Comparing licensing processes at the interfaces of syntax, semantics and pragmatics

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Linguistic licensing, local as well as seemingly non-local, is syntax-controlled (e.g., number agreement, reflexive binding, trace-binding in cyclic movement etc.), but may also take place at the interfaces of syntax, semantics and pragmatics. The latter type of licensing raises questions about the interplay between different components of grammar during sentence comprehension, and about their interaction with other cognitive systems like working memory. We use a range of offline and online methods to compare different licensing phenomena at these interfaces in German sentence comprehension. We address both established and new interface licensing phenomena to move toward a more general account of linguistic dependencies.

The first phenomenon is the licensing of negative and positive polarity items (NPIs and PPIs) like jemals (‘ever’) and durchaus (‘certainly’). These must be licensed by a downward-entailing operator, e.g. negation, or by the absence of negation, (1a) and (1c) [4]. Normally, the operator must locally c-command the NPI. However, a number of language processing studies on English and German have found evidence for intrusive licensing by a non-c-commanding licensor (1b) [3, 6, 7, 8, 9], or pragmatic licensing by implicit negation [10]. These findings have sparked discussions about the nature of the underlying linguistic illusions, their relation to working memory, and the division of labor between semantic and pragmatic licensing (see [5] for an overview).

The second phenomenon is the licensing of question-sensitive discourse particles (QDiPs) like German denn (lit. ‘then’). These must be licensed by a c-commanding Q(uestion)-operator or wh-trace [1]. Unlike NPI licensing, QDIP licensing has only recently been described in the sentence comprehension literature [2], and it remains unclear to which extent this phenomenon is subject to intrusive licensing.

Both NPI/PPIs and QDiPS enrich the pragmatic impact of their surrounding clause type (negation, assertion or question), while being constrained by syntax and semantics in systematic ways. In combination, they allow us to proceed from the investigation of isolated licensing phenomena to a more general understanding of licensing processes at the interfaces of syntax, semantics and pragmatics.

We show data from rating studies, self-paced reading and ERP measurements of these different licensing phenomena. For QDiPs, rating studies show graded reductions in acceptability for absent (2b,d) and inaccessible (2c) relative to accessible (2a) Q-licensers. Self-paced reading studies show enhanced processing costs for absent (2b,d), but not for inaccessible (2c) Q-licensers, suggesting that the violation of some licensing constraints is not robust under time pressure. This in turn suggests either a graded increase in processing costs for graded violations, or illusory licensing by inaccessible licensers, similar to what has been described for NPI licensing. ERP measurements for QDiPs show increased P600 amplitudes for absent licensers (2b,d), and mildly increased P600 amplitudes for inaccessible licensers (2c), but no differences in the N400 time window. In contrast, the same datasets reveal that unlicensed NPIs (1b,c) elicit enhanced N400 amplitudes but no visible difference in the P600 time window (in parallel to some of the literature on German NPIs, but in contrast to English NPIs, for which licensing violations tend to elicit P600s). This suggests that differences between findings for English and German NPIs in the literature cannot be reduced to different strategies in both languages, but rather suggest that the respective experiments tap into different subprocesses
during licensing at the interfaces.
We discuss (i) parallels and differences between QDiP and NPI licensing behavior (ii) possible underlying reasons for both licensing violations (illusions or graded reductions in acceptability), and (iii) different possible subprocesses in licensing at the interfaces.

Additional Material: Examples of language materials for experimental conditions

**NPIs and PPIs:** (a) accessible NEG-licenser, (b) inaccessible NEG-licensors, (c) no NEG-licenser
(stimuli based on Vasishth et al. 2008)

(1a)  
Kein Biologe, der eine Brille aufgesetzt hatte, war jemals/*durchaus gesprächig.
  No biologist who det glasses put.on.part. aux was NPI/PPI talkative.
  ‘No biologist who wore glasses was ever/*certainly talkative.’

(1b)  
Ein Biologe, der keine Brille aufgesetzt hatte, war *jemals/*durchaus gesprächig.
  A biologist who no glasses put.on.part. aux was NPI/PPI talkative.
  ‘A biologist who wore no glasses was *ever/certainly talkative.’

(1c)  
Ein Biologe, der eine Brille aufgesetzt hatte, war *jemals/*durchaus gesprächig.
  A biologist who no glasses put.on.part. aux was NPI/PPI talkative.
  ‘A biologist who wore no glasses was *ever/certainly talkative.’

**QDiPs:** in root clause with (a) accessible Q-licenser, (b) no Q-licenser;
in embedded clause with (c) inaccessible Q-licenser, (d) no Q-licenser

(2a)  
Wer hat den Kuchen aus der Bäckerei denn aufgegessen?
  who has the cake from the bakery QDiP up.eat.part
  ‘Who then ate the cake from the bakery?’ [Please note that the exact flavor of denn cannot be translated.]

(2b)  
* Robert hat den Kuchen aus der Bäckerei denn aufgegessen.
  Robert has the cake from the bakery QDiP up.eat.part
  ‘Robert then ate the cake from the bakery.’

(2c)  
* Wer hat gesagt, dass die Oma den Kuchen denn aufessen muss?
  who has said that the granny the cake QDiP up.eat.part must
  ‘Who said that the granny should eat the cake then?’

(2d)  
* Robert hat gesagt, dass die Oma den Kuchen denn aufessen muss.
  Robert has said that the granny the cake QDiP up.eat.part must
  ‘Robert said that the granny should eat the cake then.’

**References**

[9] Xiang, M., Grove, J., Giannakidou, A. (2013). Dependency-dependent interference: NPI interference, agreement attraction, and