

Variable priming correlates with learning – evidence from word order patterns in L2 Norwegian

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OBJECTIVE: Some word order patterns have been shown to be harder to acquire than others for L2 learners of Norwegian, and non-target-like patterns, especially with respect to subject placement, appear to persist or even increase with proficiency [1, 2] most notably the placement of subjects relative to negation and light pronominal objects (see Table 1). In this study, we investigate whether L2 learners are similarly differentially affected in a speech production priming paradigm, while controlling for sensitivity to word order alternations in a perception task. As priming effects are expected to be equally large or larger for less frequent [3, 4], a small priming effect cannot be attributed to low construction frequency, which could otherwise explain differences in learning rates. By comparing priming in production, perceptual sensitivity, and acquisition patterns, we aim to better understand the factors influencing learning rates.

METHOD AND MATERIAL: 66 L2 learners and 20 L1 speakers of Norwegian participated in a priming study, targeting four different word-order pair: the relative placement of (1) *negation* and **phrasal subjects** (subject shift, SS); (2) *pronominal objects* and **negation** (object shift, OS) (3) *verb particles* and **phrasal object** (Particle shift, PS) and *pronominal objects* and **phrasal subjects** (Long object shift, LOS) (see table 1). Participants' baseline word orders were first established in a pre-test (Pre), where they read 24 sentences (six per condition) with an invariable word order, constructed by separating subjects, objects, negation and particles by finite and non-finite verbs (see table 1), and were cued to produce transformed versions of the same sentences in a simple tense or with an inverted subject, forcing the participants to linearize the two target elements with respect to each other. This was followed by a priming phase, where participants heard each of the target sentences from the first part produced by a native speaker and were asked to repeat the sentences verbatim. The participants were randomly assigned to one of two priming conditions: one where the *phonetically lighter* element preceded the **heavier** one (LightFirst group), or the opposite order (LightSecond group). The participants subsequently carried out the same cued production task with the items in the pre-task (Post), followed by another set of 24 items with similar structures (Final). Finally, participants carried out a sentence matching test, where they heard pairs of sentences that were either identical or differed with respect to the ordering of the light and heavy element, and judged if the two sentences were identical. This was done to test if the L2 learners paid attention to word order, and to test to which extent word order sensitivity in perception correlated with priming effects. Proficiency measures and language background data was collected.

RESULTS: The Pre-priming results matched previous perception and production studies: the L2 group differed most from the L1 group with respect subject placement (SS L2 = 22% LightFirst (LF), L1 = 68% LF, LOS L2: 15% LF, L1 0% LF), while OS and PS showed similar patterns for the L2 and L1 groups (see fig 1-2.). Furthermore, while the distance to L1 mean LightFirst proportions decreased with increased L2 proficiency for OS and PS, SS and LOS did not, i.e., subject placement was equally non-target-like across the proficiency range. While an initial logistic regression with LightFirst as dependent variable and Part (Pre, Post, Final) and Group (LightFirst, LightSecond) as predictors, displayed an expected Part by Group interaction (i.e., a larger increase in LightFirst production from Pre to Post/Final part in the LightFirst group relative to the LightSecond group ($\chi^2(2)=14.8$, $p=0.001$, Type III Wald), this effect disappeared when Cond (SS, OS, LOS, PS) was added as an interaction term, where instead a marginal interaction effect between Cond and Part emerges ($\chi^2(6)=11.5$, $p=0.07$): the four conditions show differences in their change from Pre to Post part, irrespective of

priming condition. This is mainly explained by an overall decrease in distance to L1-target patterns, from Pre to Post priming part, which is found in all but the SS condition, partly correlated with an overall increase in fluency. The priming is overall smaller in the SS condition, see fig. 1. The perception task show no difference between the conditions for the L2 group. Postive correlations between perception, proficiency and priming was found only for the OS and PS conditions. The L1 group showed similar but more salient priming patterns as the L2 group. We will discuss various factors that make subject placement patterns hard to master and difficult to prime in L2 Norwegian, including L1 influence, and the difficulty of associating the subject placement patterns either with a small subset of lexical items (c.f. dative and particle alternations [5]) and obvious information structural effects (c.f., passive-active alternations).

References:

[1] Merete Anderssen et al. The acquisition of word order in L2 Norwegian: The case of subject and object shift. *Nordic Journal of Linguistics*, 41(3), 2026. [2] Maud Westendorp & Björn Lundquist. Tverrspråklig innflytelse fra L1 i tilegnelsen av argumentplassering i L2 norsk og svensk. *Norsk lingvistisk tidsskrift*, 2021. [3] Carrie Jackson. Second language structural priming. *Second Language Research*, 34(4), 2018. [4] Florian Jaeger, & Neil Snider. Alignment as a consequence of expectation adaptation. *Cognition*, 127. 2013. [5] Sarah Bernolet & Robert Hartsuiker. Does verb bias modulate syntactic priming? *Cognition* 114. 2010.

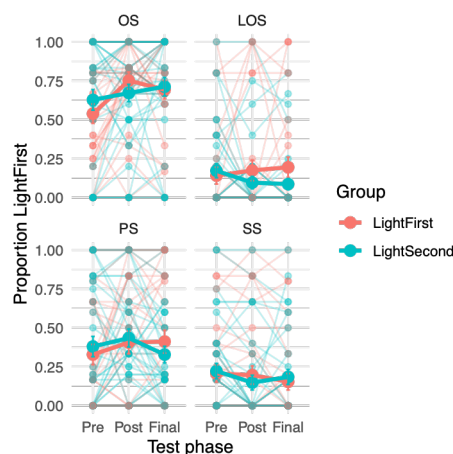


Fig 1: L2 proportion LightFirst

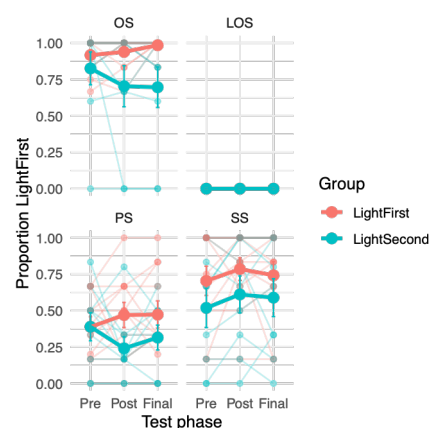


Fig 2: For comparison, L1 proportion LightFirst

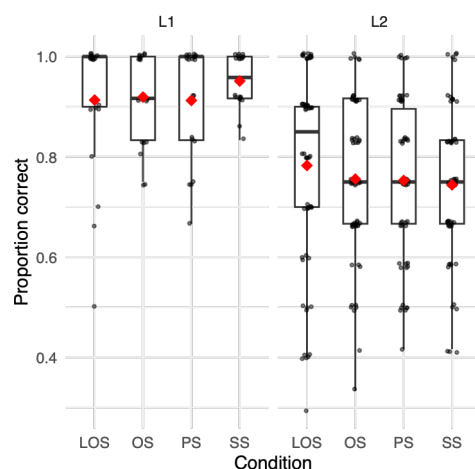


Fig 3: Proportion correct responses for the perception task, across L1 and L2 groups, and conditions.

Condition	Read	Cue	Production
Object shift	Han vil ikke hjelpe meg med leksene denne uka. He will not help me with the homeworks this week	Han hjalp... He helped..	<i>meg ikke</i> med leksene... <i>me not</i> with the homework
Subject sh.	Advokaten kommer ikke til å reise på ferie i år. The lawyer will not to go on holiday this year	I år reiste... This year went...	<i>ikke advokaten</i> på ferie <i>not the lawyer</i> on holiday
Particle sh.	Tavlen ble hengt opp på veggen av læreren The painting was hung up on the wall by the teacher	Læreren hengte.. The teacher hung...	<i>opp tavlen</i> på veggen. <i>up the painting</i> on the wall
Long obj. sh.	Læreren kommer til å skade seg under gymtimen. The teacher will injure himself during gym class.	På gymtimen skadet... During gym class injured...	<i>seg læreren.</i> <i>himself the teacher.</i>

Table 1: Example of stimuli in the production task. The participant reads the “Read” sentence aloud, and is then presented with the “Cue”, which is also read aloud, after which the participant finishes the sentence, using the content from the “Read” sentence (still present on screen). Examples in the “Production” column are all given in the “light-first” order, but the light-second order is available for all conditions, and the only one available in Long object shift for L1 speakers.