Pragmatic Structuring and Negation in Formal Grammar

The central objective of the work presented in this talk is the formal modeling of ‘focus sensitivity’ of negation and related phenomena. Information structure, and hence focusing, manifests itself in different layers of natural language: (i) in interpretation: semantically, in terms of introducing alternatives (e.g., Rooth, 1992; Krifka, 2001) or pragmatically, in terms of relating to the QUD (Roberts, 2012) or in terms of pragmatic structuring (Lambrecht, 1994), and (ii) in structure building: in terms of the triggering of dedicated syntactic operations and configurations (e.g., É. Kiss, 1995). It is widely accepted that the interpretation of a range of linguistic expressions is dependent on the IS of the utterances in which they occur (König, 1991; Krifka, 2001; Beaver & Clark, 2008). This holds for a range of focus sensitive particles (e.g., only, also, even), as well as for negation. This observation is cross-linguistically valid and the phenomenon is referred to as focus sensitivity, that can manifest itself in different ways. Current approaches to focus sensitivity are rather restricted to the field of formal semantics/pragmatics. However, despite their fairly uniform semantics, focus sensitive elements vary across languages with respect to their structural behaviour, which in turn strongly affects their modeling in formal grammar. Leading grammar theories and formalisms that capture IS-phenomena (CCG, LFG, HPSG) do not systematically address focus sensitivity. These accounts generally acknowledge both aspects of IS, structure building and interpretation, but they often concentrate on only one of them, or lack the formal means in their architecture to equally address both aspects.

The formal analysis of any linguistic phenomenon requires a two-sided approach: theoretical claims need to be verified by empirically valid and formally exact models, and formal models must be built on solid theoretical grounds. Therefore, in our proposal, we build upon the formalized version of Role and Reference Grammar (Kallmeyer et al., 2013; Osswald & Kallmeyer, 2018), which facilitates such a two-sided approach. The formal specification of this grammar is inspired by Tree-Adjoining Grammar (Joshi & Schabes, 1997), while it is based on a solid theoretical framework, RRG (Van Valin & LaPolla, 1997; Van Valin, 2005), with a strong typological and cross-linguistic perspective. However, the system lacks a formal specification and modeling of information structure, which asks for an extension. The general architecture of RRG is modular, with linking relations defined between various levels of representation (called ‘projections’). At the center of the grammatical system of RRG is a bi-directional linking of syntax and semantics, capturing both language production and comprehension, and influenced by discourse-pragmatics. The representation and analysis of discourse-pragmatics is given in the Focus Structure Projection. Within this projection, RRG distinguishes the actual focus domain (AFD), the syntactic domain that corresponds to the focus in Lambrecht’s (1994) terms, and the potential focus domain (PFD), where the focus can occur. Both syntactic domains include one or more information units (IU), which are the minimal phrasal units in the syntactic representation (Appendix, Figure 1). The formalized version of RRG has the advantage that semantic construction can be carried out compositionally. Syntactic templates come with (pieces of) semantic representations, given as decompositional frames (Petersen, 2015; Löbner, 2017), formally defined as base-labelled typed feature structures (Kallmeyer & Osswald, 2013). The semantic composition is on a par with the syntactic composition, mediated by the interface features on the nodes. The syntactic operations trigger the composition of the semantic representations, thereby deriving the meaning representation of the sentence. The semantic composition proceeds by unification (Appendix, Figure 2).

A central cross-linguistic claim is that negation has a direct access to the focus structure of the utterance. Generally, there are two types of negation distinguished: predicate (or clausal) negation (1a) and focus (or constituent) negation (1b).
a. Alex did not kiss Sam.

b. Alex did not kiss SAM.

In certain languages, these two types are distinguished structurally. For example, in Hungarian, the negative particle nem ‘not’ can appear right before the predicate or right before the preverbal narrow focus, expressing the above negation types respectively.

(2) a. Alex nem csókolta meg Samu-t.
   Alex not kissed VPRT Sam-ACC
   ‘Alex did not kiss Sam.’

b. Alex nem Samu-t csókolta meg.
   Alex not Sam-ACC kissed VPRT
   ‘It is not SAM whom Alex kissed.’

We argue that negation generally operates on the actual focus domain, which determines its scope. This is represented within the Focus Structure Projection (3). This is cross-linguistically valid, regardless of the structural differences expressing the various types of negation.

(3) a. Alex did not kiss Sam.
   [\[\text{NEG} \rightarrow [IU IU \text{AFD}] \text{PFD}]]

b. Alex did not kiss SAM.
   [\[\text{NEG} \rightarrow [IU IU \text{AFD}] \text{PFD}]]

While the above representation straightforwardly captures the relation between negation and the actual focus domain, it lacks a crucial aspect: what it precisely means for the interpretation of the sentence. How to capture the semantic scope of negation from this, and what meaning contribution is exactly affected by the negation. These issues take us beyond a mere logical treatment of negation, and, as we argue, they require an approach extending to the analysis and formal representation of the information structure (in particular, the focus structure) of the sentence. Along these lines, we propose a formal approach based on pragmatic structuring of the sentence.

Following Lambrecht (1994), focus leads to a pragmatic structuring of the utterance, where ‘predicate focus’ contributes some predication of a previously selected topic, while ‘narrow focus’ contributes the identification of the missing information in the open proposition provided by the background (= pragmatic presupposition). Informally:

(4) a. Alex [kissed SAM]$^F$
   pragmatic presupposition: referent of ‘Alex’ is available as topic
   pragmatic assertion: ‘(he) kissed sam’
   is predicated of the topic

b. Alex kissed [SAM]$^F$
   pragmatic presupposition: ‘alex kissed x’ (open proposition)
   pragmatic assertion: ‘x = sam’ (identification)

The AFD corresponds to the ‘pragmatic assertion’ of the utterance (Van Valin, 2005), and we argue that this is the meaning contribution that is targeted by negation. In this talk, we will introduce the formal approach along this line and propose the necessary extension of the formal representation of the focus structure projection with reference to the pragmatic assertion and the pragmatic presupposition. In the definition of negation it operates on the pragmatic assertion. To formally derive these meaning components, we define the role and exact nature of information units, that constitute the AFD and PFD of the sentence. We extend their definition in a way that they not only make reference to syntactic domains (the current case), but also to the pieces of semantic information, that undeniably contribute to the information within the pragmatic structuring of the sentence. Furthermore, we address structural/syntactic considerations, with special attention to discourse configurational languages (É. Kiss, 1995). The model we propose contributes to the analysis of the understanding of the relation between negation and focusing, as well as aspects of focus sensitivity. It also elaborates on the relation of syntactic scope, semantic scope and pragmatic interpretation.
Appendix

Figure 1. Focus structures in classical RRG

(a) predicate focus:  
SENTENCE  
CLAUSE  
CORE  
NUC  
PRED  
V  
kissed  
RP  
Alex  
SAM  
IU  
AFD  
PFD  
(b) narrow object focus:  
SENTENCE  
CLAUSE  
CORE  
NUC  
PRED  
V  
kissed  
RP  
Alex  
SAM  
IU  
AFD  
PFD  
(c) narrow subject focus:  
SENTENCE  
CLAUSE  
CORE  
NUC  
PRED  
V  
kissed  
RP  
ALEX  
Sam  
IU  
AFD  
PFD

Figure 2. Syntax-semantics interface in formalized RRG

(a) tree templates (before composition)  
SENTENCE\(^{(P=e)}\)  
CLAUSE\(^{(P=e)}\)  
CORE\(^{(P=e)}\)  
NUC\(^{(P=e)}\)  
V\(^{(P+e)}\)  
kissed  
RP\(^{(P+e)}\)  
Alex  
IU  
AFD  
PFD

(b) resulting tree (after composition)  
SENTENCE\(^{(P=e)}\)  
CLAUSE\(^{(P=e)}\)  
CORE\(^{(P=e)}\)  
NUC\(^{(P=e)}\)  
V\(^{(P+e)}\)  
kissed  
RP\(^{(P+e)}\)  
Alex  
IU  
AFD  
PFD

References


