The COMP-trace effect and sentence planning: Evidence from L2
Boyoung Kim (KAIST) and Grant Goodall (UC San Diego)

McDaniel et al. (2015) propose that the COMP-trace phenomenon, illustrated in (1), stems ultimately from properties of sentence planning. Their account has three basic components:
- The clause is the default major planning unit and filler-gap dependencies across clauses, as in (1), are inherently difficult.
- Reduced clauses (e.g. without *that*) can more easily be part of the matrix clause planning unit, so filler-gap dependencies into them are less difficult.
- Complex material is dispreferred at the beginning of a planning unit (Principle of End Weight). Gaps are highly complex, so strongly dispreferred in this position.

(1c) is bad because the filler-gap dependency extends into a *that*-clause, a separate planning unit by default, and because the gap is at the beginning of that planning unit; (1d) is better because the gap is not at the beginning. In (1a-b), the embedded clause (without *that*) can be part of the matrix clause planning unit, so in neither case is the gap at the beginning of that unit.

Under this account, speakers with a low capacity for sentence planning will be unable to do cross-clausal planning even with reduced clauses, so embedded subject gaps will always be at the beginning of a planning unit and will thus be severely degraded, Do such speakers exist? L2 speakers are likely candidates. Relatively little is known about their sentence planning in particular (Konopka et al. (2018)), but their sentence production in general is widely thought to be less efficient than that of L1 speakers (Runnqvist et al. (2011)). If this affects their sentence planning as well, as seems plausible, then the McDaniel et al. analysis predicts that they will find both (1a) and (1c) severely degraded in acceptability relative to (1b) and (1d), respectively.

The experiments: We test the prediction by means of three formal sentence acceptability experiments. Experimental stimuli were identical in all three. They consisted of long-distance *wh*-questions in a 2x2 design, crossing the factors THAT (+/-) and GAPSITE (subject vs. object), as in the samples in (1). Subjects saw 5 tokens of each condition, along with 81 filler items, resulting in 101 total stimuli (fully counterbalanced and pseudo-randomized) and rated them on a scale from 1 ("very bad") to 9 ("very good"). The participants were 72 L1 English speakers (Exp. 1) and two groups of L2 English speakers: 72 L1 Korean speakers (Exp. 2) and 49 L1 Spanish speakers (Exp. 3). All L2 participants immigrated to the U.S. between ages 6 and 15 and had lived in the U.S. for at least 7 years.

The results, transformed to z-scores, are presented below. In the L1 English group, a linear mixed effects model reveals a significant interaction between THAT and GAPSITE ($p \leq 0.001$; lmerTest), indicating a classic COMP-trace effect. In the L1 Korean and L1 Spanish groups, there is no such interaction (Korean: $p = 0.219$; Spanish: $p = 0.946$). Instead, there is a significant main effect for GAPSITE (Korean: $p \leq 0.001$; Spanish: $p \leq 0.001$; cf. L1 English: $p = 0.067$), resulting from subject gaps being uniformly worse than object gaps, regardless of the presence or absence of *that*. In the two L2 groups, then, there is a "subject effect" rather than a COMP-trace effect.

Discussion: These results are exactly as predicted, under the plausible assumption that L2 speakers are less able to plan filler-gap dependencies into an embedded clause, regardless of the form of that clause. Why are these results of interest? First, they document a very clear and initially mysterious contrast between L1 and L2 speakers in the extent to which they allow gaps in embedded clauses. Second, they provide tentative evidence for an analysis of the COMP-trace phenomenon in which the effect derives from basic properties of sentence planning, as we have seen. Many questions remain, but the fact that L2 speakers show the "subject effect" that the McDaniel et al. analysis would seem to predict for speakers with a reduced capacity for cross-clausal planning is intriguing and worthy of further exploration.

(1)a. Who do you think [__ saw Mary] ?
   b. Who do you think [Mary saw __] ?
   c. *Who do you think [that [__ saw Mary] ?
   d. Who do you think [that [Mary saw __] ?
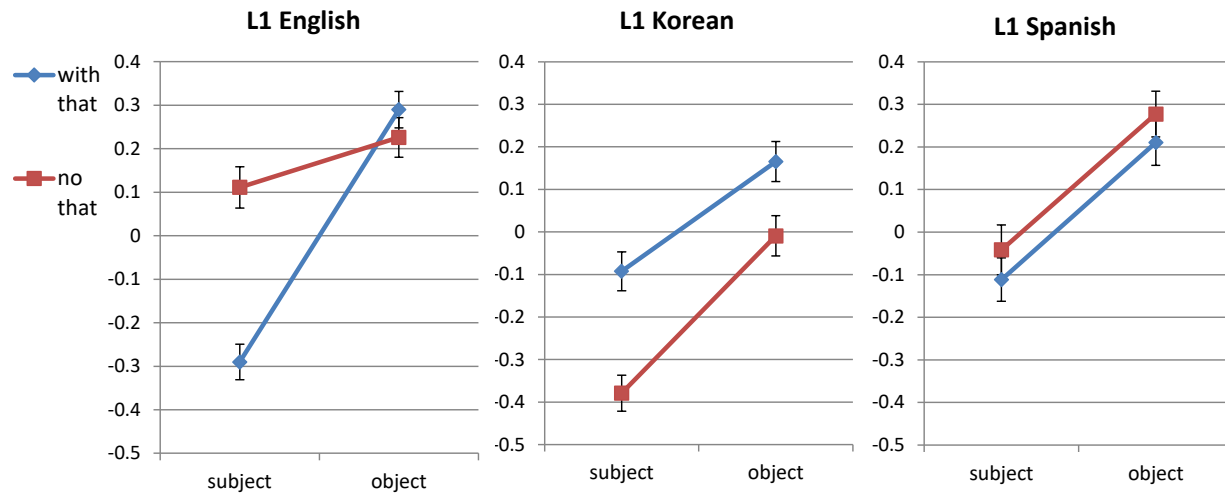
References

Cowart, W. and McDaniel, D. (to appear). The *that*-trace effect. In G. Goodall (ed.), *The Cambridge Handbook of Experimental Syntax*.

Konopka, A., A. Meyer, T. A. Forest (2018). Planning to speak in L1 and L2. *Cognitive Psychology*, 102:72-104.

McDaniel, D., McKee, C., Cowart, W., & Garrett, M. F. (2015). The role of the language production system in shaping grammars. *Language*, *91*(2), 415-441.

Runnqvist, E., Strijkers, K., Sadat, J., & Costa, A. (2011). On the temporal and functional origin of L2 disadvantages in speech production: A critical review. *Frontiers in Psychology*, *2*, 379.