (2) the repetition of the noun, color, or pattern of the prime in Experiments 2A, 2B and 2C, respectively (see Fig.3). More PC (relative to CP) AAN responses were chosen after PC than CP AAN primes, and the repetition of color, pattern, or noun all boosted conceptual order priming ( $ps < .05$ ) (Fig.4).

Experiment 3 examined if syntactic priming is enhanced by noun repetition only or if it can be enhanced by repetition of any property (cf. Scheepers et al., 2018). We varied (1) the conceptual order (CP vs. PC) and (2) syntactic structure (AAN vs. RC) of the prime, as well as (3) repetition of noun, color, and pattern in Experiments 3A, 3B and 3C, respectively. The analyses on syntactic choice (AAN vs. RC) showed that noun repetition ( $p < .05$ ), but neither color nor pattern repetition ( $ps > .05$ ), enhanced syntactic priming (Fig.5). The analyses on conceptual order choice (CP vs. PC), however, showed that not only noun repetition but also color or pattern repetition enhanced conceptual order priming (Fig.6). Thus, whilst syntactic priming is “head-driven”, boosted by the repetition of the syntactic head only, conceptual order priming is boosted by non-heads.

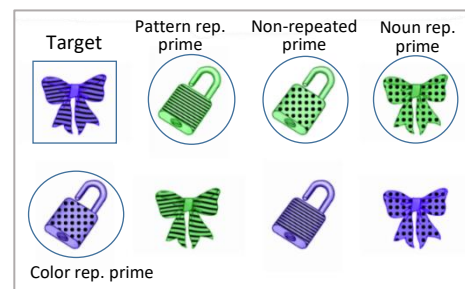
Taken together, conceptual order priming and syntactic priming do interact; speakers reproduce the combination of the prime syntax and conceptual order. Critically, whilst conceptual priming is boosted by both noun and adjective repetition, syntactic priming can only be boosted by noun repetition. We interpret these results as indicating that conceptual order and syntactic structure are represented at different levels; whilst the strong linkage between these two levels of representation facilitates structural priming, the conceptual and syntactic nodes are activated independently and this allows some degree of independent priming.

**Fig.1.** Example display (Exp 1)

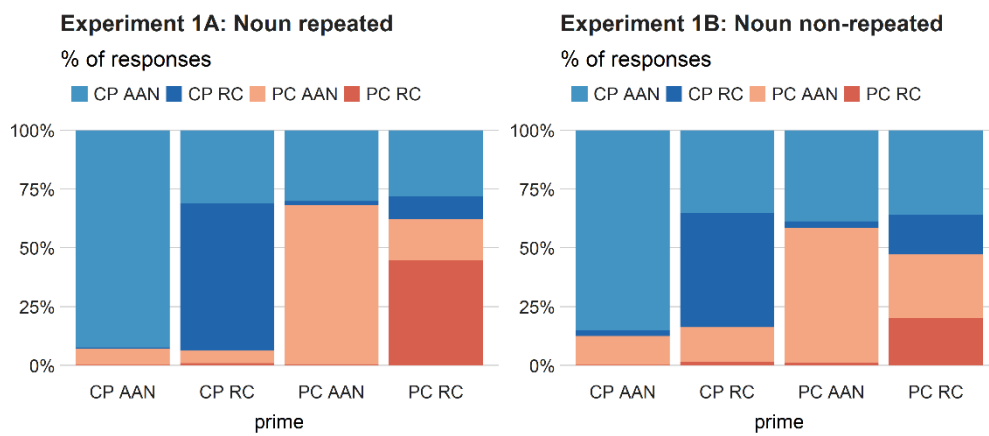


**CP** = Color-Pattern, **PC** = Pattern-Color  
**AAN** = Adjective + Adjective + Noun, **RC** = Adjective + Noun + RC (Adjective)

**Fig.3.** Example display (Exp 2 & 3)



**Fig.2.** Distributions of responses: Experiment 1A & 1B (48 subjects and 36 items per experiment).



**Fig.4.** Conceptual order priming within AAN: Experiment 2A, 2B, 2C (48 subjects, 36 items each)

**Fig.5.** Syntactic priming: Experiment 3A, 3B, 3C (48 subjects, 40 items each)

**Fig.6.** Conceptual order priming: Experiment 3A, 3B, 3C

