Constructional approaches in formal grammar

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INTRODUCTION 1

Constructional approaches to language are associated with Construction Grammar, a family of theories whose main analytical concepts can be summarized as follows: a surface-oriented description; the simultaneous presence of form-, meaning- and, sometimes, usage-properties of utterances; non-locality or extended locality of linguistic units; the organization of linguistic knowledge in a hierarchical network (such as a type hierarchy); the rejection of the strict distinction between lexicon and syntax and the assumption of a syntax–lexicon continuum. One concept that is not necessarily associated with Construction Grammar, and is in fact viewed by some as standing in opposition to it, is formal grammar. The goal of the present special issue is to consider how constructional approaches can be used and have been used in formal approaches to grammar.

Given that Construction Grammar comes with a number of different basic assumptions, which are in part shared with other, non-constructional approaches, there is not necessarily a consensus on what counts as *constructional*. In the context of this special issue, we see three basic understandings of this notion. First, "constructional" can be used in the sense of non-local, contrasting with a syntactic and semantic notion of compositionality as incorporated most clearly in Montague Grammar (e.g. Montague 1974). This will be a central issue in Findlay's paper. Second, "constructional" is understood in the

sense of phrasal, as opposed to lexicalist. This means that idiosyncratic properties of complex expressions should not necessarily be reduced to idionsyncratic sub-syntactic elements, and that they can be a property of the complex expression itself. This perspective is argued for in van Eynde's contribution to this special issue. Finally, "constructional" can be used in a more general way, in the sense of holistic, standing in opposition with atomistic. In Melnik's paper, in which a formalization of a functional analysis is proposed, these two perspectives do not stand in opposition but rather complement each other.

What is essential of these three senses of "constructional" in the context of this special issue is that they are uniformly shared by Construction Grammars, but are typically seen in opposition to the basic analytical concepts of most versions of formal grammar and Mainstream Generative Grammar. To be more precise, formal approaches typically assume (local) compositionality – in contrast to extended locality; they strive at a minimal amount of idiosyncratic phrasal combinations – in contrast to the assumption of an extended phrasal *constructicon*; and they give preference to atomistic analyses – contrasting with the mentioned holistic view. We think that this has given rise to the impression that *constructional* stands in opposition to *formal*.

Indeed, some approaches within the general framework of Construction Grammar explicitly reject formalization in principle. On the other hand, we find highly formalized and computationally implemented versions of Construction Grammar. This already indicates that the formal vs. non-formal opposition is not necessarily tied to a constructional vs. non-constructional linguistic analysis. In fact, this debate extends well beyond the domain of Construction Grammar, and is often accompanied by other dichotomies: functionalist vs. formalist, usage based vs. competence based, holistic vs. analytic, theory-driven vs. data-driven, nativism vs. constructivism, or the acceptance vs. rejection of a core–periphery distinction. Arguments against formalization often target Minimalism, as a straw-man case for any criticism towards formal grammar (a point already made in Croft 1999). Furthermore, Newmeyer (2010) finds that formalism and functionalism are complementary, rather than diametrically opposed.

Consequently, the dichotomies that feature in the formal vs. non-formal debate are to a large degree orthogonal to the question of whether a formal account is possible, desirable, or insightful. More-

over, they are not necessarily linked to a constructional vs. non-constructional opposition – under any understanding of *constructional*: There are formal linguistic approaches that deviate from classical context-free phrase structure grammars and which incorporate the empirical motivations and conceptual ideas of construction-size linguistic units. Leading examples are (constructional) Head-driven Phrase Structure Grammar (Sag 1997; Ginzburg and Sag 2000; Müller 2017), Tree Adjoining Grammar (Joshi 1987), proposed constructional extensions of Lexical Functional Grammar (Asudeh *et al.* 2014; Findlay 2017), and Simpler Syntax (Culicover and Jackendoff 2005).

There are, however, issues that legitimately challenge the feasibility or the usefulness of formalization. In particular: (i) due to limitations of the chosen formalism, important aspects of a phenomenon may fall outside of what can be described, which might wrongly suggest that they need not be looked at, (ii) formalization constraints might force a researcher to make analytic decisions that are not directly related to the phenomenon at hand, (iii) the formalization of an analysis may be mistakenly taken as hard evidence for its veracity, and (iv) formalization can analyze structures but usually does not provide an independent explanation or a link to general cognitive or processing principles.

While it is important to keep these caveats in mind, a formal description has a number of advantages: (i) it makes all essential aspects of an analysis explicit, (ii) it makes it possible to check for the compatibility of analyses of different phenomena, (iii) it makes testable and verifiable predictions about possible and impossible utterances, (iv) it clearly separates different aspects of a phenomenon, and (v) it might serve as the basis for an implemented grammar and various NLP software applications.

We conclude that, although some basic views of what is considered *constructional* are not shared by many formal approaches to language, there is no intrinsic or principled correlation between constructional and non-formal. The papers in this special issue do not question the usefulness of a formal approach to the description of language. They demonstrate that our three notions of constructional approaches are instrumental in achieving a comprehensive understanding of linguistic data and in formalizing empirical generalization. At the same time, they discuss to what extent deviations from (local)

compositionality, non-phrasality, and an atomistic analysis are needed and implementable within the chosen framework.

2 THE PAPERS IN THE ISSUE

In this section, we will briefly show how each of the contributions addresses the issues raised in this introduction. In particular, the three assumptions of constructional approaches that are usually not shared by formal analyses will play a role, i.e., non-locality of the analysis, idiosyncratic phrases, and holistic characterizations of phenomena.

2.1 *Jamie Y. Findlay: Lexical Functional Grammar as a Construction Grammar*

In his contribution, Findlay argues that Lexical Functional Grammar (LFG) can be viewed as a suitable framework for formalizing Construction Grammar analyses. He lays the foundations for his argument by identifying seven meta-theoretical assumptions shared by much research within Construction Grammar frameworks. He then presents LFG and discusses its properties in the light of these assumptions. According to Findlay's presentation, there are two fundamental differences between the two approaches: First, he elaborates on the contrast between a strong morphology–syntax division in LFG (so-called *Lexical Integrity*) and the common assumption in Construction Grammar that there are constructions "all the way down", i.e., that there is no strict boundary between morphology and syntax. Findlay argues in favor of a mid-way position on lexical integrity, showing that LFG might provide means to allow for a morphology–syntax interaction within restricted, well-defined limits.

Second, Findlay points out that the assumption of an *extended domain of locality* in Construction Grammar is incompatible with the syntactic combinatorics of LFG, which is based on a context-free phrase structure grammar. He acknowledges that, while there are more local, more classically compositional analyses of so-called *substantive idioms* (Fillmore *et al.* 1988) such as *spill the beans* and even *kick the*

bucket, approaches that assume a single, complex, phrasal syntactic representation associated with a simple semantic representation are more common in Construction Grammar. He then shows that a formally precise, genuinely phrasal description of such idioms is possible within LFG by replacing the phrase structural syntactic combinatorics with a tree grammar, following his own work (see Findlay 2019).

2.2 *Frank van Eynde: The Dutch Anaphoric Possessive Construction*

Van Eynde provides a detailed discussion of the formal properties of what he calls the *Dutch Anaphoric Possessive Construction* (APC), illustrated in (1) (van Eynde's example), which he contrasts with other possessive constructions in Dutch that are more similar to possessive constructions in English.

(1) Ik heb [Tom zijn fiets] verkocht.
I have Tom his bike sold
'I have sold Tom's bike.'

He shows that the construction shares a number of properties with more canonically formed noun phrases, but also has its own, idiosyncratic properties. Since none of the lexical items is construction-specific, van Eynde argues that a phrase-based analysis is well motivated.

This interplay is modeled by a multiple inheritance hierarchy using the framework of *constructional HPSG*. This framework comes with the locality assumption that there are no phrasal units of analysis that go beyond immediate mother–daughter relations (Sag 2010), i.e., there is no extended domain of locality. The APC is a potential challenge for this assumption. As van Eynde shows, in the syntactic structure of the relevant noun phrase, [Tom_i [$zijn_i$ *fiets*]], the full NP possessor and the co-indexed possessive pronoun are not immediate daughters of the same local tree, nor is there a direct selectional relation between them. However, the combination of feature percolation from the specifier inside the noun phrase *zijn fiets* and the properties of the idiosyncratic construction make it possible to maintain the locality that is inherent to the framework.

2.3 *Nurit Melnik: Copy Raising Reconsidered*

Melnik's contribution focuses on a phenomenon that is often referred to as *copy raising*, illustrated in (2a), due to its resemblance to the well-known *subject-to-subject raising* construction, as in (2b).

(2) a. Richard$_i$ appears like he$_i$ is in trouble.
b. Richard$_i$ appears t$_i$ to be in trouble.

However, as Melnik points out, there is no consensus in the literature regarding its defining characteristics and whether it in fact involves a raised subject and a pronominal copy. This lack of consensus, she claims, reflects an improper taxonomy of the phenomenon. Instead she identifies two distinct functions that perception verbs such as *appear*, *look*, *sound* and *smell* serve: *perceptual depiction* and *perceptual inference*. Moreover, she shows that these functions extend well beyond their particular instantiation in what is referred to as "copy raising".

The analysis that Melnik proposes is twofold: functional and formal. The functional analysis begins with a pre-theoretical examination of the construction and its functions. This perspective sidesteps the syntactic questions that dominate the discussions in the literature regarding copy raising, and in doing so she adopts a more holistic constructional approach, which incorporates aspects of both form and meaning. The formal analysis is couched in the framework of Head-driven Phrase Structure Grammar (HPSG). Strictly speaking, it is a lexicalist analysis; the meanings of the two distinct constructions are ultimately derived from a single lexeme. Nevertheless, the formal analysis captures the essence of the functional account. It does so by employing a lexical type inheritance hierarchy which reflects the shared core meaning of the verbs heading the constructions as well as the extra-lexical meaning components which are associated with each construction.

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