Influential linguistic theories assume a perfect mapping between syntactic and semantic structure, such that each noun phrase maps onto one semantic role [1]. However, in light verb constructions (LVCs) like “Jan gave Elsa a kiss”, the indirect object (“kiss”) forms a complex predicate together with the verb (“give”), such that the subject (“Jan”) is the Agent of both the verb and the indirect object (“kiss”). This results in a mismatch between syntactic and semantic argument structure.

To overcome this mismatch, some theories treat LVCs as listed exceptions, whose idiosyncratic syntax-semantic mapping has to be stored in the lexicon [2,3]. An alternative view is that both the verb and the direct object of an LVC project their argument structures onto the subject, leading to the computation of a shared argument structure through semantic combination [4]. While the former two proposals predict that LVCs should be simple to process than non-light constructions for their reduced syntactic complexity [3] or high frequency [2], the latter assumes that LVCs require more complex semantic composition than typical sentence processing. Consistent with this, previous behavioral data has shown that LVCs elicit increased reading times [5,6].

In the present study we used event-related potentials (ERPs) to examine the online neural processing of LVCs. In particular we were interested in whether, compared to non-LVCs, LVCs would evoke a characteristic signature of complex semantic composition, a larger late negativity [7, 8, 9] that is distinct from the N400 component that would be predicted if LVCs were retrieved from the lexicon as a unit [10].

METHODS: Eighteen German native speakers read sentences, presented word-by-word (450ms, 150ms ISI), using Subject-Object-Verb word order. ERPs were measured to verbs in three constructions: normal LVCs (1); non-LVCs using the same verb (2); and anomalous LVCs using the same verb (3). Sentences were fully counterbalanced across three lists, each of which contained 120 critical items and 80 filler scenarios. A context sentence, presented as a whole, preceded each critical sentence, and the main clause followed it. The cloze probability for verbs was 53% in LVCs, 20% in non-LVCs, and zero in anomalous LVCs. Participants’ task was to classify every scenario as natural or unnatural.

RESULTS: Subjects rated LVCs and non-LVCs as equally natural, and the anomalous LVCs as unnatural. Construction type did not modulate N400 amplitude evoked by critical verbs. Instead, within the 500 to 900ms time window, verbs in LVCs elicited a large, widely distributed negativity, compared to verbs in non-LVCs, while anomalous LVCs evoked a posteriorly distributed positivity between 500 and 900ms (a P600). Additionally, LVC evoked a sustained negativity on words following the critical verb.

CONCLUSIONS: These findings indicate that, despite their frequent usage, LVC processing is very different from non-LVC processing. The effect's timing, scalp distribution and prolonged duration indicate that argument sharing processes are distinct from detecting semantic anomalies that evoke a classical N400 [11]. The results are most consistent with theories in which LVCs involve complex semantic composition [4], rather than retrieval from the lexicon as a unit [2, 3].
EXAMPLE SENTENCES:

Context sentence: Das Flugzeug war bereits hoch über den Wolken.  
The airplane was already high over the clouds (i.e., high in the sky)

(1) LVC sentence:
Als die Stewardess eine Ansage machte
When the stewardess an announcement made,

(2) Non-LVC sentence:
Als die Stewardess einen Kaffee machte
When the stewardess a coffee made,

(3) Anomalous LVC sentence (ungrammatical in German due to semantic restrictions):
*Als die Stewardess ein Gespräch machte
*When the stewardess a conversation made,

Continuation of each sentence: ging gerade die Sonne auf.
went just the sun up (i.e., the sun was just rising.)

Figure 1. Averaged waveforms on the Central Electrode to verbs in the LVCs (dashed line), non-LVCs (solid line), and anomalous LVCs (dotted line). Starting at 500ms after verb onset, there was a widespread and sustained negativity for verbs in the LVCs, and a P600 to verbs in the anomalous constructions.

References: