Introduction

Formalizing Functionalism

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1.   Formal vs. Functional

At least since Chomsky (1957, 1965), the field of linguistics has been roughly divided into two camps concerning the philosophical, methodological, and empirical domain of the discipline. Traditional grammarians, following the early work of the Prague School of linguistics, as well as linguists coming from approaches as diverse as computational neural net theory and typological descriptive traditions, identify themselves primarily as *functional* linguists. The term is meant to evoke the idea that the driving force in linguistic study is a focus on the (communicative) function of grammatical structure. The other approach, which found its origins in the American structuralist school of linguistics (such as the work by Bloomfield) but became solidified in Chomskyan generative grammar and related approaches, is focused on the form and structure of the language, rather than on its communicative (and other) functions. This view is commonly called *formalism.*

The labels *functionalist* and *formalist* represent an unfortunate oversimplification of very complex foundational issues. There is very little agreement among linguists about which particular assumptions or methodologies mark one as a functionalist or formalist. There are a number of important works on the question of defining the camps, including Croft (1995) and Newmeyer (1998), and the collection of articles in the volumes edited by Darnell, Moravcsik et al. (1999). We cannot hope to do justice to the complexity of the issue here, but will offer a brief synopsis of some of the leading lines of thought. Part of the problem of defining the terms functional and formal lies in the fact that among practitioners of functionalism there is little agreement as to what characteristics a functional theory must have. On the side of formalist theories (such as Minimalism, HPSG and LFG), there is a greater agreement about the domain of the discipline, but still important foundational disagreements about methodology and implementation. As such, defining what constitutes a formal theory of grammar or a functional one is notoriously difficult.

Essentially, the formal/functional distinction turns on one's position along a number of dimensions. A theory's alignment as functionalist or formalist seems to depend on how many of these dimensions that one takes a more or less functional position on. In no particular order these dimensions include (these dimensions are based on work of Croft (1995) and Newmeyer (1998)):

1. The role of structure in grammatical theory: Less reliance on structure makes one more functionalist.[1]

2. The role of arbitrariness in grammar: Formalists hold the strict Saussurian view that language, including the grammar, is essentially arbitrary; whereas the most radical of functionalist approaches only see arbitrariness in the lexicon. Less radical functionalists (e.g. Cognitive Grammarians) view arbitrariness in the grammar and the lexicon to be of a like-kind, that is: grammatical arbitrariness is essentially lexical arbitrariness.[2]

3. The autonomy of syntax:[3] Many formalist theories hold that there are a number of grammatical phenomena that allow formal characterization without reference to their semantic or pragmatic function. By contrast, all functionalist approaches view the importance of the semantic or pragmatic function of grammatical phenomena to be so overwhelming in shaping the grammatical form, that speaking of the grammatical form in isolation is meaningless.

4. The diachronic/synchronic distinction: Formalist theories roughly hold that the goal of linguistic theory is to characterize the grammatical system of a speaker at a given moment in time, without reference to the historical pressures that gave rise to that grammatical system. Functionalists, hold that a full characterization of the grammatical system is incomplete without an understanding of the historical events that gave rise to it.

5. The competence/performance distinction:[4] Formalist grammarians hold that there is core grammatical knowledge which can be characterized independently of the production/comprehension system that realizes it. Functionalist grammarians, on the whole, argue that the performance system and the competence system are isomorphic.

6. A methodological issue over what constitutes "data" for linguistic study: Formalist grammarians usually, although not uniformly, focus on grammaticality judgements, typological comparison and data from language acquisition. Functionalists often, but not always, exclude grammaticality judgements, focusing instead on statistical corpus analysis. They also include historical and sociological data which is regularly excluded from formalist theories.

These broad distinctions among theoretical approaches have given rise to an interesting split in the discipline with respect to particular linguistic phenomena. Some phenomena are treated almost exclusively by functionalist theoreticians, and

others exclusively by formalists. For example, with a few notable exceptions, the study of information structure, and the discourse-syntax interface is primarily done in the functionalist traditions. It is this distinction in terms of empirical coverage that we refer to by the "'Function" in the title of this book. In this volume we gather together papers by well-known authors writing in formalist (primarily Chomskyan) frameworks about many of the phenomena traditionally treated only in functionalist traditions.

2.   Eloise Jelinek and formal functionalism

For the past 20 years, the work of Eloise Jelinek, while she self-identifies as a die-hard formalist, has been a driving force in showing formalist linguists how to treat material previously considered only within functionalist traditions. Jelinek's work on lesser studied languages, including Native American, Semitic and Australian languages, often focussing on phenomena apparently controlled by external factors, such as information structure, has shown other formal linguists how to approach cases of interface between purely "grammatical" (i.e., syntactic, morphological, or phonological) phenomena and the discourse, semantic, phonetic or conceptual forces that drive them. Indeed, the most recent version of the Chomskyan Principles and Parameters approach, Minimalism (Chomsky 1995b, 2001a,b), explicitly claims that cross-linguistic and language-internal variation in the syntactic computational component stems from the interface between that component and other systems such as the conceptual/interpretive system or the auditory/production system. Much of the credit for the change from purely syntactic modeling to detailed consideration of interface conditions, should be attributed to Eloise Jelinek (and, of course, her collaborators and colleagues who investigate the same issues).[5]

Formal grammar is, for the most part,[6] structuralist. On a purely surface level, many of (if not the majority of) the world's languages exhibit syntactic phenomena that appear problematic for structure-based accounts. Purely structural accounts, such as a phrase structure grammar or a transformational grammar of the EST type, suggest that grammatical and semantic information is read directly off of the structure of the syntactic tree. For example, in the EST, the subject of an English sentence is the daughter of the S node, and sister to the VP. Non-configurational[7] languages, such as Warlpiri, allow a multitude of word orders (and by hypothesis a multitude of structures). For such languages, a one to one mapping between structure and grammatical/semantic function seems, at least on the surface, to be severely misguided. This conclusion led many functionalists and formalists (as in the LFG and RG traditions) to abandon structural accounts of word order phenomena. Within the structuralist/formalist traditions, many attempts were made to account for these languages: Hale (1982) proposed that there was a configurationality

parameter, whereby non-configurational languages didn't use X-bar structure, but used a non-configurational phrase structure rule instead: S $\rightarrow$ … X*… which allowed free ordering of elements. This type of approach was challenged by the fact that even in non-configurational languages there appear to be some phenomena which are sensitive to hierarchical structure. Ross (1967) proposed that these languages had a stylistic or purely phonological rule which took a fully specified hierarchical structure and "scrambled"[8] the elements. Neither of these approaches is terribly satisfying in light of the evidence that word order in non-configurational languages, when examined in a closer light, appears to be determined by discourse-level considerations, such as topic, focus or narrative force. In traditional formal autonomous syntax, such "external" factors are difficult to account for since they essentially involve access to contextual (and thus presumably performance and other extralinguistic) information. Jelinek's work, however, has shown that an autonomous syntactic component does not necessarily have to operate in a vacuum. Instead, by looking at the interfaces with such domains as discourse information structure, we can distinguish between purely syntactic/grammatical phenomena and those grammatical phenomena that draw information from other modules.

Jelinek (1984), a seminal paper in this domain, proposed the Pronominal Argument Hypothesis (PAH), which broke new ground in providing an explanation of why non-configurational languages show some sensitivity to structural hierarchical structural information, but appear to resist an analysis of their surface word orders in terms of structure. The PA hypothesis claims that languages are parameterized into lexical argument languages (LA), which allow full NPs to be arguments of a predicate, and pronominal argument languages (PA) which only allow pronouns (or agreement which represents pronouns) in argument positions. Full lexical NPs in PA languages are not in argument positions, but are adjoined to the structure, similar to left-dislocation structures in English. The surface word order of lexical elements is determined by discourse-configurational considerations (which may or may not also map to particular structural positions in the tree, such as the specifiers of Topic or Focus functional projections). Phenomena that appear to be sensitive to traditional hierarchical "syntactic" constraints make reference to the pronominal arguments. Those that are sensitive to discourse refer to the adjunct NPs.

Closely tied to this work on discourse-syntax interaction is Jelinek's work on the mapping between the syntactic structure, semantic notions such as specificity and definiteness, and grammatical notions traditionally characterized in the functionalist literature[9] in terms of accessibility hierarchies (see, for example, Keenan (1976); Keenan and Comrie (1977); Givon (1994) and many others). Because these notions refer primarily to semantic and world knowledge, they are not easily dealt with in traditional autonomous-syntax models. Jelinek's work, both alone and in collaboration with Molly Diesing, has proposed that such abstract hierarchies correspond, in fact, to hierarchy imposed by the phrase structure.

Relational and semantic hierarchies are "mapped" off of the syntactic structure. A number of such hierarchical effects, including person, animacy, specificity, and topic/focus structure result from mapping between specific positions in the syntactic tree and semantic structure. Positions high in the syntactic tree correspond directly to items that are high in the semantic hierarchy. The contribution from Carnie and Jelinek in this volume is an attempt to apply this insight to a wide range of data, considering an interaction of phases and mapping domains.

In pursuing these areas, Eloise Jelinek has shown that formal Chomskyan grammar can, with minor modifications, provide explanatory and interesting accounts of phenomena traditionally dealt with only by functionalist theoreticians.

3.   Formal grammars of function

The papers we have collected together in this volume continue in this spirit. They either directly address questions that Jelinek has raised (e.g., the papers of Baker, Hale, Davis & Matthewson, and Bach) or pursue other traditionally "functional" topics in the spirit of a formal approach (e.g. Langendoen, Diesing, Rice, McDonough, Sgall et al., etc.) The papers address both syntactic/semantic/pragmatic questions and phonological/phonetic ones, where the formal/functional divide also exists.

Addressing to the relationship between Jelinek's Pronominal Argument Hypothesis, the structural representation of grammatical relations, and definiteness, Ken Hale presents a non-movement account of the Navajo verb form and nominal incorporation, which he argues is a necessary consequence of the PAH. Emmon Bach explores the consequences of the PAH for composition, adopting a strict semantic type/syntactic category mapping hypothesis. In particular, he suggests that the way in which overt DP arguments are composed with verbal predicates must differ radically in pronominal argument languages, since the verb-word denotes a saturated proposition (or truth value), rather than an argument-taking function. Bach concludes that the PAH provides a framework in which one can characterize this type of parametric variation as variation in the availability of V and VP as categories: these categories are not available in PA languages. Also dealing with parametric variation and the PAH, and perforce adopting a similar hypothesis about composition of dislocated DP arguments, Mark Baker treats the semi-configurational properties of Kinande, a Bantu language, relating them to similar semi-configurational properties observed for Romance languages by Alexiadou and Agnosopolou (1998). Baker relates these properties to the presence or absence, and the obligatoriness or optionality, of subject and object agreement in Kinnande. He proposes that a particular formulation of the PAH can explain the behavior of agreeing and non-agreeing DPs within a single language. Keren Rice examines the interaction of agreement doubling with the famous *y-/b*-alternation in the Northern

Athabaskan language Slave. According to the PAH, pronominal argument languages should always allow co-occurrence of overt DPs with pronominal agreement (the pronominal arguments). Northern Athabaskan languages, which in general do not allow doubling of agreement and overt DP arguments, have been treated as non-PAH languages. Rice demonstrates that in at least some contexts, Slave allows doubling of agreement, and discusses the theoretical consequences of this result for the PAH. In the last paper dealing explicitly with the PAH, Henry Davis and Lisa Matthewson outline a treatment of some *non*-agreeing objects in St'át'imcets (Straits Salish), which they argue are problematic for a PAH approach. They demonstrate that the interaction of inherent plurality of events and determiners on these objects can be naturally treated as a scope phenomenon.

Turning to function more broadly construed as an interface issue, Molly Diesing investigates multiple fronting in *wh*-questions in Yiddish. This is a very current topic of investigation, and several formal accounts in terms of *wh*-features have been recently proposed (Richards 1997, Pesetsky 2000, among many others). In the grammar of Yiddish, multiple *wh*-fronting co-occurs with single-fronting and non-fronting constructions, and Diesing shows that the multiply-fronted construction is strongly conditioned by D(iscourse)-Linking, in the sense of Pesetsky (1987). Lynn Nichols also deals with constraints on extraction, in the context of another currently heated debate about the syntactic realization of Davidson's event argument. She proposes that the event argument itself can be relativized, which produces a relative clause that has in the past been misanalyzed as a clausal complement to 'evaluative' nominals like *claim, fact,* or *theory*. Such nominals identify the speaker's attitude toward the proposition; Nichols shows that the relative-clause hypothesis can explain certain morphological and syntactic facts in English, Burmese and Turkish. Her paper is very much in the Jelinek tradition: she demonstrates the existence of structural consequences of a factor (speaker's evaluation of reliability) which past formalists would have marginalized as not relevant to the grammar. Eva Buráňová, Eva Hajičová and Petr Sgall propose to investigate the relationship between topic, focus and sentence structure in the Functional Generative Description framework. They divide the syntactic tree into Focus and Topic subtrees, much in the spirit of the mapping hypothesis pioneered by Diesing and Jelinek.

In a third paper on focus constructions, looking at phonology/discourse interactions, Joyce McDonough reports the results of an important study of pitch excursions and focus in Navajo, and explores the possibility that Jelinek's Pronominal Argument Hypothesis can provide the basis for an explanation of the (lack of) intonational contours that appear in Navajo focus constructions. Finally, Colleen Fitzgerald investigates the three-way interface between discourse structure, syntactic structure and rhythmic structure in Tohono O'odham, concluding in particular that rhythmic constraints must also be taken into account in determining surface word order in the language.

Morphology/syntax interface questions are addressed by Jane Hill in her paper on the Cupeño verb and the appropriate functional projections in which to situate Cupeño's valence-affecting affixes. Hill draws heavily on Jelinek's work on Yaqui (Hiaki, Yoeme) (Jelinek 1996), in which Jelinek posits two valence-affecting functional heads: TransP and VoiceP. Hill also discusses how a formal approach provides a grounding for the historical and functional pressures that gave rise to the system. Diana Archangeli's paper investigates questions concerning the morphology/phonology interface within Optimality Theory. She examines the morpheme structure constraints operative in Tiv, concluding that a theory which permits direct reference to morpheme classes by OT constraints is empirically and theoretically superior to either a strictly ranked grammar where irregularities are simply encoded as lexically specified variation, or to a 'co-phonology' model where the phonological idiosyncrasies of different morpheme classes can be associated with different constraint rankings. In so doing she is able to account for 'irregular' variation in a systematic way that has previously escaped formal treatment. Finally, examining the phonology/phonetics interface, Natasha Warner investigates the relationship between the functional dimension of segment perceptibility and typological frequency of distinctive feature. She argues in support of the hypothesis that more quickly perceived distinctions are more likely to show up as grammaticized distinctive features in the grammars of languages. The intuition is that the more quickly perceptible a feature is, the greater its functional utility in speech, and that this pattern is reflected in the typology of grammars.

In the final section, we present papers dealing with foundational questions of grammatical structure and operations. The rule-based, grammatical/ungrammatical generation systems of formalist doctrine operate on the assumption that "extra-linguistic" factors, such as frequency, should not play a part in the organization of the grammatical system. Hammond, using the formal devices of Optimality Theory, explores the question of how we can incorporate these frequency effects into a formal grammatical theory. In the spirit of the minimalist program, Terry Langendoen presents a new proposal for the formal generation of structured linguistic expressions, formally modifying Chomsky's proposed family of Merge operations, which are the heart of the generative engine of modern formal linguistic theory. Langendoen's conclusions about Merge address the long-standing tension between the straightforwardly functional limitations imposed by computational capacity and the formal expressiveness needed to generate the recursive structures of natural language. Also working within the minimalist program, Simin Karimi addresses the foundational issue of the nature of the features whose checking drives movement, in particular examining the theoretical status of so-called 'uninterpretable' features, contrasted with interpretable features which drive the movement of *wh*-phrases. Discussing two types of focus construction in Persian, only one of which seems to involve overt movement, she argues that focus is indeed an instance of the operation