Syntax – Theory and Analysis
HSK 42.1

# Handbücher zur Sprach- und Kommunikationswissenschaft

Handbooks of Linguistics
and Communication Science

Manuels de linguistique et
des sciences de communication

Mitbegründet von Gerold Ungeheuer
Mitherausgegeben (1985–2001) von Hugo Steger

Herausgegeben von / Edited by / Edités par
Herbert Ernst Wiegand

Band 42.1

De Gruyter Mouton

# Syntax – Theory and Analysis

An International Handbook

Volume 1

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De Gruyter Mouton

ISBN 978-3-11-020276-2
e-ISBN (PDF) 978-3-11-037740-8
e-ISBN (EPUB) 978-3-11-039423-8
ISSN 1861-5090

*Library of Congress Cataloging-in-Publication Data*

A CIP catalog record for this book has been applied for at the Library of Congress.

*Bibliographic information published by the Deutsche Nationalbibliothek*

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available on the Internet at http://dnb.dnb.de.



Typesetting: Meta Systems Publishing & Printservices GmbH, Wustermark
Printing and binding: Hubert & Co. GmbH & Co. KG, Göttingen
Cover design: Martin Zech, Bremen
♾ Printed on acid-free paper

Printed in Germany

www.degruyter.com

*This handbook is dedicated to the memory of our dear friend Ursula Kleinhenz (1965−2010).*

*The light that burns twice as bright burns half as long.*

# Preface

When our friend Ursula Kleinhenz approached us during the annual meeting of the German Linguistic Society (DGfS) in Mainz in 2004, it was not to piece together the events of the previous evening. Being without the benefit of a screenwriter and a director, we usually had to figure out the events from the nebula of a hangover ourselves (but we never woke up next to a tiger). Ursula was just as hilarious as she was professional and could switch between these personas just as easily as she could be both simultaneously. If any consolation can be found in her premature death, it is only because her life was as intense as that of two others. Ursula's proposal was that we should edit the *syntax handbook* in the HSK series. Like other handbooks in the series, the syntax handbook had a predecessor (published in 1993 and 1995), but Ursula (and de Gruyter) thought that it was about time to take a fresh look. Presumably, she also had a deeper insight in the process of conceiving, compiling, and editing such a handbook. Perhaps she could even foresee how much time would pass until the idea became a published book.

With its present structure, the handbook aims to provide a valuable source not only for the professional syntactician but also for the linguist who wants to gain information about the current state of the art in syntax; in particular it should facilitate the advanced student's way into syntax.

Syntax can look back on a long tradition. The term itself is ambiguous. On the one hand, it is understood as a means of structural and descriptive analysis of individual languages using clearly defined instruments. Naturally, syntactic analyses can be comparative, spanning several languages. On the other hand, *syntax* is understood as syntactic theory, the aim of which is to decide which instruments can be sensibly applied to syntactic analysis. Syntactic theory thus defines the aims of syntactic research. Especially in the last 50 years, however, the interaction between syntactic theory and syntactic analysis has led to a rapid increase in analyses and theoretical suggestions. This increase has been accompanied with the impression that syntax is a fragmented discipline. This impression is not wrong in so far as syntactic theory cannot be traced back to one school, but rather to a great number of approaches in competition with each other. It should, however, not be forgotten that the competitive situation in most cases was triggered by empirical problems and that complex problems may be approached in more than one way. Precisely this situation has led to very decisive progress in syntactic analysis in the last 50 years. This result would probably have never been achieved if syntax had been limited to just one dispute about theory or method.

This handbook – which is spread out over three volumes, containing 61 articles in nine sections – adopts these unifying perspectives and places at the fore the increase in knowledge that results from the fruitful argumentation between syntactic analysis and syntactic theory. To reflect this, the handbook contains articles on syntactic phenomena from two different angles: one perspective is mainly descriptive, allowing linguists to grasp what is at issue when a particular phenomenon is subjected to sometimes heated debate. Thus Section III (Syntactic Phenomena), which covers the bulk of Volume I of the handbook, contains descriptions of a set of phenomena that are called *syntactic*. The phenomena comprise the argument-adjunct distinction, negation, agreement, word order, ellipsis, and idioms, among others. We would like to note that the phenomena were not selected on the basis of the personal preference of the editors. Instead, we asked our

colleagues around the world to take part in a survey in order to determine which phenomena should be dealt with in such a handbook.

Four of the phenomena are taken up again in Section VI (Theoretical Approaches to Selected Syntactic Phenomena) and receive theoretical analyses. The reader of the handbook may thus approach syntactic phenomena from the perspective of what is in need of an analysis. We assume that a description can be provided prior to (even if it is not entirely independent of) an analysis since the phenomena are natural – at least in parts. Alternatively, the reader may approach syntactic phenomena from the perspective of what has been, and also what has not been, covered by an analysis. We believe that those issues in particular that have been omitted from current analysis provide good starting points for future syntacticians to gain access to the syntactic community. Such gaps in analysis should thus not been seen as flaws but as open questions to be dealt with promptly.

As for the structure of the handbook as a whole, the first volume (Sections I–III) is devoted to the position of syntax in linguistics (including its interfaces to other linguistic domains), to the syntactic tradition prior to the advent of structuralism and generativism, and − as already mentioned − to syntactic phenomena.

The second volume (Sections IV−VI) begins with a survey on the dominant syntactic theories and frameworks (in the Introduction to the handbook we deal with the perennial question of why we have more than one theory (cf. 1)), and continues with a detailed description of the relationship between syntax and its major interfaces. Considering the relationship of syntax to other neighbouring disciplines, we note that, right up to the 1990s, an artificial comparison between formal models and models dealing with content was postulated, for example using the key phrase of "the autonomy of syntax". However, it has become clear in the meantime that syntax based on formal options interacts with other components of linguistic knowledge, for example through correspondence rules or through defined interfaces. The chapters in Section V (together with the overview on Syntax and its interfaces in Section I) provide a picture of syntax as placed among the other linguistic domains.

The second volume closes with theoretical analyses of several of the aforementioned phenomena.

The third volume (Sections VII−IX) provides syntactic sketches of various languages, language types, and language families (the Bantu language family, Bora, Creole languages, Georgian, German, Hindi-Urdu, Japanese, Mandarin, Northern Straits Salish, Tagalog, and Warlpiri). It then deals with the cognitive environment of syntax, covering language acquisition, language disorders, and language processing, and finally deals with the broader role of syntax when dealing with corpora, lexicographic resources, stylistics, computational linguistics, the development of reference grammars and the documentation of (endangered) languages, and finally, what role syntax might play in the classroom.

In conclusion, this handbook highlights syntax as a mature discipline, whose state of knowledge concerning the languages of the world has rapidly increased.

This brief preface cannot and should not be concluded without an expression our gratitude to the various groups of people without whose participation this handbook would have been an even more impossible mission.

We thank our authors, which are not named here, as their articles speak for themselves.

Each article has been subjected to an anonymous review process, and individual articles as well as the handbook as a whole profited enormously from the comments and the suggestions made by these reviewers. We would like to thank Peter Ackema, Susan Bejar, Eva Belke, Adriana Belletti, Miriam Butt, Katharina Colomo, Jeroen van Craenenbroeck, Berthold Crysmann, Holger Diessel, Laura Downing, Stanley Dubinsky, Susann Fischer, Bart Geurts, Kook-Hee Gill, Michael Hahn, Hubert Haider, Daniel Hole, Joachim Jacobs, Jaklin Kornflit, Beth Levin, Terje Lohndal, Anke Lüdeling, Stefan Müller, Timothy Osborne, Eric Potsdam, Beatrice Primus, Frank Richter, Norvin Richards, Björn Rothstein, Vieri Samek-Lodovici, Florian Schäfer, Sabine Schulte im Walde, Frank Seifart, Wolfgang Sternefeld, Jesse Tseng, Marc de Vries, Helmut Weiß, Martina Wiltschko, and Niina Ning Zhang.

We would also like to thank Barbara Karlson, Birgit Sievert, Anke Beck and Wolfgang Konwitschny at Walter de Gruyter for their assistance and their gentle way of midwifery. We also thank Nils Hirsch and Patrick Lindert for editorial assistance. Many thanks to Miriam Butt and Gereon Müller for discussions early on in the process of structuring the content of this handbook.

Finally, a very special thank you to Alicia Katharina Börner. Without her rigorous and thoroughgoing assistance in the preparation of the final manuscripts, we would perhaps still be awaiting the publication of the handbook.

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# I. Introduction: Syntax in Linguistics

## 1. Syntax – The State of a Controversial Art



### Abstract

*This article provides a broad introduction to Syntax, as it is conceived in this handbook. We will present a number of assumptions that have been considered to constitute common ground for all syntacticians. But they are as fundamental as they are controversial for syntactic theory and analysis. In fact, approaches to syntactic analysis as well as syntactic theories quite often take controversial positions, leading to the apparent conclusion that syntactic research is fractured. It is not our goal to offer a band-aid to patch up what better should be kept separate. Our conclusion is that many issues might indeed be controversial within syntactic research but that such controversy should be seen as the driving force behind progress in syntax.*

### 1. Introduction

Perhaps the simplest way to approach syntax is to define it as the linguistic component that relates sound and meaning, and thus fulfils this crucial task in mapping the two intelligible sides of the Saussurean sign. Syntax must thus be able to break up the continuous flow of sound signals into elementary tokens, must be able to provide a structure for the tokens, and enable the semantic component to access the tokens − and the larger parts made of them in order to account for the interpretation of complex units. It goes without saying that the same story could be told if we started with the interpretational component, letting syntax map meaning to sound.

A grammar consists of a complex formal unit that requires analysis, a rule system relating atomic and complex units to the complex formal unit under analysis, and a characterization of the atomic or elementary elements, and how they relate to the rule system. Typically, the sentence (S) is the formal unit that requires analysis, there are all kinds of rule systems resulting in a sentence, and the lexical units are taken to be the atomic elements, which are assigned appropriate categories so that the rule system can make use of them. This characterization seems to be uncontroversial, and it owns its

uncontroversial status to its relative abstractness, e.g. the lack of detail concerning the rule system, the use of categories, and more or less everything else required to actually carry out a syntactic analysis.

When it comes to detail, however, syntax is mostly conceived as fractured. It is often forgotten that, within the broader realm of Saussurean linguistics, proper syntax started as a straggler, coming to maturity only approximately 60 to 70 years ago, and that it has achieved quite a lot in this short lifetime. And yet, a necessary precondition of syntax seems to be that the linguist becomes a member of one of the many different schools of thought. Schools that sometimes are engaged in fierce fights (giving rise to terms like "Linguistics Wars", cf. Harris 1993), and sometimes are content with peaceful coexistence, or mutual neglect. In fact, one realizes soon that "schools" are partitioned in various dimensions, as for instance formal in opposition to functional or cognitive, formal in opposition to descriptivist, and so forth. Deep within syntax, different views pertain to the structures that are actually used to carve up the continuous flow of sound signals (be they tree structures, dependency arcs, grammatical relations, derivations etc.). This situation may leave those who want to study syntax in a state of confusion, about which school to choose, or whether to choose one at all, or more than one. (In addition to confusion, students may also feel pressured since syntax is interfacial by definition, and hence it will become necessary for the apprentice to be familiar with one of the major components with which syntax interfaces.) It should be noted, however, that disagreement is not pertinent to syntax alone, but can be observed in other areas of linguistics as well (or linguistics as a whole), cf. the discussion following the influential article of Evans and Levinson (2009).

The goal of the present article is twofold: On the one hand, we would like to address several issues that seem to be controversial within syntax as a research area, and shed some light on real or apparent controversies. On the other hand, we would like to make clear that controversy in itself does not mean that a field is unripe or uninteresting, but to the contrary that disagreement is an expression about the relative maturity of syntax. In doing so, we will take recourse to Henk van Riemsdijk's presentation of a set of background assumptions "which (…) virtually every linguist (…) shares" (van Riemsdijk 1984: 1).

Writing in 1984, van Riemsdijk believed that the assumptions presented were widely shared. We have chosen a selection from van Riemsdijk's assumptions, the ones that we believe to have the strongest bearing on current research. Relating current positions to the positions held back then when van Riemsdijk presented them also allows us to evaluate the progress made in syntax and syntactic theory. In fact, we take controversial issues in syntax to be an indicator of scientific progress. So, it is good that there is controversy.

## 2. Syntax relates sound and meaning

While the very idea of syntax relating sound and meaning has to be considered uncontroversial, with syntax breaking up the stream of sounds into units which accordingly receive an interpretation, it is at least unclear whether sound and meaning are relevant to syntactic operations or not. Mainstream generative grammar has assumed from Chomsky

(1965) onwards that the syntactic component of the grammar is "generative" (we will come to this term below), while the other components are "interpretative", i.e. work on structures provided by syntax. This position has been challenged by a variety of frameworks. HPSG (Pollard and Sag 1994; cf. S. Müller, this volume) assumes that syntactic and semantic properties receive the same formal representation, and interact in agreement and anaphoric binding (the reader is referred to Wagner's contribution to this handbook to discuss the relation between syntax and phonology). Pustejovsky's generative lexicon (Pustejovsky 1995) raises the question of how syntactic categorization is influenced by lexical semantics to account for coercion processes.

These are just two proposals that challenge a model of syntax, in which syntax is taken to differ fundamentally even from the linguistic components with which it shares an interface (cf. also Mycock, this volume).

## 3. Sentence grammar differs from extra-sentential (or sub-sentential) modes of combination

Riemsdijk (1984: 2) states that "[the structure of the sentence] is determined by rules and principles sui generis". As often when contemplating questions about syntax, the statement seems to be clear and intuitive at the outset, but invites further considerations after second thoughts. What we can assume is that there are sentence internal operations (rules and principles), whose application to units that consist of sentences would be nonsensical, i.e. would not lead to plausible results. Case marking might be a case in point, as well as reference to syntactic arguments or grammatical relations as discourse relations. But the composition of sentences may also rely on rules, which do not exclusively apply within a sentence. Pronominal agreement can serve as an illustration. Consider the examples in (1).

(1) a. *John told Paula$_i$ that she$_i$ would have to apply for the dean position on Monday the latest.*

b. *John spoke with Paula$_i$ about the dean position. She$_i$ understood that she would have to apply on Monday the latest.*

To begin with, we are talking about one sentence in (1a), but two sentences in (1b). And yet, the relationship between the object of *tell/speak* to the subject of the embedded sentence and the subject of the second sentence, respectively, seems to be similar. In particular, we see agreement in gender, person, and number. Going further, we may assume that the agreement is a consequence of Principle B of Binding Theory (Chomsky 1981; Pollard and Sag 1994) in (1a). Since identification of the indices of antecedent and pronoun implies agreement of antecedent and pronoun in number, person, and gender, the observed agreement can be deduced from a condition on syntactic elements within a clause. In (1b), however, the agreement may come about because the discourse referent of the antecedent is identified with the discourse referent of the pronoun, as this is usually done in Discourse Representation Theory (Kamp and Reyle 1993). Since they are identical, and since discourse referents either cannot be formally distinguished from

indices (as in the analysis of Pollard and Sag 1994) or bear the very same features, once again agreement emerges because two indices are identified, and hence the features that make up the indices are identified as well. At this point, we may ask whether index identification is a syntactic rule *sui generis.* It would be possible to argue that index identification started as rule of sentence grammar and spread into the rule system for discourses. If this interpretation is assumed, we may consider van Riemsdijk's view as uncontroversial. The statement would have to be translated to the effect that rules of sentence grammar might form the basis for rules outside of sentence grammar, but that the reverse is not likely to happen. The reader may decide whether this characterization still allows the maintenance of the position that the structure of the sentence is formed by rules *sui generis.*

We would like to note that there is a second interpretation of Riemsdijk's statement. Even if we take it that the rules within a sentence are different from the rules outside of it, we may still ask whether the rules are restricted in their application to atomic units or whether the sentence is the smallest unit to which specific rules apply. This question translates into the relationship between syntax and morphology, or more generally into the relationship between syntax and the lexicon (for the latter, cf. Alexiadou, this volume). One position has been initiated by *lexical integrity* (Bresnan and Mchombo 1995). According to the lexical integrity hypothesis, morphological processes and syntactic rules form two separate domains of linguistic rule systems. Interestingly, the lexical integrity hypothesis has not only been attacked from the position of syntactic access to sub-syntactic units, but also by *lexical rules* that seem to affect syntax and morphology (for a recent vindication of lexical rules against constructional analyses, cf. Müller and Wechsler 2014). Another position gives up the distinction between morphology and syntax (cf. Harley, this volume).

Can morphology for instance be taken to be word syntax? This question requires careful investigation as well, and sometimes, we find surprising evidence. Consider the relationship between syntactic combinations and morphological composition. If morphological composition crucially differs from syntactic modes of combination, the former should not be able to satisfy requirements imposed by the latter. But this does not seen to be correct. It is well known that morphological operations − such as composition and derivation − affect the valency of lexemes, but one sometimes even finds that modification is mirrored in morphology. As an illustration consider mass terms in German that may only appear together with an indefinite determiner if they are internally modified, as illustrated with *Stahl ('steel')* in (2).

(2) a. *Dies ist ein Stahl *(von besonderer Güte).* [German]
this is a steel of particular quality
'This is a high-quality steel.'

b. *Dies ist ein Gütestahl.*
this is a quality.steel
'This is a high-quality steel.'

The combination with an indefinite determiner is ungrammatical without internal modification in (2a), and similarly in (2b). But in (2b), the modifier is realized as part of a compound. If (morphological) composition and (syntactic) modification are aspects of

modification within sentence grammar, the observation in (2) would not be surprising. If morphological operations are separated from syntactic operations, the observation is in need of an explanation.

The analysis of polysynthetic languages forms another challenge for the distinction of syntactic and sub-syntactic rule systems. With regard to polysynthetic languages, some researchers argue to give up a distinction between morphology and syntax (cf. Evans and Levinson 2009: 432). Eventually, the analysis of polysynthetic languages will form a touchstone for the relation between syntax and morphology, and will thus allow to answer the question whether syntactic rules are rules *sui generis* when compared to super-syntactic operations, or perhaps also when compared to sub-syntactic structure building.

With these provisos given, one could still say that the vast majority of syntacticians agree that the sentence is the unit within which syntactic relations must be established. By the same line of reasoning, syntacticians assume that syntactic relations are not employed to describe relations between sentences. The clear distinction between rule systems affecting the sentence and rule systems affecting super-sentential units gives the sentence a psychological reality, as well as a formal definition.

## 4. There are (no) universals

The concept of universal grammar, and with it, the concept of a syntactic universal has always been controversial. Van Riemsdijk was well aware of this. He thus simply states that "universals are there to be found". He goes on and says: "we all think we must find them". Nowadays, this view is contested from various points of view. Evans and Levinson (2009) argue against it from the perspective of linguistic typology. Construction Grammar (cf. Fried, this volume) rejects the idea of a universal from the perspective of syntax being derived in a bottom-up fashion from individual instances.

Let us restrict ourselves to the term *universal* (we will come back to the term *universal grammar* below), and let us further restrict ourselves by explicitly excluding the Greenbergian concept of a universal from further discussion. One reason for excluding this concept is that it is not the entity that most syntacticians have in mind when using the term *universal.* Another reason is that the Greenbergian concept is controversial in itself. As an illustration, consider Dryer's (1988) refutation of the conditional universal relating verb object and adjective noun orders. Even under this restriction, it is amazing to observe the sheer magnitude of misconceptions that the term *universal* invites. Chomsky (1965: 27−30) initiated the debate. It is thus instructive to look at Chomsky's introduction of the terms of *substantive* and *formal* universals. The former are characterized as follows: "A theory of substantive universals claims that items of a particular kind in any language must be drawn from a fixed class of items." (Chomsky 1965: 28) *Formal universals* receive the following introduction: "The property of having a grammar meeting a certain abstract condition might be called a *formal* linguistic universal, if shown to be a general property of natural languages. Recent attempts to specify the abstract conditions that a generative grammar must meet have produced a variety of proposals concerning formal universals (…) For example, consider the proposal that the syntactic component of a grammar must contain transformational rules (…) mapping semantically

interpreted deep structures into phonetically interpreted surface structures, or the proposal that the phonological component of a grammar consists of a sequence of rules, a subset of which may apply cyclically to successively more dominant constituents of the surface structure (a transformational cycle …)" (Chomsky 1965: 29).

Criticism has focussed much more on substantive than on formal universals. Within the generative syntactic tradition, criticism has also been encouraged by undertaking research into the identification of universals only sparsely. The most advanced attempt to provide such universals, within the Theory of Principles and Parameters (Chomsky and Lasnik 1993), has failed by general consensus within and outside of generative linguistics. With regard to formal universals, there has been an extended debate between 1979 and 1994 (approximately) on whether transformational rules are formal universals or not for the reason that their very existence has been called into question (cf. Gazdar 1981; Gazdar et al. 1985). But this debate has not broadened our understanding towards the concept of formal universals. Evans and Levinson (2009: 430−431) have a clear idea what substantive universals should be, but are much less clear in their characterization of formal universals. We would doubt that *subjacency* would actually be considered a formal universal (cf. Evans and Levinson 2009: 436−437).

But discussions of the term *substantive* universal suffer from problems as well. Evans and Levinson (2009: 432) make the following claim with regard to the existence of apparently substantive universals despite their superficial absence in individual languages: "The differences (…) are somehow superficial (…) This (…) is wrong, in the straightforward sense that the experts (…) do not agree that it is true." This conclusion seems to suggest that an assumption is proven to be wrong because not every expert agrees on its truth. There might be something that escapes us here, but major scientific breakthroughs have quite often been accompanied by denials of experts. So it seems that the existence of universal categories that are not attested in every language is controversial, and not that their existence has been falsified. But controversy can lead to research results, even if these results falsify the initial assumptions of the researcher. Consider the discussion around the claim that well-established syntactic categories (such as noun, verb, adjective, or preposition) form part of the inventory of every language. Pinker and Bloom (1990) claim − perhaps somewhat prematurely − that all languages employ the aforementioned categories. Evans and Levinson (2009: 434) adduce arguments to show that adjectives and adverbs may not exist in all languages and that certain languages may even relinquish the distinction between noun and verb. (Northern) Straits Salish is usually cited as a language that does not make use of a noun/verb distinction. The current discussion, however, as also presented in Czaykowska-Higgins and Leonard (this volume), suggests that the distinction between verbs and nouns is present in Northern Straits Salish. Here, Evans and Levinson (2009) apparently underestimate the insights that syntacticians can gain from pursuing such assumptions. We argue that it might be premature to assume the universality of lexical categories that we have taken over from Latin and Greek grammarians. But the true nature of lexical categories can only be revealed once we have at least shown negatively that we cannot work with these purported categories. In this respect, a claim about the universality of a lexical category, while proven wrong in further research, opens a venue to refine our understanding of the concept of a lexical category in itself. But such claims are always couched in linguistic (syntactic) theories. A modest syntactic theory may at least offer a means to adduce

evidence that an entity considered to be a prerequisite does not exist, with the usual repercussions for the theory.

More concrete entities usually abound in the controversies about syntactic universals. More abstract categories or rules are not typically the subject of such debates, and with it the existence of more abstract (possibly formal) universals is not often discussed.

We would like to illustrate this point with three examples: the *exhaustive constant partial order* (ECPO) property of ID/LP grammars in GPSG as an example of a universal that is directly derived from the formal properties of the grammar, the presumed universality of endocentricity (a.k.a. *Merge* in Minimalism), and the terminological non-universality of relative clauses.

The ECPO property of ID/LP grammars states that constraints on ordering must be context-insensitive insofar as an ordering must neither depend on the mother under which the ordering takes place, nor on the head of a phrase. This property has been introduced as a general property of grammars that separate dominance and linear precedence in GPSG (Gazdar et al. 1985). It should be noted here that other grammar models that assume this distinction do not take over the ECPO, as e.g. HPSG (Pollard and Sag 1994). The ECPO predicts that languages that require contextual ordering as mentioned above do not exist. The ECPO is thus a strong candidate for a formal universal. Gazdar et al. (1985: 49) carefully note that imposing the ECPO restricts the possible languages analysed by a GPSG severely, and hence that they would even be surprised "if ECPO turned out to be a linguistic universal". Nevertheless, Gazdar et al. (1985: 49) are "committed to the rather strong claim that it turns out to be universal".

In discussing the ECPO from hindsight, it is not really important that it became clear rather soon that it could not be a universal. With regard to this point (but not actually addressing the ECPO), Haider (1993) noted that unmarked orders between German complements depend on the verbal head of which they are complements. Hence, it had to be admitted that German violates the ECPO (with regard to the ordering constraints in German, (cf. Frey, this volume)). What is important is that the ECPO is even more abstract than a formal universal in that it provides a property that is directly derived from the formal apparatus of GPSG. ID/LP grammars of the form presented in GPSG must obey the ECPO. It seems to us that uncovering potential formal universals like the ECPO is more rewarding than collecting indicators that a particular syntactic category does not occur in a language − even if the potential formal universals are refuted eventually.

Let us now turn to the treatment of complementation, which perhaps is sometimes considered an operation so ubiquitous that its character is not even mentioned. We will illustrate the problem with the treatment of complementation in HPSG, but similar considerations apply to the operation *Merge* in syntactic Minimalism. HPSG (Pollard and Sag 1994; cf. the introduction by S. Müller, this volume) assumes that Immediate Dominance Schemata form part of Universal Grammar. One such schema is the head-complement-schema, which combines a head with one or more complements, and which is a subtype of endocentric phrases. They illustrate their analysis mostly with English (and thus invite criticism by linguistic typologists), but the very point in question can already be made clear by adding another related language (German) to the picture. For English, Pollard and Sag (1994) introduce Schemata 1 and 2 as instances of the head-complement-schema. They are instances of the head-complement-schema for English (the first combining sole arguments with phrasal projections, the second combining all arguments save one with lexical entities), and as such could not be used to analyse German, where

it seems much more plausible to assume that complementation is instantiated by a single schema, which yields uniformly binary branching structures. Schema 1 and Schema 2 as well as the purported schema for German are instances of complementation, but complementation is a universal mode of combination (cf. below for a qualification), and as such requires a formal representation within the model.

It turns out that a schema more general than Schema 1 and Schema 2 in English, as well as more general than the schema employed for German cannot be easily defined. Still, the combination of a head with its argument(s) seems to be a plausible candidate for a universal rule, which may even apply to free *word* order languages (Evans and Levinson 2009: 441), i.e. languages that are not apparently confined by phrasal boundaries. Latin is a familiar instance of a free word order language, as opposed to languages employing free order of phrases. Evans and Levinson (2009: 441) illustrate for Latin that tree-like structures may not be appropriate to describe the relations between the verb and its subject, or between an adnominal modifier and the head noun of the subject, as illustrated in (3).

(3) *ultima Cumaei venit iam carminis aetas* [Classical Latin]
last.NOM Cumae.GEN come.3SG.PST now song.GEN age.NOM
'The last age of the Cumaen song has now arrived.'
Evans and Levinson (2009: 441)

We can observe that the adjective *ultima* is severed from the noun *aetas,* and the relationship between this subject (last age) and the verb *venit* is interrupted by an adverbial and the postnominal genitive *carminis Cumaei.* An analysis in terms of non-branching trees is presumably not easily provided for (3). What we can say, however, is that endocentricity plays a crucial role in this example, just as it does in structures that can be described more easily in tree structures: *aetas* is the head of the subject, and *ultima* is its adjectival modifier, and the featural make-up (nominative) must be related to the head, and not to the postnominal complement of the head. One can say that the discontinuity of *ultima* and *aetas* becomes a discontinuity only because they are conceived as a unit at some level of representation, that they together fulfil the subject argument slot of the verb, and as such that they together are subject to complementation.

While there may not be evidence for continuous phrases, there is clearly evidence that features target the 'right' elements, which must be achieved somehow, and is usually achieved by invoking endocentricity.

So while Pollard and Sag's Immediate Dominance Schemata translate into more usual phrase structures for German and English, this does not have to be the case, and structures akin to Dependency Grammar (cf. Osborne, this volume) may be the result. Still, we would like to maintain for Latin that the head-complement-schema is at work, and more generally that either the schema or the concept of endocentricity count as a universal. The universality of complementation is not entirely undisputed. Koenig and Michelson (2012) discuss Oneida and suggests that the head-complement-schema is not employed in this language. Even if this conclusion turns out to be correct, we would still require a formal concept of complementation to begin with.

Van Riemsdijk (1984: 2) also takes structure dependence to be an uncontroversial tenet of syntactic theory, but ignores the fact that structure dependency invites the question which kind of structure is required. It might well be that not all languages of the

world can be analysed by employing tree-like structures − in fact, it strikes us that tree-like structures are more often used as a *lingua franca* of dialects of syntactic theories than as basic building blocks of the theory, consider Categorial Grammar (Baldridge and Hoyt, this volume) and Minimalism (Richards, this volume) in this respect − but it still seems plausible to assume that syntax adduces structure, be it for the simple reason that semantic interpretation works more nicely, if structure is adduced. The question whether tree-like structures or dependency structures (or functional structures, as employed in LFG, cf. Butt and King, this volume) or something entirely different will be appropriate can only be determined by making strong claims that stand the test against the diversity of natural languages. Linguists criticising syntactic universals often adhere to diversity as a means in itself, but it strikes us that only the interplay between claims embedded in syntactic theories and the diversity of natural languages may eventually allow linguistics to become a mature science. With regard to the complementation schema discussed above, we would like to assume that language specific complementation schemata are formally represented as instances of a more abstract, and possibly universal complementation schema, which forms an instance of endocentricity (with a modification schema as another instance of endocentricity, and further instances as well). Couched within the respective theory, the relation between the universal and the language-specific schemata should be represented as simply as possible (if it turns out that the appropriate definition may only refer to dependencies, tree-like structures employed in German or English may be viewed as epiphenomena). Ideally, language-specific schemata should be represented as more specific instances of universal schemata; the specific schemata are still abstract (for instance, they do not make reference to particular categories), and yet they are much more concrete than their universal super-types.

Imposing a concept like complementation requires its formal representation within syntactic theory. Hence, it becomes a prerequisite for determining the adequate modelling in the theory, and a touchstone for the theory itself. The quest for formal universals has thus an immediate bearing on determining the competition of syntactic theories, and clearly cannot be established outside the realm of a theory (which may lead to the confusion that is e.g. expressed in Evans and Levinson (2009: 436−437)).

With this background, let us enter unto a discussion of what we see as misunderstood universal categorizations. We assume that most (if not all) linguists would agree that a term like *relative clause* is much less a universal category than a pure means of description. It is less clear whether a relative clause is an instance of a more general operation, where a phrasal modifier is related to a modified element through a marker (the marker itself may be present or not, and may be more or less abstract). Gil (2001: 107−108) tries to show that clausal association to nominals in Hokkien Chinese, as illustrated in (4), should not be confused with the concept of a relative clause in English or German.

(4) *a*$^{44(>44)}$*-beŋ*$^{24}$ *bue*$^{53}$ *e*$^{24>22}$ *p*$^{h}$*eŋ*$^{24>22}$*-ko*$^{53}$ [Hokkien Chinese]
Ah Beng buy ASSOC apple
'apples that Ah Beng bought'
(Gil 2001: 107)

Because the attributive marker *e*$^{24}$ (the superscript indicates a tone; x > y indicates tonal sandhi) is not only used in Hokkien to establish a relationship between a clause and a nominal, but is also required to establish relations between adjectives and nouns, PPs

and nouns, and further adnominal elements and nouns, Gil (2001: 108) concludes that the concept *relative clause* should not be used in Hokkien grammar. While this may be correct, it also seems trivial. However, it seems plausible to assume that the attributive construction in Hokkien and relative clauses in other languages share a common core in that a nominal element is formally linked to another phrase, and establishes a restrictive interpretation through the combination. A relative marker (not to be confused with the relative pronoun, and hence possibly without phonetic signature) in English or German establishes what is established by $e^{24}$ in Hokkien. If we abstract over this particular property and indicate that we are not calling a *relative clause* a universal, we might be able to identify a possibly universal mode of combination (cf. for instance, Kayne 1994 and subsequent work).

With regard to the question raised in this section, and the current state of affairs regarding its answer, it seems to us that syntactic research should focus on identifying or rejecting more abstract universals as part of syntactic theories (as e.g. complementation). In addition, it seems that at least some rather basic universals (such as employing noun and verb as categories) have survived recent iconoclastic attempts to demolish them (once again, the reader is referred to the language sketch of Northern Straits Salish in Czaykowska-Higgins and Leonard, this volume). So, the nature of linguistic universals is controversial, but it is a fruitful controversy.

## 5. What is the object of study?

After Saussure's introduction of the distinction between *langue, parole* and *faculté de langage*, every syntactic theory must position itself with regard to its actual object of study. Saussure made it clear that the object of study is mesmerizingly difficult: "Quel est l'objet à la fois intégral et concret de la linguistique? La question est particulièrement difficile" (Engler 1968: 123). Van Riemsdijk (1984: 1) states that "we regard the object which we study as a real object, a mental organ as Chomsky has put it. From this it also follows that what we study is the grammar, not the language." Van Riemsdijk concludes that language acquisition is the central problem of syntactic theory. This position has been attacked from various perspectives − not the least one being that there seems to a conflation of a variety of concepts. For instance, there can be real objects without being related to a mental organ. In their introduction to one of the strictest attempts to provide a formal analysis of natural language, Gazdar et al. (1985: 5) state that "[o]ur linguistic theory is not a theory of how a child abstracts from the surrounding hubbub of linguistic and non-linguistic noises enough evidence to gain a mental grasp of a natural language." Other syntacticians attack the idea that grammar comes first and that language is derived from grammar. At least some versions of Construction Grammar (cf. Fried, this volume) assume that the grammar is induced from language data. It seems uncontroversial, however, that language in general is a bio-cultural hybrid, partly the product of biological evolution, but also partly the product of our own making, but this characterization applies to human beings in general, and may thus not be a specific property of language, or a property only in the slightly circular sense that it is human language we are dealing with.

The objects of syntactic study have been delimited by means of various distinctions that prove to be problematic in themselves. There is the celebrated distinction between

competence and performance, as introduced in Chomsky (1965), and later supplanted by a distinction between *internal* and *external* language in Chomsky (1986). Here, van Riemsdisk (1984: 3) remarks that "everyone lives by it". We are not so sure that this is actually correct. The latter distinction has been utilized to separate theories into those that address internal and those that address external language. But even if we followed this direction and assumed that Gazdar et al. (1985) investigated external language, while Chomsky (1986) was concerned with internal language, we cannot be sure that the separation actually yields different objects, as it is purely noumenal. Drawing such an arbitrary distinction will lead to confusion at best, and will weaken the field as a whole at worst. In any case, there are many syntactic models that are agnostic to the distinction, as well as to the distinction between competence and performance.

Similarly, the object under syntactic study was delimited by the distinction between core and periphery within the Theory of Principles and Parameters. If one goes through the discussions of the past 20 years, however, one easily detects that today's periphery might become tomorrow's core and vice versa. Müller (2013) discusses *Exceptional Case Marking* (ECM, more familiar in traditional grammar under the rubric 'accusative-cum-infinitive construction') as an illustration for this tendency: Chomsky (1981: 70) assigned ECM to the periphery, but 15 years later, ECM became a building block of case assignment in specifier-head-configurations.

The morale to be drawn here is threefold. Firstly, it seems to us that the distinctions (competence/performance, core/periphery, etc.) have been useful in the past since it allowed syntactic research to start somewhere without being constantly endangered by requests to also account for other, presumably related phenomena. In this sense, early syntactic theories had to be reductionist, and introduced distinctions to this end. Syntax in its current guise should give up reductionism.

Secondly, it seems that these distinctions have failed to provide an instrument to gauge whether syntactic models make headway or not. If we take a fixed concept of a core that has to be described or explained by syntactic theory, then we can assume that a model should be abandoned (or at least very critically scrutinized) that does not provide analyses for phenomena that unequivocally belong to a "core". Progress could be characterized by accounting for an agreed-upon set of phenomena, and could be gauged by consecutively extending the core that is covered in this way, until it becomes clear that further extensions would lead to analyses of phenomena that form part of the periphery because they emerge as cultural artefacts that have no biological basis. It would also allow syntactic analysis to establish a canon of analysed phenomena (where a canon is understood in the sense of engineering and natural science, i.e. as foundational part that has already been successfully covered), and to proceed from this canon to areas of syntactic research that still await detailed scrutiny. Yet, syntactic theories often have not developed in this way. As a striking illustration consider the treatment of negative placement in inverted English sentences.

(5) a. *Can John not leave?*
b. *Will John not leave?*

Almost 25 years after their celebrated analysis in *Syntactic Structures* (Chomsky 1957), Lasnik (2000: 151) admits that "[t]here are about a dozen really fancy ways in the literature to keep [the sentences in (5)] from violating the [Head Movement Constraint].

To the best of my knowledge, not one of them really works." One does not have to understand the workings of the *Head Movement Constraint* to see that any syntactic analysis blocking the derivation of the examples in (5) may be in need of refurbishment. While such renovations took place, they were not initiated by indications of prior failure and did not lead to an overall improvement.

What are the conclusions here? It sounds awkward to assume that negative placement in English belongs to the periphery, and even absurd to delegate it to issues of performance. But it might very well be that syntactic theories should not generalize from rather singular language-specific properties to propose universal constraints. Perhaps the general ignorance towards this construction has to do with the conclusion that the construction is in fact peculiar − but a distinction between competence and performance, or core and periphery adds little to this insight.

Thirdly, and finally, it should be noted that the distinction between competence and performance also provides the ground for the distinction between grammaticality and acceptability (the former only affected by competence, the latter affected by factors of performance as well). This is important insofar as psycholinguistic experimentation, which seems to be the most plausible methodology to arrive at conclusions about the biological side of syntax, can only access acceptability, i.e. is always "blemished" by performance (cf. Schütze 1996 and Felser, this volume).

In light of the problems mentioned, it seems wise to consider the question of the object under study with a bit of agnosticism. Currently, it is a majority view that the objects of study are real objects (but one also finds the position that language is principally a cultural creation), but it does not follow that all syntacticians agree in investigating a mental organ, and moreover that it remains unclear how such an organ could be assessed in the first place.

## 6. Generative grammar

With the term *generative grammar,* we seem to have arrived at a completely uncontroversial spot, given the definition provided by van Riemsdijk (1984: 2): "anyone is a generative grammarian (…) who holds that the grammar must be a finite rule system which explicitly characterizes an infinite set of sentences." Even linguists who would not characterize themselves as generative grammarians agree to versions of this statement, as e.g. Martin Haspelmath (2010: 666): "To describe a language, one needs categories, because it is not possible to list all the acceptable sentences of a language."

## 7. There is more than one way to do it (presumably)

The final quote from Henk van Riemsdijk's list serves to illustrate that syntactic research has indeed progressed considerably in the past 30 years: "Modern linguistic research is characterized by a comparative freedom of strict methodological imperatives. In this sense, it is clearly different from corpus linguistics, (…) and the statistical straight-jacket of the social sciences. (…) most grammarians will tend to have most faith in serious introspection." (van Riemsdijk 1984: 3) This statement is interesting insofar as linguistics

(syntax in particular) strives to become acknowledged not as part of the humanities, but as part of the natural sciences. Whatever one might say about this, it should be clear that the methodological constraints within the natural sciences might be even more rigid than the ones of the social sciences (with the usual proviso that we should not forget the lesson learned by Paul Feyerabend's *Against Method)*. But the quote reflects the time when syntax had to work with the resources that were available. Without proper computing machinery, the development of corpora was problematic, syntactic annotation was practically unknown, and hence data analysis was much less a question of methodological orthodoxy than of impossibility. All this has changed. In addition, we have a much better understanding of the limits of introspection, and may also use controlled experiments to arrive at conclusions about data. So, from hindsight, it appears that 30 years ago, syntactic research was free from one particular methodological imperative for the simple reason that the methodology was still in its infancy. With the advent of advanced computing devices and a deeper understanding of controlled experimentation, the current syntactic researcher has not only much more freedom to decide whether data should be derived from introspection, from corpus search, or from experimentation. We also understand now that data sometimes cannot be assessed through introspection, just as scarcely occurring data cannot easily be assessed through corpus-based methodologies (for a case study, cf. Meurers and Müller 2009). It is thus handy that more than one method is at our disposal.

While methods flourish, other − more practical, as well as socio-economical − constraints affect syntactic research (as well as linguistics in general). Linguistics remains a rather small field, the subject under study, however, provides an abundance of data that in many cases resist automated analysis and thus requires human analysis (in this respect, we fully agree with Evans and Levinson 2009). It would be ideal if all languages could receive the same degree of attention, but syntactic research is not often recognized as a goal in itself.

Finally, there is not only more than one way to do it method-wise, but also with regard to the different frameworks that the syntactician may employ. More often, syntacticians do not choose from these frameworks because they belong to schools, but because they see that for the questions at hand, different frameworks may allow different entry points, which eventually may lead to similar conclusions, or even similar ways of analysing syntactic data. As an illustration, consider the treatment of long distance dependencies. When Gazdar (1981) proposed that certain long distance dependencies could be handled without transformations but by employing complex (SLASH) categories, Chomsky retorted that GPSG (under which name the new transformationless framework became known) was just a notational variant of the current version of transformational grammar. While it seems illogical to call something a "notational variant" that employs less machinery than the theory of which it is considered a variant, the lesson learned was that "notational variants" are to be dodged, if only because they are superfluous. If one compares the current-day treatment of long distance dependencies in certain versions of Minimalism (cf. Richards, this volume) with the treatment of long distance dependencies in HPSG (S. Müller, this volume, HPSG in this sense is an offspring of GPSG), one is tempted to assume that the treatment must be very different for the very reason that the first framework calls itself derivational, while the second is termed representational. Closer scrutiny reveals, however, that the strictly local representational treatment (in terms of local trees) is mirrored in strictly local versions of derivational Minimalism. It

does not matter whether an analysis is based on representations or derivations, if both are strictly local. Just as a syntactician cannot look "into" a local representation, he or she cannot look into the history of a local derivation. In this light, the so-called *uniform-path* analyses in derivational Minimalism cannot be distinguished from SLASH-based analyses in representational HPSG (cf. Alexiadou, Kiss, and Müller 2012: 30). What is more, a replacement of *uniform-path* analyses in favour of *punctuated-path* analyses, which would not be "notational variants" of SLASH projection, cannot be justified by observable consequences (i.e. empirical differences) (again, cf. Alexiadou, Kiss, and Müller 2012: 30–31).

The new lesson to be learned is that it may perhaps be not only be useful to attack problems from different vantage points, but also to observe what the other camp is doing. If the results gained are similar, they are so not because they are "notational variants", but perhaps because they represent the limit of current expertise in the worst case, and the true nature of the object under investigation in the best.

## 1. Acknowledgements

This article has benefited from comments by Stefan Müller, for which we are grateful.

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# 2. Syntactic Constructions



## Abstract

*The term* construction *is widely used descriptively in discussing grammar, and is still used informally in most theoretical work for characteristic formal patterns of syntactic categories or features, usually associated with a meaning and/or function. Modern linguistic theories employ a range of formal devices to produce or characterize surface constructions; they may be rules, or schemata, or constraints. It is usually assumed that competence in a language consists largely of these formal devices together with a lexicon; the constructions themselves are epiphenomenal. As such, constructions are an abstraction over the data which linguistic theory must analyze; insight in syntax is achieved through discovering generalizations across constructions.*

## 1. Introduction

The term *construction* is ubiquitous in contemporary syntactic literature, being used informally to refer to linguistic expressions in a variety of ways. The term also has a technical sense in the theory of Construction Grammar, as detailed in Chapter 28.

The term construction is widely used to characterize certain kinds of form–meaning pairings, as when we refer to "possessive constructions" or "the verb–particle construction" to refer to examples like those below.

(1) Three examples of possessive constructions
  a. *Seymour's new friend*
  b. *a new friend of Seymour's*
  c. *Seymour has a new friend*

(2) Three examples of the verb-particle construction
  a. *We picked up a lamp at the flea market.*
  b. *We picked a lamp up at the flea market.*
  c. *What did you pick up at the flea market?*

In general, linguists would not refer to the three examples in (1) as comprising a single possessive construction, because they are too different in their syntax; in (1a) the possessor precedes the possessed noun, in (1b) the possessor follows the possessed noun, and in (1c) the possessor is expressed as a distinct argument outside the possessed noun phrase. These differences represent three different ways of expressing the concept of possession, in English.

In (2), on the other hand, many linguists would be inclined to refer to all three sentences as manifesting a single verb-particle construction, on the basis of the perceived similarity of the syntax of the three cases. There is a very large class of verb–particle pairings which allow the ordering alternation shown in (2a)–(2b), where the order reflects no apparent difference in meaning (such as *drop off, smash up, fix up, turn on, leave out*). In such cases, the object can systematically be the focus of a question, as in (2c); so the general consensus would be that these three sentences illustrate the verb-particle construction.

On this view, (1) illustrates three different form–meaning pairings, even though one component of the meaning is shared across all three, while (2) illustrates one form–meaning pairing, even though independent factors distort the shared form (and the correct characterization of the meaning component may be elusive).

At the same time, (2c) illustrates a *wh*-question construction, in addition to the verb-particle construction. Since the properties of the *wh*-question construction (e.g. *wh*-expression in clause-initial position, auxiliary in second position) are independent of the verb-particle construction (e.g. the predicate includes a particle like *up, down, out*, etc.), there is no motivation for formulating a distinct "verb-particle *wh*-question construction."

## 1.1. Toward a definition

The term construction is not a technical term (outside of Construction Grammar), and consequently it is difficult to define. As an approximation, it can be defined as follows.

(3) A construction is a characteristic formal pattern of syntactic categories or features, usually associated with some meaning and/or discourse function.

The use of the word *pattern* here is an attempt to be as theory-neutral as possible; a pattern might be a structure, or a template, or the output of a rule. The notion *formal* is meant to include aspects of form which are of significance to grammar. In some theories word order is a primitive of grammar, while in other theories word order is derived from structure, such that structure, but not linear order, would count as a formal property (see Chapters 17 and 40 on Word Order).

The notion *syntactic categories* is intended to include major parts of speech but also minor or functional categories such as the class of English verb-particles, or the class of determiners. The notion *syntactic features* in the definition is meant to include morpho-syntactic features such as the past participle or dative case but also semantico-syntactic features such as negation or "wh" (borne by interrogative expression like *what* and *who*). Together *syntactic categories or features* includes function words such as infinitival *to* and bound formatives such as possessive *'s*, on any analysis.

The definition in (3) is meant to exclude phonology and surface exponence, which do not characterize constructions as the term is ordinarily used in mainstream syntax. For example, we would not expect to find a construction which necessarily involved words beginning with the phoneme /w/, even if we speak loosely of various kinds of *wh*-constructions. Similarly, if there is more than one formal category in English which is spelled out by the suffix *-ing*, then we expect a construction to be identified by the underlying features which are being spelled out (e.g. progressive, or gerund), not by the phonological form of the exponent doing the spelling out. Though we might descriptively call something an Acc-*ing* construction, for example, in a more careful statement of its characteristics, we would distinguish the feature or category that *-ing* manifests.

Thus, the definition offered above is intended to stress syntactic form, not phonological form. This is in accord with the usual use of the word construction in syntax. An idiom like *kick the bucket* meaning 'die' requires the lexical items *kick* and *bucket*, and hence makes direct reference to exponents with phonological content (see Chapter 23 on Idioms). As such, ordinary usage would not make reference to a *kick the bucket* construction (Construction Grammar, however, is different here: idioms are considered to be constructions).

In this way, more or less functional elements like the interrogative pronoun *what* and the light verb *do* are treated together with syntax as opposed to lexical items like *kick* and *bucket*. Thus is it not controversial to speak of a construction of the form *What's X doing Y?* meaning roughly 'Why is X Y?,' where X is a subject and Y is a predicate. For example: *What's the newspaper doing in the bushes?* or *What are you doing leaving without your shoes?* This construction requires *what* and *do* as well as the progressive with an appropriate form of *be*.

The definition offered in (3) also suggests that a construction is usually associated with some meaning and/or discourse function. The importance of meaning is somewhat loosely applied in practice. Thus, it is not usually considered necessary to have a rigorous statement of the meaning of a possessive construction like the one in (1a) in order to call it a construction, if it has a clearly defined syntactic form. But if there are two disjoint meanings involved, then it is common to think of them as involving two distinct constructions. For example, in English, the auxiliary inverts with the subject when a *wh*-item is fronted, but also when a negative element is fronted, as in (4) (cf. Chapter 12, on V2).

(4) a. *Which of them would he recommend?*
b. *None of them would he recommend.*

Even if the syntax of the inversion is identical in the two cases, it would be most natural here to speak of subject-auxiliary inversion constructions in the plural, rather than a single subject-auxiliary inversion construction which was indifferent to whether the initial element was a negative or an interrogative phrase–though practice varies somewhat here (and in Construction Grammar, there is no limit to how abstract a construction can be).

The notion of discourse function in (3) is intended broadly, to include various pragmatic inferences and affect. For example, the *What's X doing Y?* construction is only used when there is some sense that it is incongruous or inappropriate for X to be Y (as discussed by Kay and Fillmore 1999). Thus the question *Why are men rebelling?* can be asked in a range of contexts, but *What are men doing rebelling?* can only be asked if there is some salient sense (perhaps the speaker's opinion, but not necessarily) that it is inappropriate, incongruous, or outrageous for them to be doing so.

## 1.2. Applying the definition

Returning to the examples in (1)–(2), we can apply the definition offered in (3) to show that it is harmonious with the common intuition that (1) illustrates three different possessive constructions while (2) represents three different manifestations of a single construction.

According to (3), a class of phrases or sentences must share a characteristic formal pattern in order to belong to a single construction. The formal differences among the three examples in (1) are fairly clear; (1a) lacks *of* and the possessor precedes the possessum, while (1a) contains the function word *of*, and the possessor follows the possessum. Furthermore, in (1a), the possessum is understood as definite, while in (1b), the possessum is indefinite. The example in (1c) is predicative, and contains the verb *have*. So the fact that the three expressions describe the same semantic relation is not normally taken to imply the existence of a single possessive construction. Thus it seems that the definition appropriately picks out each of the three as a construction.

Turning to (2), we can first address the question of whether (2c) represents a different construction from the other two. Of course it does, as it involves *wh*-movement, but this is irrelevant to the verb–particle construction. The interrogative construction simply applies to a clause that has a verbal particle in the predicate, just as it does in an ordinary transitive clause.

The second question is whether there is motivation to treat examples like (2a) and (2b) as distinct constructions. This cannot be conclusively determined without formal analysis. By and large, the two are distinguished only by word order, not by meaning, nor by functional categories or features. There are some differences, for example (2b) allows the object to be pronominal (*We picked it up*), but (2a) does not (**We picked up it*). If such differences can be independently explained, then an analysis can be motivated in which there is a single construction with some flexibility of order, that is, a single 'characteristic formal pattern of syntactic categories or features' in which whatever deter-

mines the placement of the particle before or after the internal argument is not characteristic, or is not a syntactic feature. This is the usual consensus (see Ramchand and Svenonius 2002 for one such account), though alternative analyses exist in which the two represent distinct constructions (see Farrell 2005).

## 2. Examples of constructions

To further illustrate the notion of construction, several examples of constructions are listed in this section. No detailed characterization or analysis is attempted. The examples serve simply to give an impression of a small part of the range of syntactic constructions.

### 2.1. Argument structure, grammatical functions

A number of constructions involve valency, argument structure, and grammatical functions (see Chapter 8 on Grammatical Relations). For example, a passive construction involves the demotion of the external argument, compared to the active use of the same verb (see Chapter 22 on Voice). In English, the demoted external argument can be expressed in a *by*-phrase or left implicit, and the verb appears in a past participle form, with a form of the auxiliary *be*. The implicit argument can control a purpose clause, as illustrated in (5b), just as with the active construction in (5a). English also has a middle construction, in which the external argument cannot appear in a *by*-phrase, and is not syntactically active as diagosed by a purpose clause, as illustrated in (5c).

(5) a. *The owner sold the house (to pay off debts).*
b. *The house was sold (by the owner) (to pay off debts).*
c. *Houses sell easily (*by the owner) (*to pay off debts).*

In a conative construction, illustrated in (6b), the internal argument is oblique and is not as fully affected as in a regular transitive construction, compare (6a). In a benefactive construction, illustrated in (6c), an indirect object derives some benefit from the action, or comes into possession of the direct object (see Chapters 9 and 37 on Arguments and Adjuncts).

(6) a. *The baker cut the bread.*
b. *The baker cut at the bread.*
c. *The baker cut me a piece of bread.*

Resultative and depictive constructions involve secondary predicates, as illustrated in (7a) and (7b) respectively.

(7) a. *They drank the bar dry.*
b. *They ate the bread dry.*

Control, raising, and so-called Exceptional Case Marking (ECM, or accusative-with-infinitive, or subject-to-object raising) constructions usually involve infinitive comple-

ments in which arguments are, descriptively speaking, shared across the two clauses (see Chapters 14 and 38 on Control).

(8) a. *Ian wants to stay at the house.* (control)
b. *Ian seemed to stay at the house.* (raising)
c. *We believed Ian to stay at the house.* (ECM)

English provides many more examples of constructions involving various configurations of arguments, and other languages provide yet more. In some cases, the availability of a construction may be tied to the availability of a lexical item; for example, it may be that if a language has an ECM construction if and only if it has a verb with the selectional properties exhibited by English *believe* in (8c). However, in other cases, the availability of a construction in a given language does not seem to be connected to lexical items. An example is the resultative construction illustrated in (7a), which many languages lack, despite having verbs and adjectives which are otherwise like the ones used in the English resultative construction (Snyder 2001).

## 2.2. Unbounded dependencies

There is a range of constructions which have been analyzed as involving displaced constituents, or filler-gap dependencies. These include (in the order in which they appear in [9]): *wh*-questions, embedded *wh*-questions, clefts, pseudoclefts, relative clauses, comparative constructions, and (contrastive) topicalization (for some discussion of some of these and related constructions, see Chapter 12 on V2, Chapter 13 on Discourse Configurationality, and especially Chapter 21 on Relative Clauses and Correlatives).

(9) a. *Which book did you read?*
b. *I asked which book you read.*
c. *It was this book that I read.*
d. *What I read was this book.*
e. *The book that I read was long.*
f. *She read a longer book than I read.*
g. This *book, I read.*

These constructions have in common that the dependency can cross finite clause boundaries.

(10) a. *Which book did your mother think you read?*
b. *I asked which book your mother thought you read.*
c. *It was this book that my mother thought I read.*
d. *What my mother thought I read was this book.*
e. *The book that my mother thought I read was long.*
f. *She read a longer book than my mother thought I read.*
g. This *book, my mother thought I read.*

In this respect they contrast with passive, as illustrated in (11a), and for example raising, as illustrated in (11b) (compare [12]).

(11) a. **The house was thought (by his mother) the owner sold.*
b. **Ian seemed stayed at the house.*

(12) a. *It was thought the owner sold the house.*
b. *It seemed Ian stayed at the house.*

In fact, the constructions in (9)–(10) can cross indefinitely many finite clause boundaries, and for this reason are known as unbounded dependencies.

(13) a. *Which book did you think your mother thought you read?*
b. *I asked which book you thought your mother thought you read.*
c. *It was this book that I thought my mother thought I read.*
d. *What I thought my mother thought I read was this book.*
e. *The book that I thought my mother thought I read was long.*
f. *She read a longer book than I thought my mother thought I read.*
g. This *book, I thought my mother thought I read.*

The availability and properties of unbounded dependency constructions can vary somewhat from one language to the next. For example, sometimes there is a resumptive pronoun in the gap position, and in other cases there is no displacement on the surface, with the filler element remaining *in situ*. Unlike the case with argument structure alternations, this kind of variation tends not to be dependent on lexical items, though it may be connected to the properties of functional elements such as *that* and *which*.

In fact, it has been proposed that properties of constructions are largely determined by the properties of their heads. This is explicit in the name of the theory Head-Driven Phrase Structure Grammar (see Chapter 27 on HPSG), but is also a common assumption in other theories (e.g. Borer 1984). For example, the properties of a relative clause could conceivably be entirely determined by the cluster of features contained on its (possibly abstract) head. The head would be a kind of C[omplementizer] taking a finite TP complement, attracting a suitable nominal element to its specifier, and projecting a category which could be used as a nominal modifier.

## 2.3. Complex constructions

In this regard, constructions like the *What's X doing Y?* construction mentioned above are complex, as they appear to involve an interdependency of several heads. Mainstream theory would probably treat a construction of this kind as a special kind of idiom.

Construction Grammar, in contrast, holds that there is no principled difference between a fully general construction and a highly idiomatic one, or even between a fully general abstract construction and a lexical item; each is a pairing of form with function, broadly construed.

## 3. Constructions and syntactic theory

Traditional descriptive grammars may characterize and exemplify a list of constructions in a given language. They may organize the constructions according to perceived similarities, and may attempt to state generalizations which transcend the individual constructions. This much is extremely useful in a reference grammar (see Chapter 59 on Reference Grammars).

Modern syntactic theory necessarily goes further, and is based on the assumption that higher-level generalizations are necessary in order to achieve what Chomsky (1964) called explanatory adequacy, a model of language which accounts for how individual languages are learnable by children.

Traditional grammar posited rules to characterize or generate constructions, such as passive and relative clauses. Generative grammar took this as a starting point and went on to abstract properties from classes of rules, such as elementary transformations and different kinds of formal conditions constraining them. Generative grammar in the 1970's explored the ways in which the properties interacted in rule systems, and sought to discover constraints on them.

For example, Emonds (1976) observed that transformational rules did not produce structures unlike those which had to be base-generated ("structure preservation"), suggesting that the full power of transformations was unneeded. Chomsky (1977) showed that the class of unbounded dependencies displayed highly uniform properties, suggesting that they were not produced by distinct rules.

Subsequent work has increasingly focused on higher-level generalizations over rule types, shedding much light on the nature of grammar.

Thus, generalizations about constructions involving valence and argument structure led to those being analyzed in Lexical-Functional Grammar as the output of lexical rules (see Chapter 25 on LFG), accounting, for example, for their structure-preserving properties and their relative sensitivity to lexically listed traits of individual verbs. Similarly, generalizations about the class of unbounded dependencies as a whole led to the development of Move-$\alpha$ in Government-Binding Theory (Chomsky 1981), and the SLASH feature as used in Head-Driven Phrase Structure Grammar (see Chapter 27 on HPSG).

The development of Principles and Parameters theory (Chomsky 1981) involved rethinking the nature of rules entirely; once deconstructed into a system of invariant universal principles interacting with parametric points of variation, there are no rules per se. This is expressed in the following quote from *Lectures on Government and Binding*: "The notions "passive," "relativization," etc., can be reconstructed as processes of a more general nature, with a functional role in grammar, but they are not "rules of grammar"" (Chomsky 1981: 7).

Since constructions were the output of rules in the traditional conception of grammar, the elimination of rules from the theory means that in a Principles and Parameters framework, constructions are epiphenomenal, as reflected in the following quote, also from Chomsky but a decade later: "A language is not, then, a system of rules, but a set of specifications for parameters in an invariant system of principles of Universal Grammar (UG); and traditional grammatical constructions are perhaps best regarded as taxonomic epiphenomena, collections of structures with properties resulting from the interaction of fixed principles with parameters set one or another way" (Chomsky 1991: 417).

Since that time, although the notion of parameter has been substantially rethought, mainstream syntactic theories continue to regard the notion of construction, like the notion of rule or transformation, as a descriptive stepping stone on the path to greater understanding rather than as an analytic result in its own right.

Work in Construction Grammar, too, recognizes that insight does not come from simply listing the individual surface constructions in a language, and therefore, like other theories, seeks generalizations over constructions; the difference between Construction Grammar and other theories mentioned here is that in Construction Grammar, the generalizations are themselves modelled as abstract constructions. Nor is this just a terminological distinction: the claim in Construction Grammar is that the generalizations have the same kinds of properties as the constructions themselves, at a suitable level of abstraction.

## 4. Conclusion

I have characterized a construction as a characteristic formal pattern of syntactic features, usually associated with some meaning or discourse function. The way constructions are characterized in descriptive work tends to combine morphological, syntactic, and semantic facts. Purely phonological facts, however, tend not to be significant for the characterization of constructions. The precision of the syntactic characterization is usually taken to be more important than the semantic description of the meaning of a construction (e.g. even if two possessive expressions had exactly the same meaning, substantially different syntaxes would usually lead to them being classified as distinct constructions).

Some such notion is descriptively indispensible in syntactic work. Descriptive grammars must contain detailed characterizations of surface properties of constructions, and all careful empirical work makes reference to numerous construction types, as will be seen in the other chapters in this work.

Linguistic theory advances through the careful examination of the properties of constructions. Ultimately, principles are sought which transcend the individual constructions themselves, and the construction itself can be taken to be a taxonomic artifact.

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# 3. Syntax and its Interfaces: An Overview



## Abstract

*The notion that knowledge of language comprises separate modules or levels is central to linguistic research, though the precise subcomponents of grammar, their rules and primitives, the extent to which they overlap, and the nature of the architecture of which they are a part are still the subject of intense debate. Investigation into interface phenomena necessarily straddles the traditional boundaries of linguistic enquiry and thus provides an important perspective not only on specific empirical issues, but also on broader theoretical matters including the organization of the grammar itself. The focus of this chapter is the interaction of syntax with other modules of grammar which have been posited: the lexicon, morphology, phonology, semantics, and pragmatics. Each section explores a different syntactic interface through discussion of contemporary empirical and theoretical research undertaken in a variety of frameworks.*

## 1. Introduction

The aim of work on syntax and its interfaces is to identify the basic properties which other modules share with syntax and thus the precise domain of syntax within the grammar. In this respect, there are three central questions to be answered: How is syntax distinct from other components of the grammar? To what extent do syntactic processes operate within the grammar? How is syntax related to other levels of linguistic representation? Addressing these issues has implications for fundamental aspects of the grammatical architecture. Any theoretical framework will ultimately be judged on the extent to which it is able to capture the relevant generalizations about syntax and its interfaces with regard to the autonomy of posited components, the input–output relations which exist between them, and language structure versus usage.

The issue of autonomy naturally precedes any discussion of the interfaces which link modules of the grammar. With respect to syntax, the question is to what extent its primitives and operations influence aspects of linguistic structure which might otherwise be treated as belonging to another component of the grammar, and vice versa. For instance, debate continues regarding whether morphology exists as an autonomous component of the grammar with its own combinatory principles. It has been argued that positing a separate part of the grammar to account for apparently morphological phenomena is unmotivated and unnecessary because the features of complex word formation are consistent with independent syntactic principles. Data which indicate that the relationship between morphology and syntax is not always isomorphic undermine the claim that morphology can be reduced entirely to syntax. Some approaches imply that syntax itself is not an independent component, raising the question of whether syntax represents an abstraction of the linguist or a natural object. For example, Head-Driven Phrase Structure Grammar (Pollard and Sag 1994) includes a single level of structure SYNTAX-SEMANTICS.

Any approach which posits autonomous components of the grammar must also define the input–output relations which connect them. Precisely how syntax interacts with each component in terms of whether the relationship is serial or parallel, unidirectional or bidirectional is still the subject of much debate. For instance, a strictly serialist conception of the interface between syntax and phonology, according to which the former serves as input to the latter, predicts the influence of syntax on phonology and excludes the possibility of interaction in the opposite direction. Data which appear to show that prosodic weight may influence syntax represent a challenge to such a unidirectional characterization of the syntax–phonology interface. The nature of the links between different components of the grammar continues to be the focus of research. Even the standard assumption that the lexicon serves as input to syntax has been challenged (Borer 2005).

Finally, there is the matter of how the architecture of the grammar reflects a structural as opposed to a usage-based approach to language, an issue perhaps most clearly illustrated by the interaction between syntax and pragmatics. For instance, Mandarin Chinese is claimed to be a language whose syntax is organized in terms of the distinction between topic (that which is being discussed) and comment (what is being said about the topic) rather than grammatical relations such as subject and object (Li and Thompson 1976). Accounts of such interaction in terms of the organization of the grammar will contribute to the wider debate on the relative merits of a structural versus a usage-based model of language.

Research into syntax and its interfaces thus has implications for the architecture of the grammar which are relevant across theoretical frameworks and sub-disciplines.

## 2. Syntax and the lexicon

### 2.1. Introduction

While it is often posited that the lexicon exists as a separate part of the grammar, this has not always been the case, nor is it true of all current theoretical frameworks. In those approaches which distinguish the lexicon from the syntactic component, the issue of where the boundary between the two lies has consequences for the interface between them, as well as the organization of the grammar as a whole.

In early generative work such as Chomsky (1957), lexical items and morphemes were those units which could be inserted at the terminal nodes of Deep Structure trees by phrase structure rules. Despite their unique status, these elements were not initially treated as members of a component distinct from syntax with its own rules and types of structure. The lexicon was identified as a part of the syntactic Base Component in Standard Theory (Chomsky 1965) and defined as an unordered list of entries containing information only about a lexical item's idiosyncratic features (cf. Bloomfield 1933). However, subsequent research has indicated that at least some word-formation processes may differ in key respects from those which form syntactic structure, prompting a reassessment of the contents of the lexicon and its nature. Today, the Lexicalist Hypothesis (Chomsky 1970) still lies at the heart of the debate on the relationship between lexical items and syntax (Section 2.2), as the different analyses of processes such as causative formation (Section 2.3), undertaken within a variety of theoretical frameworks, illustrate.

### 2.2. The Lexicalist Hypothesis

Chomsky (1970) identified regularities in the relation between a nominal and the verb from which it had been derived (1a), but noted that this nominalization process had idiosyncratic features such as restricted productivity (1b), which made it incompatible with syntactic rules characterized as applying without exception.

(1) a. *John **criticized** the book.* V
*John's **criticism** of the book* N

b. *John **amused** (interested) the children with his stories.* V
**John's **amusement** (interest) of the children with his stories* N
(Chomsky 1970: 187–189)

To account for such data, Chomsky argued for the inclusion of some operations in the lexicon. Under this lexicalist view, the lexicon served not only as a repository for lexical items, but also as a generative component in its own right. Wasow (1977: 331) contrasted lexical rules with syntactic ones in terms of five criteria; the former and not the latter affected structure, could relate items of different categories, were local, could have exceptions, and applied before any syntactic rules. These distinctions, and the last criterion in particular, assume an architecture of grammar in which the lexicon interacts in a limited way with syntax, providing the minimal units manipulated by syntactic operations. These assumptions underlie the Principles and Parameters model (Chomsky 1981),

in which the lexicon is no longer treated as a part of a syntactic component, but rather has equal status with syntax and the other independent levels of linguistic structure posited (Logical Form and Phonetic Form).

Central to all formulations of the Lexicalist Hypothesis is the notion that syntactic operations, which follow those responsible for word-formation, are blind to the internal structure of lexical items. This principle distinguishes lexicalist from non-lexicalist approaches to grammar and thus is an important one with far-reaching consequences. Systematic regularities in word-internal structure are accounted for in terms of lexicon-internal processes that are fundamentally different to syntactic ones. The Lexicalist Hypothesis has often been revised, and both strong and weak forms of it have been advocated, the difference being whether inflection is classed as a syntactic operation along with derivation and compounding or not.

Within transformational theory, the Lexicalist Hypothesis has been challenged by Baker (1988), who proposed that the incorporation of a noun into a verb is a word-formation process that is not lexical but syntactic (Section 3.2). This syntactic analysis has been used to account for other word-formation processes such as causative formation (Section 2.3.3) as well. Some researchers go further and reject the Lexicalist Hypothesis entirely, claiming that primitives and processes relevant to lexical items and word-formation are wholly syntactic (e.g. Ramchand 2008). Other work broadly compatible with the Minimalist Program, by contrast, adopts some version of the Lexicalist Hypothesis (e.g. Ackema and Neeleman 2004).

In contrast to approaches such as the Minimalist Program, which seek to relate syntactic structures via transformational operations and hence are derivational, many lexicalist theories are non-derivational. The latter provide a framework within which to explore grammaticality in terms of how constraints on the correspondences between different levels of linguistic structure, which are simultaneously present, can be satisfied. Such correspondence theories include Head-Driven Phrase Structure Grammar (HPSG; Pollard and Sag 1994), Lexical-Functional Grammar (LFG; Bresnan 2001), Role and Reference Grammar (Van Valin and LaPolla 1997) and Culicover and Jackendoff's (2005) Simpler Syntax. Construction Grammar (e.g. Fried and Östman 2004) takes a different overall approach, treating the relationship between the lexicon and syntax as a continuum on the basis that both lexical and syntactic constructions represent pairs of form and meaning which simply differ in terms of internal complexity. The relationship between syntax and the lexicon has been explored in each framework through analysis of a variety of interface phenomena. In addition to the issue of the relationship between morphology and syntax (Section 3), research has centred on accounting for the realization of arguments and argument structure alternations, for example the dative alternation (Goldberg 1995), unaccusativity (e.g. Alexiadou et al. 2004; Levin and Rappaport Hovav 1995), aspect (e.g. Erteschik-Shir and Rapoport 2005) and incorporation (Baker 1988). The different analyses of causativization which have been proposed serve to illustrate the major differences between these approaches with regards to a particular valency-changing operation.

## 2.3. Causative constructions: lexical or syntactic?

The English sentence (2) is an example of a periphrastic causative in which Charlie is the causer, Lily is the causee, and the caused event is Lily laughing. This sentence

describes two separate events expressed by two different verbs, each in a different clause, with the cause of the second event being given in the first clause. Each verb is a separate lexical item that corresponds to a separate syntactic predicate.

(2) *Charlie caused Lily to laugh.*

Not all causative constructions are formed in this way though, and the variation that exists brings to light issues which have a direct bearing on the status of lexical items and their interaction with the syntactic component of the grammar. In a Romance language such as Catalan, the causative construction consists of two verbs, but in contrast to its English counterpart, tests show that it is not biclausal but monoclausal. For example, while the logical subject of *llegir* 'read' is realized as a grammatical subject in (3a), in (3b) it appears as an object expressed as a prepositional phrase which must follow the other object noun phrase *un poema* 'a poem' (Alsina 1996: 190, 210). This is consistent with the causee (the boy) being the third argument of a single syntactic predicate ('make-read') in a simple clause.

(3) a. *El nen llegeix un poema.* [Catalan]
the boy read a poem
'The boy is reading a poem.'

b. *El mestre fa llegir un poema al nen.*
the teacher makes read a poem to.the boy
'The teacher is making the boy read a poem.'
(Alsina 1996: 190)

In the Catalan monoclausal causative construction therefore two separate verb forms combine to give a single syntactic predicate, demonstrating that the overt form of a verb and its function can be separated in this instance.

In Japanese, the productive causative formation process involves affixation of the morpheme *-(s)ase* to the verb, as in (3b).

(4) a. *Akira-ga it-ta.* [Japanese]
Akira-NOM go-PST
'Akira went.'

b. *Hiroshi-ga Akira-o ik-ase-ta.*
Hiroshi-NOM Akira-ACC go-CAUS-PST
'Hiroshi made Akira go.'

This process would be classed as occurring in the syntax according to Wasow (1977) because it is productive. I refer to this construction in theory-neutral terms as the productive *sase* causative.

Kuroda (1965), amongst others, argues that the productive *sase* causative construction exemplified in (4) consists of two clauses rather than one, even though the verb is a single word. Evidence for this analysis includes the fact that the inclusion of a manner adjunct, which can be interpreted as modifying either the grammatical subject or the logical subject

in a biclausal sentence, also results in ambiguity in a productive *sase* causative construction, as (5) shows. Hence, productive *sase* causative constructions are biclausal.

(5) *Jon-wa muriyari sono ko-ni sono kutsushita-o ooyorokobide* [Japanese]
John-TOP forcibly the child-DAT the socks-ACC happily
*hak-ase-ta.*
put.on-CAUS-PST
'John forcibly made the child put on his socks happily.'
[ambiguous as to who was happy]
(Matsumoto 1998: 9)

In a sense, the productive *sase* causative in (4b) is the mirror image of the Catalan causative in (3b): in the Japanese construction, a single verb form corresponds to two syntactic predicates; in Catalan, two verb forms correspond to a single syntactic predicate. Thus, data show that there is not necessarily a one-to-one correspondence between function and verb form.

In addition to the biclausal productive *sase* causative construction in Japanese, a certain group of transitive verbs form a monoclausal structure when the causative *-(s)ase* morpheme is added. For example, the causative form of *nomu* 'to drink' (*nom-ase-ru*) in (6) means 'to feed/give a drink to'.

(6) *Hahaoya-wa akachan-ni miruku-o nom-ase-ta.* [Japanese]
mother-TOP baby-DAT milk-ACC drink-CAUS-PST
'The mother fed the baby with milk (from a bottle).'
(Matsumoto 1998: 5)

This process would be classed as occurring in the lexicon according to Wasow (1977) because it is not fully productive. I refer to this construction as the non-productive *sase* causative.

In contrast to a biclausal productive *sase* causative construction like (5), the interpretation of adverbials is unambiguous in the case of a non-productive *sase* causative construction such as (7). This and other data indicate that non-productive *sase* causatives are monoclausal.

(7) *Jon-wa sono netakirino roojin-ni sono kutsushita-o* [Japanese]
John-TOP the bedridden old.man-DAT the socks-ACC
*ooyorokobide hak-ase-ta.*
happily put.on-CAUS-PST
'John happily put the socks on the feet of the bedridden old man.'
[unambiguously John who was happy]
(Matsumoto 1998: 9)

However, if the productive *sase* causative is formed in the syntax, as per Wasow (1977), and the lexicon provides the input for the syntax, Manning et al. (1999) note that data such as (8) are problematic. In this sentence, a lexical process (nominalization via suffixation of *-kata* 'way') has applied after the formation of a productive *sase* causative.

(8) (?*kodomo-e-no*) *hon-no* *yom-ase-kata* [Japanese]
child-DAT-GEN book-GEN read-CAUS-way
'the way to cause (the child) to read a book'
(Manning et al. 1999: 44)

Any analysis of the productive *sase* causative must account for (8), as well as the different syntactic structures (monoclausal vs. biclausal) of the two *sase* causative constructions. Three different approaches could be adopted: (i) both causatives are formed by a syntactic process, but differ in terms of their syntax (Section 2.3.1); (ii) both are formed by a lexical process, but differ lexically (Section 2.3.2); or (iii) the two processes are fundamentally different because one is lexical and the other is syntactic (Section 2.3.3). Comparing these approaches, each with distinct theoretical consequences, provides an insight into a range of issues concerning the relationship between lexical items and syntax and how they have been addressed.

### 2.3.1. Syntactic approaches

Harley (2008) analyses causativization in purely syntactic terms within the framework of Distributed Morphology (Halle and Marantz 1993; see also Section 3.2), a theory in which there is no lexicon and (syntactic) principles apply to both morphology and syntax. The main semantic feature shared by different types of causatives is defined syntactically: the head CAUSE of a verbal projection is common to all causative constructions. The two Japanese *sase* causatives are analysed as differing in terms of the structural complexity of their syntax. In the case of the non-productive *sase* causative, *-(s)ase* appears in v°, immediately adjacent to a verb root which cannot have a subject of its own. By contrast, in the biclausal productive *sase* causative, *-(s)ase* is the head of a verbal CAUSE projection which subcategorizes for a clause with its own subject.

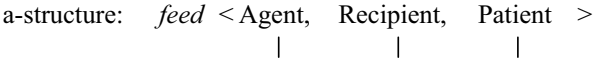
The possibility that the same morpheme may attach to a "high" or "low" projection, and that this may correlate in a systematic way with the differences between them, is common to a number of analyses. For example, Travis (2000) distinguishes different types of causatives in Malagasy and Tagalog on the basis of the syntactic position that the causative morpheme occupies. Travis (2000) states that the Event Phrase marks the boundary between l(exical)-syntax and s(yntactic)-syntax; causatives formed in the domain of l-syntax (causative morpheme occurs below E, the head of the Event Phrase) are non-productive, while those formed in s-syntax (causative morpheme occurs above E) are productive. This approach to the issue of causativization, as well as those outlined by Harley (2008) and Ramchand (2008: 150–192), treats syntax as a generative component with respect to word formation.

However, data from languages other than Japanese challenge a uniform syntactic analysis of causativization cross-linguistically. For example, Horvath and Siloni (2010) argue that a productive causative construction in Hungarian is not biclausal but monoclausal (see also Pylkkänen 2008: 107). The productive/non-productive distinction thus does not appear to correlate with the proposed difference in syntactic structure. Another issue for a syntactic analysis is that in order to account for the data in (8), *-kata* nominals must be derived in the syntax, as Harley (2008: 48, fn. 8) notes.

### 2.3.2. Lexicalist approaches

Analyses such as Manning et al. (1999), working in the framework of HPSG, and Matsumoto (1996, 1998), working in LFG, seek to account for the two Japanese *sase* causatives in terms of a lexical distinction. In both cases, the causative verb is derived from the base verb in the lexicon. The monoclausal/biclausal distinction is generally dealt with as a difference in structural complexity relating to the mappings between different types of linguistic structure. For example, Matsumoto (1998: 5–6) captures the fact that productive and non-productive *sase* causatives in Japanese share some features by proposing that they are both monoclausal at f(unctional)-structure, a level of syntactic structure at which grammatical relations such as subject and object are represented. Non-productive *sase* causatives involve a single predicate – the verb stem and causative morpheme together have a single argument structure – and are "purely monoclausal" (Matsumoto 1998: 5), i.e. at the level of a(rgument)-structure as well as at f-structure (9).

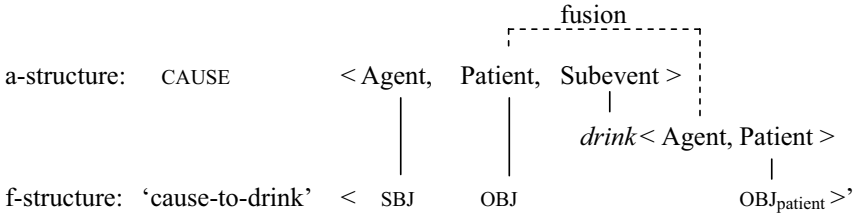
(9) Non-productive *sase* causative, e.g. *nom-ase-ta* 'fed/gave a drink to' in (6)




(Matsumoto 1998: 6)

By contrast, productive *sase* causatives are biclausal at the level of a(rgument)-structure. The causative morpheme introduces a separate predicate CAUSE with its own argument structure. The patient of CAUSE and the agent of the embedded predicate are fused together in a-structure, as indicated by the dashed line in (10), the result being that two thematic roles are shared by a single "fused" argument (Alsina 1992).

(10) Productive *sase* causative, e.g. *nom-ase-ta* 'caused to drink'




(Matsumoto 1998: 5)

Thus two different a-structures may map to the same f-structure, cf. (9) and (10), and the observed monoclausal/biclausal contrast is analysed as a reflex of argument structure. The fact that the productive *sase* causative can be nominalized by suffixation of *-kata*, as exemplified in (7), supports this lexicalist analysis because both are proposed to be formed in the lexicon.

Accounting for the possibility of disjunction of sub-word constituents under the scope of causation (Kuroda 2003: 455–458) and the causativization of raising verbs (Horvath and Siloni 2010: 168) have been identified as challenges to the lexicalist analysis of the productive *sase* causative.

### 2.3.3. Mixed approaches

A third possible approach to the two *sase* causatives would be to assume that they are inherently different, one being formed in the lexicon and the other being formed in the syntax. Baker (1988) represents a framework broadly consistent with the Weak Lexicalist Hypothesis within which to explore this possibility. According to this approach, the underlying structure of both causative constructions is the same because according to the Uniformity of Theta Assignment Hypothesis (UTAH; Baker 1988: 46), there is a one-to-one correspondence between syntactic positions and thematic roles as assigned by a specific type of predicate. The productive *sase* causative is formed in the syntax: the base verb is head of a lower VP that moves to SpecC' before its head is adjoined, via Incorporation (Section 3.2), to *-(s)ase* which is the head of a higher VP. The non-productive *sase* causative, on the other hand, is formed in the lexicon and represents a single verb in the input to the syntax. Harley (2008: 33) criticizes this type of Incorporation analysis for failing to account for the systematic relationship which exists between the productive and non-productive *sase* causatives. For discussion of other problems with an Incorporation analysis of causatives, see Alsina (1992).

Horvath and Siloni (2010) propose an analysis which does not seek to define causative formation in purely syntactic or lexical terms either, defining the difference in terms of the setting of the Lexicon-Syntax Parameter (Reinhart and Siloni 2005), which states that valency-changing operations including causativization apply either in the lexicon or in the syntax in a language. In Japanese, causativization is claimed to apply in the syntax; non-productive *sase* causatives are hypothesised to be underived lexical items or relics and therefore irrelevant to the language's parameter setting. It remains to be clarified how data such as (8), which shows that a syntactic causative can be the input to nominalization, is dealt with under such an analysis.

## 2.4. Conclusion

The causative construction has been the focus of much research and its study continues to raise issues of importance. This and other data concerning the realization of arguments are key to understanding and defining the relationship between lexical items and syntax. A closely related issue is the interface between syntax and morphology.

# 3. Syntax and morphology

## 3.1. Introduction

Different theoretical approaches account for the part which syntax plays in the formation of complex words in distinct ways. Defining the nature of morphology is an important consideration in itself. A key proposal that cuts across lexical and syntactic approaches to the syntax–morphology interface is the Separationist Hypothesis (see Beard 1995, amongst others), which advocates divorcing the meaning or morphological function of

a morpheme from its form. For example, an abstract L(exical)-derivation rule of pluralization changes the features of an English singular count noun thus: [−Plural, +Singular] → [+Plural, −Singular] (Beard 1995: 160). The form of the plural is determined in a separate morphological spelling (MS) component. MS-rules include suffixation, e.g. *dog−dogs*, and umlaut, e.g. *man−men*, which accounts for the multiple exponence of the morphosyntactic category 'plural' in English. This approach is often adopted in the analysis of inflection, and has also been extended to derivation by some researchers (see Beard 1998).

For those who do not subscribe to the view that syntax subsumes morphology (Section 3.2) and instead adhere to a strong or weak version of the Lexicalist Hypothesis (Section 3.3), the challenge is not only to identify those primitives and operations which are uniquely morphological in their nature and define them, but also to characterize the interface between syntax and morphology (Section 3.4). Key data are examples of phenomena which exhibit a combination of properties that appear to be neither wholly morphological nor wholly syntactic. These include cliticization (e.g. Anderson 2005; Halpern 1995; Zwicky 1994), incorporation (e.g. Baker 1988; Mithun 1984) and inflection (e.g. Anderson 1992; Steele 1995; Stump 2001). Indeed, approaches to morphology can also be classified according to the relations they posit between the morphology and morphosyntactic properties of an inflected word (lexical vs. inferential and incremental vs. realizational). See Stump (2001).

The proposed analyses of incorporation, undertaken in a variety of frameworks, provide a useful insight into some major issues.

## 3.2. Syntax subsumes morphology

Noun incorporation is a productive process found in a number of languages including Classical Nahuatl, a North American language. The two sentences in (11) are very similar in meaning and include the same morphemes, but in (11b) the direct object *naca* 'meat' is part of the verb *qua* 'eat', the only word in the sentence.

(11) a. *ni-c-qua* *in* *naca-tl.* [Classical Nahuatl]
1SG.SBJ-3SG.OBJ-eat DET meat-ABS
'I eat (the) meat.'

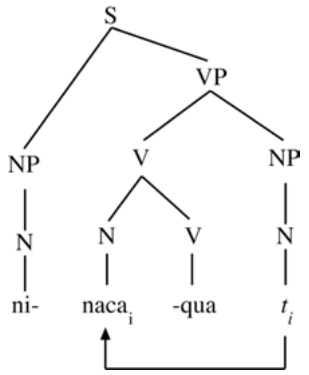
b. *ni-naca-qua.*
1SG.SBJ-meat-eat
'I eat meat.'
(Iturrioz Leza 2001: 715)

The process involved in forming (11b) is productive and may be the usual way to convey a particular meaning. This is reminiscent of a syntactic process, though the result of this noun incorporation is a single word. As Mithun (1984: 847) states, such noun incorporation is "perhaps the most nearly syntactic of all morphological processes".

Baker's (1988) influential approach to noun incorporation is an example of how word formation can be analysed as a syntactic process: syntax is argued to manipulate morphemes to form words in cases such as (11b). Specifically, complex words are formed

by head movement, a syntactic operation restricted by the Head Movement Constraint (Travis 1984: 131), or possibly the Empty Category Principle (Chomsky 1981: 250) or Relativized Minimality (Rizzi 1990), as shown in (12). This type of derivational rule is known as Incorporation.

(12)




Noun incorporation, a way of forming a complex word, is thus analysed in terms of established principles of derivational syntax. In this way, syntactic operations are proposed to be responsible for generating structure below as well as above word level. Other syntactic analyses of noun incorporation are presented in van Geenhoven (1998), Koopman and Szabolcsi (2000) and Massam (2001). Baker (2009) compares his head-movement analysis to these approaches in the context of the Minimalist Program (Chomsky 1995).

Baker (1988) also uses Incorporation to account for other morphosyntactic phenomena, including passivization and applicativization, two processes in which affixation may accompany a change in argument structure. Baker (1985: 375) further claims that grammar is constrained by the Mirror Principle: "morphological derivations must directly reflect syntactic derivations (and vice versa)". The order of affixes relative to each other and the base is thus predicted to reflect the order in which the relevant syntactic operations applied in the derivation of a complex word. If syntax subsumes morphology entirely, the Mirror Principle should always constrain word-internal structure. However, while it represents a strong tendency, the Mirror Principle does not appear to be inviolable, as Hyman et al. (2009) show. For example, when an applicative is passivized, the order of syntactic operations is applicative then passive, so the applicative morpheme should be affixed closer to the base than the passive one according to the Mirror Principle. This is the case in the example from the Bantu language Ndebele in (13a). However, when a passive is subject to applicativization in Ndebele, and hence the order in which the syntactic operations apply is reversed, as in (13b), the same morphemes appear in the same order as in (13a).

(13) a. Passivized Applicative [Ndebele]
*abantwana b-a-phek-el-w-a ukudla*
children they-PST-cook-APPL-PASS-FS food
'The children were cooked food'

b. Applicativized Passive
*ukudla kw-a-phek-el-w-a abantwana*
food it-PST-cook-APPL-PASS-FS children
'The food was cooked (for) the children'
(Hyman et al. 2009: 298)

Thus, morphology does not reflect syntactic derivation in (13b). This undermines one of the strongest types of argument for a purely syntactic analysis of such productive complex word formation because in these cases the processes involved in syntactic and morphological structure building do not appear to be exactly the same.

Baker himself does not advocate a syntactic analysis of all complex word formation (Baker 1993: 588) and Incorporation could not be straightforwardly extended to cover morphological processes which are non-concatenative. Others go further though, assuming that there is no separate part of the grammar which generates morphological structure. Lack of isomorphism is an issue which syntactic approaches to morphology must address.

Lieber (1992) seeks to capture complex word formation in terms of independent principles of syntax and phonology. Under this approach, syntactic rules based on revised principles of X-bar theory may apply to form a word from morphemes contained within the lexicon. In this linear model, the sole interaction between morphology and syntax is insertion of lexical items into syntax, at which point structure above and below word level is built. Lieber's (1992) analysis rests on definitions of head and non-heads intended to apply both above and below word level, and the proposal that direction of headedness is a parameter set once for a language and thus that the order of syntactic units and morphemes will be identical, all things being equal. In support of this claim, Lieber (1992) notes that, for example, English is largely a head-final language with right-headed morphology (i.e. suffixation, Lieber 1992: 49–64, the head of a word being the part that determines its category) while Tagalog is largely a head-initial language with left-headed morphology (i.e. prefixation; Lieber 1992: 40–49). There are languages such as Warlpiri (Simpson 1991) though which exhibit freedom of word order and a rigid morpheme order that would be difficult to account for in terms of a headedness parameter.

A purely syntactic analysis must account for complex word formation in terms of independently motivated syntactic principles. However, Lieber (1992) finds it necessary to adapt X-bar principles to account for word-internal structure, indicating that it does differ in some respects from syntactic structure (see Borer 1998).

Distributed Morphology (Halle and Marantz 1993; Harley and Noyer 1999; Marantz 1997) is another syntactic approach to morphology, according to which "all derivation of complex objects is syntactic" (Embick and Noyer 2007: 290), and therefore syntactic and morphological structure are fundamentally the same. Distributed Morphology is an attempt to incorporate Separationism in a model which in effect eliminates morphology altogether. Instances in which there is a lack of isomorphism between the two are accounted for by differences in the complexity of the derivation involved or the application of readjustment rules post-syntactically (Embick and Noyer 2007: 305–310).

Distributed Morphology, in common with other syntactic treatments of morphological phenomena, is argued to be preferable on the grounds of parsimony: by having the syntactic component subsume some or all complex word-formation, it is possible to

reduce or eliminate the need for morphology as a separate part of the grammar. However, if it is necessary to posit new or revised operations which are not motivated on independent syntactic grounds and may never apply in the syntax, or to add powerful post-syntactic stipulations in order to account for morphological processes, the parsimony argument in favour of a syntactic analysis is undermined.

## 3.3. Lexicalist approaches

Contrasting with syntactic approaches to morphology are those such as Aronoff (1994) which maintain that the formation and structure of complex words is distinct from that of phrases and hence morphology is a separate component of the grammar.

The Strong Lexicalist approach (e.g. Halle 1973), in which specific rules of word formation apply in one component of the grammar and feed into a separate syntactic component, has generally been rejected on the basis that inflection exhibits features consistent with syntactic principles. This is the weak lexicalist position found in the work of Aronoff (1976), whose word-formation rules (WFRs) account only for derivational morphology. According to the Weak Lexicalist Hypothesis, derivational processes apply in the lexicon, whereas "inflectional morphology is what is relevant to the syntax" (Anderson 1982: 587). Thus in English, nominalization by addition of *-ion* (derivational morphology) is analysed as being inherently different from affixation of *-s* to a verb stem indicating third person singular subject agreement (inflectional morphology) as the latter is integrated with the syntax. Inflectional processes such as agreement and case marking are characterized as a set of adjustment rules which serve to harmonize the output of the syntactic and morphological components in a Weak Lexicalist framework. Kiparsky's (1982) Strong Lexicalist analysis, by contrast, relates the distinction between derivation and inflection to the cyclic ordering of rules of affixation relative to each other within the lexicon. Morphology is thus kept separate from syntax in this Lexical Phonology/Morphology model, but the price is to situate morphological and phonological rules in the lexicon.

The process of incorporation is open to a lexicalist analysis, as work by Di Sciullo and Williams (1987), Mithun (1984) and Rosen (1989) shows. Under such an analysis, noun incorporation is the result of a verb combining with one of its arguments, similar to an English verbal compound such as *horse riding*. This is a lexical rather than a syntactic process. (Not all noun incorporation appears to be the same in this respect. Rosen 1989 identifies a type of incorporation, Classifier NI, which involves incorporation of a noun that is not selected as an argument by the verb.)

Anderson (2000: 135), concurring with Baker, notes that "the syntactic and lexical theories of Noun Incorporation are 'tied' in that each can be said to account for roughly the same range of phenomena the other can", but goes on to discuss data which are problematic for a purely syntactic analysis. Specifically, Anderson (2000) discusses instances of morphosyntactic agreement in noun incorporation constructions. Baker (1996: 307–329) claims that when the syntactic operation of Incorporation has applied, a trace is left which occupies the position in which the incorporated noun was base generated, as in (12). There should not be marking on the verb of agreement with this trace because it does not possess any of the features of the moved element. Anderson

(2000) though cites data which show that such agreement can occur. In sentence (14) from Mohawk, the marker *-hi* may signal agreement with the incorporated noun.

(14) *Wa'-ke(-hi)-kstʌ-hser-áhset-e'* [Mohawk]
FACT-1SG.SBJ-M.SG.OBJ-old.person-NOM-hide-PUNC
'I hid the old person (the old man)'
(Anderson 2000: 137)

The agreement in (14) is unexpected if the incorporated noun's original position is occupied by a trace. Under a lexicalist analysis, on the other hand, this agreement is accounted for because *pro* (rather than a trace resulting from movement) is posited to be one of the noun-verb compound's arguments (Anderson 2000). Baker et al. (2004) revise the syntactic approach, suggesting that a trace may retain some (non-phonological) features of the incorporated noun, in line with copy theory (Chomsky 1995), which explains the different agreement patterns found in languages with noun incorporation. The issue of whether incorporation is a syntactic process or not thus continues to be debated, and analysis of this phenomenon still represents an important line of research into the syntax−morphology interface.

Ackema and Neeleman's (2004) approach is also consistent with the weak lexicalist hypothesis because, while they claim that the systems which generate hierarchical phrasal and word-internal structure are part of the same module of the grammar, within this SYNTAX macromodule there are separate submodules of phrasal syntax and "word syntax" (morphology). Word syntax and phrasal syntax, though distinct, share features and principles of the SYNTAX macromodule of which they are both a part, including the notions of head and c-command (Ackema and Neeleman 2004: 6). This approach therefore avoids duplication within the grammar. Syntax and morphology are characterized as being in competition; when all is equal, syntactic combination wins over morphological combination. Morphological combination must be triggered by information stored in the lexicon. This is the case when affixation occurs. As a result, morphological derivation by affixation correlates with semantic irregularity, while syntactic derivation correlates with semantic regularity. However, Lieber and Scalise (2007) point out that data do not always support this distinction: the results of affixation are not always semantically unpredictable, for example *-er* affixation (e.g. *work−worker*) and the formation of synthetic compounds such as *truck driver* exhibit semantic regularity. Lieber and Scalise (2007: 16) conclude that the proposed alignment of semantic predictability and derivation in different submodules of the grammar, which is crucial to Ackema and Neeleman's (2004: 48−88) concept of competition and thus their account of the data, is arbitrary. Lieber and Scalise (2007: 16) therefore reject competition as a way to "breach the firewall" which is assumed to divide morphology and syntax. The nature of this interface is an issue that must be addressed by any approach which assumes that the two are separate components (or subcomponents) of the grammar.

## 3.4. Interfacing autonomous morphology with syntax

While many approaches which posit a separate morphological component characterize its interface with syntax in terms of an extremely limited, linear output−input relation

(words feed syntactic rules and lexical integrity is a consequence of the structure of the grammar), this is not the only possibility.

Sadock's (1991) Autolexical Syntax approach was a direct response to the challenge of accounting for the syntactic and morphological properties of noun incorporation. Sadock (1991) proposes a model of grammar in which separate syntactic, morphological and semantic components exist in parallel. The three are related by principles which constitute an interface subsystem that governs the well-formedness of the representations generated by each independent module. Under this approach, incorporation is evidence of a mismatch between syntax and morphology: syntactically, an incorporated noun is distinct from the verb (and thus is equivalent to its non-incorporated equivalent in terms of syntactic structure), but morphologically, it is part of a single word along with the relevant verbal affix. Such mismatches are constrained by mapping principles. This accounts for those instances in which there is a lack of isomorphism between morphology and syntax.

Such a parallel architecture assumes that morphology and syntax are not ordered with respect to each other at all. However, Borer (1988) provides data which indicate that words may be formed after syntactic structures. For example, in Modern Hebrew a construct-state noun such as (15b), i.e. a complex noun phrase consisting of a definite noun, cf. (15a), modified by another noun, is constructed in the syntax, the formation process involved being productive and its meaning being compositional (Borer 1988). However, construct-state nominals behave like a single word with respect to definiteness marking and interpretation, indicating that post-syntactic word formation has occurred. Note that *ha-* can only be affixed to the non-head NP *yalda* 'girl' in (15b) and that both the head and non-head NPs are interpreted as definite.

(15) a. *ha-caʕif* [Modern Hebrew]
the-scarf
'the scarf'

b. *caʕif ha-yalda*
scarf the-girl
'the/*a scarf of the/*a girl'
(Borer 1988: 47–48)

Accounting for such data is problematic when co-analysis of morphology and syntax occurs simultaneously in a parallel architecture. Borer's (1988) own model of Parallel Morphology includes conditions that determine whether word-formation operations apply before or after the formation of syntactic structure, the latter possibility being in violation of the strong version of the Lexicalist Hypothesis. This accounts for (15b), as well as similar examples: construct-state nouns are formed by a compounding operation when its input is syntactic rather than lexical.

As well as the output of syntax feeding word formation processes, as in (15b), there is evidence that the relationship between morphology and syntax more generally may be, to some extent, bidirectional. For example, given the Lexical Hypothesis and assuming that the principles of syntax govern inflection, a syntactic head should not agree with part of a word as syntax cannot access word-internal structure. However, Corbett (1987: 300) notes that in Upper Sorbian the case marking on the possessive pronoun *mojeho* 'my' in (16) shows agreement not with the possessed plural noun *dźěći* 'chil-

dren', but with the masculine singular stem *bratr* 'brother' of *bratrowe*, the possessor noun. Such data indicate that word-internal structure is not always opaque to syntax.

(16) *mojeho bratrowe dźěći* [Upper Sorbian]
my.GEN.SG.M brother.NOM.PL children.NOM.PL
'my brother's children'
(Michałk 1974: 510; cited by Corbett 1987: 300)

There are also examples in which syntax seems to manipulate morphology, in apparent violation of the Lexical Hypothesis. Harris (2000, 2002) discusses Udi endoclitics, person markers which may not only affix to words (17a), but also appear inside them (17b).

(17) a. *yaq'-a-**ne** ba-st'a* [Udi]
road-DAT-3SG in-LV.PRS
'On the road he opens it.'
(Harris 2002: 3)

b. *zavod-a aš-**ne**-b-sa*
factory-DAT work-3SG-DO-PRS
'She works in a factory.'
(Harris 2000: 598)

Such data does not necessarily spell the end for the Lexicalist Hypothesis. Lieber and Scalise (2007), for example, argue for a reformulation of it which not only permits syntax access to morphology, but also vice versa. Anderson (2005), meanwhile, preserves the Lexicalist Hypothesis and admits the possibility of bidirectional interaction by reframing it in terms of a family of violable (though usually highly ranked) Integrity constraints in his Optimality Theoretic approach to the analysis of clitics.

### 3.5. Conclusion

While some researchers have argued that some or all features of morphology in the world's languages are distinct from those of syntax, others have argued for approaches ranging from a blurring of the distinction between syntax and morphology to an outright rejection of the assumption that a separate morphological component of grammar exists. Through its interaction with not only syntax but also phonology and semantics, morphology provides important insights into the nature of linguistic knowledge and its organization.

## 4. Syntax and phonology

### 4.1. Introduction

Research into the relationship between syntax and phonology focuses on the extent to which the structure and ordering principles of syntax constrain the domains in which

phonological processes apply post-lexically, and how best to model the mapping between the syntactic and phonological components. Approaches to this interface can be divided broadly according to whether they posit Direct Reference (Section 4.2) or Indirect Reference (Section 4.3) between syntax and phonology. (The proposal that phonological processes apply in domains at a separate level of structure is also found in Chomsky and Halle 1968; see Hayes 1989: 203–205 for an overview of the 'boundary symbol' approach to the syntax–phonology interface and issues with it.) Approaches may also differ in terms of how they characterize the correspondence between syntax and phonology, and therefore how the grammar is organized (Section 4.4).

## 4.2. The Direct Reference approach

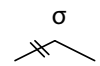
Under the Direct Reference approach, phonological output is determined by syntactic phrasing (cf. Pāṇini's conception of the architecture of grammar). This means that post-lexical phonological rules such as *raddoppiamento sintattico* in Italian, tone sandhi in Ewe, and French liaison are posited to apply in domains defined in terms of syntax alone (Kaisse 1985). Phonological processes are assumed to make direct and relatively free reference to a sentence's syntactic representation without any other level of structure mediating between the two.

This characterization of the syntax–phonology interface has not been widely adopted, though the work of Odden (1990, 1995) is an exception. Odden (1995) argues that the domain of application of certain phrase-level phonological processes in Bantu languages must be defined in terms of specific syntactic relations in similar, syntactically defined domains. To give one example, in Kimatuumbi, vowel shortening affects long stem vowels in words which are syntactic heads when they are followed by other phonetic material, i.e. when they are not the final element in an XP. Compare the form of *kɟkóloombe* 'cleaning shell' as it appears in (18a), in which it is the only word in the NP and the final word in the VP, and in (18b), in which it does not occupy XP-final position and shortening therefore applies. (The vowel affected is given in bold.)

(18) a. [*akɟtwéetɨ* [*kɟkóloombe*]$_{NP}$]$_{VP}$ [Kimatuumbi]
he.took cleaning.shell
'he took a cleaning shell'

b. [[*kɟkól**o**mbe* [*kɟkeéle*]$_{AP}$]$_{NP}$ *chaángu*]$_{NP}$
cleaning.shell red mine
'my red shell'
(Odden 1995: 50)

(19) Shortening




(Y contains phonetic material)
/ [XP[X __ X] Y XP]
(Odden 1995: 51)

Note the reference to syntactic information (XP, Y) in (19). At the interface, the hierarchical structure of syntax and phonology is taken to be identical. (See Truckenbrodt 1999

for an alternative, Indirect Reference analysis of Kimatuumbi data within an Optimality Theoretic framework. Seidl 2001 provides a critical assessment of Truckenbrodt's proposals.)

In addition to segmental processes such as that exemplified in (18), analyses of suprasegmental processes have been proposed. For example, Cinque (1993) claims that, by default, main phrasal stress is assigned to the most deeply embedded constituent on the basis of a sentence's syntactic representation. (See also Culicover and Rochemont 1983; Zubizarreta 1998.)

However, some interface phenomena indicate that syntactic and phonological domains are not isomorphic. For instance, in the example from Shanghai Chinese (20) the domain for post-focus tone deletion (underlined) is *ʔnjiaw 'geq 'dou khe*, which is not a syntactic constituent. Chen (1987) and Bošković (2001) make the same point with respect to tone sandhi in Xiamen Chinese and cliticization in South Slavic languages respectively.

(20) [Shanghai Chinese]

[['*zaw* [['*oN*]$_{AP}$ '*geq* [[*ʔnjiaw*]$_{NP}$ '*geq* '*dou* ]$_{NP}$]$_{NP}$]$_{PP}$ *khe* [*tshjaN* ]$_{NP}$]$_{VP}$

( ) ( ) (_____)( )

toward red bird head open gun

'shoot at the red head of the bird'

(Selkirk and Shen 1990: 330)

As Pak (2008: 51) points out though, Direct Reference does not necessarily mean defining phonological rule domains solely in terms of syntactic constituency: such domains can, in principle, be defined by reference to other types of syntactic information such as the head-complement relation. Examples like (20) therefore do not necessarily force the rejection of all formulations of this type of approach.

This approach has also been argued to miss generalizations about data which show that different phonological processes target the same domain of application (see e.g. Hayes and Lahiri 1991 on Bengali). This is because the (syntactic) domain of application is uniquely defined for each rule, and so cases in which distinct phonological rules converge on the same domain are a matter of coincidence rather than a consequence of the theoretical framework.

## 4.3. The Indirect Reference approach

The lack of isomorphism between syntactic and prosodic constituents, as exemplified by (20), has been cited as evidence of a separate level of prosodic structure with its own constituent structure. Under an Indirect Reference approach, syntax and phonology are related via a mediating level of prosodic structure (e.g. Gussenhoven 1984; Hayes and Lahiri 1991; Nespor and Vogel 1986; Pierrehumbert and Beckman 1988; Selkirk 1978, 1986, 1995; Truckenbrodt 1999). Prosodic structure (also referred to as phonological constituent structure) is posited to consist of a finite number of hierarchically organized prosodic units which are universally available (the Prosodic Hierarchy). These prosodic constituents, which function as the domains of application for phonological rules, are

systematically related to syntactic constituents by a mapping algorithm, but are not necessarily isomorphic with them. Syntactic structure therefore influences rather than defines phonological structure. This is more restrictive than an approach which assumes direct reference because phonology only has access to certain syntactic information via prosodic structure.

Two independent strands of research exist within the Indirect Reference literature, one primarily concerned with the domain of application of segmental rules (e.g. Nespor and Vogel 1986; Selkirk 1986) and the other with the domain of application of non-segmental intonational rules (e.g. Frota 2000; Grice 1995). Overviews are provided in Jun (1998) and Shattuck-Hufnagel and Turk (1996). These two approaches differ with respect to how prosodic constituents are defined. Generally within research into segmental phonology, prosodic units are defined on the basis of syntactic structure, the emphasis being on how to predict prosodic boundaries. The hierarchy of prosodic units assumed in the segmental approach is given in Figure 4.1.

(21) Utterance
Intonational Phrase
Phonological Phrase
Prosodic Word

Fig. 4.1. The Prosodic Hierarchy: segmental approach (see e.g. Selkirk 1978)

Within research into intonational phonology, by contrast, prosodic constituents are defined with reference to informational markers and the emphasis is on how to identify prosodic boundaries. The hierarchy of prosodic units assumed in the non-segmental approach is given in Figure 4.2.

(22) Intonation Phrase
Intermediate Phrase
Accentual Phrase

Fig. 4.2. The Prosodic Hierarchy: non-segmental approach (see e.g. Beckman and Pierrehumbert 1986)

Regardless of which Prosodic Hierarchy is assumed, a well-formed prosodic structure is consistent with the Strict Layer Hypothesis (Nespor and Vogel 1986: 7; Selkirk 1981, 1984: 26), which requires exhaustive parsing of a sentence into non-recursive prosodic constituents grouped in layers corresponding to each category of the Prosodic Hierarchy. Any prosodic constituent is thus parsed into a prosodic constituent or constituents belonging to the level of the hierarchy directly below. (The units of the Prosodic Hierarchy in Figure 4.1 are used in [23] for the purposes of exposition.)

(23)
( ——————————————————— ) Utterance
( ———— ) ( ——————————————— ) Intonational Phrase
( ———— ) ( ———— ) ( ————————— ) Phonological Phrase
( ———— ) ( ———— ) ( ———— ) ( ———— ) Prosodic Word

Fig 4.3. An illustration of exhaustive parsing of prosodic units consistent with the Strict Layer Hypothesis

Given that both claim to represent the hierarchical organization of prosodic structure, the question arises of whether the domains of post-lexical segmental rules (Figure 4.1) and non-segmental rules (Figure 4.2) are the same, i.e. does a single homogeneous prosodic hierarchy exist? Hayes and Lahiri (1991) identify a single domain to which a segmental rule (voicing assimilation) applies and which is also key to intonational (non-segmental) phonology in Bengali. Domain convergence has also been identified in European Portuguese (Frota 2000) and Korean (Jun 1998), suggesting that one homogenous Prosodic Hierarchy exists which is universally available. Gussenhoven (1992) opposes this view and argues that the two hierarchies cannot be unified because they represent separate but related types of phonological structure which do not always coincide. The extent to which there is cross-linguistic evidence of a universally available hierarchy of prosodic units is an important research issue.

The Indirect Reference approach in general has been criticized by Seidl (2001), who cites data which indicate that the domains to which different phonological rules apply are not consistent with the existence of a Prosodic Hierarchy or the Strict Layer Hypothesis. For example, in Oyo Yoruba the domains in which a tonal obligatory contour principle (OCP) phenomenon and vowel harmony apply are different, even though both consist of a clitic and its host. Tonal OCP applies in only one environment: it deletes the high (H) tone on an object enclitic when it attaches to a verb which also bears a H tone, as in (24).

(24) () = tonal OCP domain [Oyo Yoruba]
*ó=(kọ́=mí)* → *ó=kọ́=**mi***
he/she/it=taught=me
'he/she/it taught me'
(Akinlabi and Liberman 2000: 39)

Regressive tonal vowel harmony applies when a subject proclitic attaches to a verb, as in (25). It cannot apply in the environment verb plus object enclitic.

(25) [] = vowel harmony domain [Oyo Yoruba]
*[ó=lọ]* → ***ọ́**=lọ*
he/she=went
'he/she went'
(Akinlabi and Liberman 2000: 54)

The two phonological rules apply to different types of clitic-host domains and thus may overlap rather than converge, as in (26).

(26) *[ó=(kọ́=]=wá)* → ***ọ́**=kọ́=**wa*** [Oyo Yoruba]
he=taught=us
'he taught us'
(Seidl 2001: 53)

Overlapping domains are not expected if prosodic constituents are organized hierarchically and obey the Strict Layer Hypothesis. One possible way to deal with such domain paradoxes would be to reformulate the Strict Layer Hypothesis as a set of violable constraints (see Selkirk 1995).

Data which indicate that certain phonological rules must refer to syntactic information such as category membership or syntactic function, and thus that the relationship between the two components is in at least some cases more direct than indirect, also represent a challenge. For example, in Hausa a long vowel at the end of a verb is shortened when it is immediately followed by a direct object which is a full noun phrase. One suggestion is to treat such processes as fundamentally different from other phonological rules and thus distinct in terms of their domains of application (see Hayes 1990).

Given the issues with the Indirect Reference approach which have been identified, research has continued into the possibility of characterizing the syntax–phonology interface in terms of direct interaction between the two. Seidl's (2001) Minimal Indirect Reference model is more constrained than Kaisse's (1985) original Direct Reference approach. Seidl (2001) proposes that phonology has access to syntax through the level of morphosyntactic representation, which in turn has a direct relationship with syntax. Phonological domains are derived directly from theta-domains via the Phonological Domain Generator which maps morphosyntax to prosody, with prosodic ("late") rules applying to domains in which theta roles are assigned, and morphosyntactic ("early") rules applying at the edges of phases (see e.g. Chomsky 2000, 2001 on phases). Phonological processes may therefore apply at more than one stage. Domain convergence and domain paradoxes fall out of this model as a result of this distinction between early and late rules and also the types of domains to which they may apply (morphosyntactic vs. prosodic). For example, Seidl (2001: 22–33) accounts for the different domains of tone sandhi and consonant mutation in Mende, the former being smaller than the latter, by analysing tone sandhi as applying at an earlier stage than consonant mutation.

Seidl's (2001) approach involves a much more restricted notion of indirect reference than that posited by, for example, Selkirk (1986, 1995) or Nespor and Vogel (1986) because it assumes a greater degree of structural isomorphism. However, the scope of Seidl (2001) leaves room for further investigation. For instance, as Elordieta (2007: 147) points out, Seidl (2001) does not discuss phonological processes which apply to domains smaller or larger than theta-domains.

## 4.4. Defining the mapping between syntax and phonology

Whether direct or indirect reference is assumed, modelling the nature of the mapping relation between syntax and phonology is a key issue in interface research. Four main theoretical approaches can be distinguished: relational (e.g. Frota 2000; Nespor and Vogel 1986), end-based (e.g. Chen 1987; Truckenbrodt 1999), arboreal (e.g. Zec and Inkelas 1990) and cyclic (e.g. Kratzer and Selkirk 2007; Wagner 2005).

Under the relational approach, phonology has access to information about a variety of syntactic relations including c-command, dominance and the head/complement distinction. The sisterhood relation in particular is crucial, and two fundamental types of parametric variation, Type 1 and Type 2 in Table 4.1, are predicted (Hayes 1989; Nespor and Vogel 1986).

However, English is problematic: it behaves like a Type 2 language except when a complement branches, in which case the branching complement maps to a separate phonological phrase (Zec and Inkelas 1990). The effects of branching on the syntax–

(27) Tab. 4.1 Parametric variation in the syntax–phonology mapping under the relational approach

| | Syntactic structure | Prosodic structure | Example (Nespor and Vogel 1986: 179–182) |
|---|---|---|---|
| Type 1 | head and complement | separate phonological phrases | stress assignment in Chimwi:ni |
| Type 2 | head and complement | a single phonological phrase | liaison in colloquial French |

phonology mapping do not follow straightforwardly from the relational approach and must be stipulated. Nespor and Vogel (1986: 173) propose an optional restructuring rule which incorporates a non-branching phonological phrase containing a complement within the phonological phrase which contains its head. This approach could be argued to describe rather than account for the observed variation.

End-based mapping offers a more restrictive view of the interface. Phonology is posited to have access to only two types of syntactic information: X-bar constituency and the location of X-bar constituents' edges. The syntax–phonology mapping aligns one edge of a phonological domain with that of a syntactic constituent. Languages are predicted to vary in terms of how many phonological phrases a syntactic constituent maps to depending on (i) the position of the syntactic head (initial or final), and (ii) the setting of the edge parameter (left or right). However, English presents the same challenge to an end-based approach as it does to a relational one. To cover the optionality relating to the phrasing of branching complements, it is necessary to add a stipulation about branchingness (see e.g. Cowper and Rice 1987: 192).

In work by Selkirk (1995) and Truckenbrodt (1999), the end-based approach is reformulated in Optimality Theoretic (OT) terms as a set of violable constraints. Ranked together in a single hierarchy, faithfulness constraints, which apply to the mapping between syntactic and prosodic structure and serve to align the edges of both types of constituents, interact with constraints that determine the well-formedness of structure in the two separate modules, including prosodic domination constraints which preserve the Strict Layer Hypothesis. A consequence of an OT analysis which ranks interface and prosodic dominance constraints in a single hierarchy is that this type of end-based approach does not face the same challenges as one which assumes inviolable strict layering.

While it does not fall out naturally from either the relational or the end-based approach, branching – specifically, the syntactic relationship between sisters – is fundamental to Zec and Inkelas' (1990) arboreal approach, according to which syntactic sisters are mapped to a single phonological phrase. However, this approach makes strong predictions which are wrong in the case of Chimwi:ni (syntactic sisters map to separate phonological phrases) and French (branching is of no consequence to the mapping). Lack of sensitivity to branching must be introduced if the arboreal approach is to cover the data referred to in Table 4.1. This mirrors the stipulations regarding sensitivity to branching which must be added to the relational and end-based approaches in order to address precisely the opposite problem.

A fourth approach characterizes the syntax–phonology interface as a single operation of Spell-out, which applies cyclically to connect these two components of the grammar. Cyclic analyses are theoretically compatible with both Direct and Indirect Reference

approaches (cf. Pak 2008 and Ishihara 2004 respectively), but are inherently derivational, adopting key theoretical assumptions of the Minimalist framework. Within Minimalist theory, the operation Spell-out applies to a syntactic representation to give the input to the phonological component. As Spell-out occurs in cycles, phonological processes may apply to spelled-out material, which need not correspond to syntactic constituents, at various stages during a derivation. This captures the predominantly hierarchical nature of phonological domains. Even setting aside the assumption of a derivational theory of grammar, a number of theoretical issues arise with respect to the cyclic approach which remain to be explored fully, including the precise form of the input to phonology and how it is derived.

In characterizing the nature of the mapping between syntax and phonology, it is also necessary to account for its direction. A straightforward serialist view of the interface, which models syntactic structure as the input to a component whose final output is the phonological representation of an utterance, predicts the influence of syntax on phonology, in line with the principle of phonology-free syntax (Zwicky 1969; cited by Zwicky and Pullum 1986: 71) which states that "no syntactic rule can be subject to language-particular phonological conditions or constraints". Bidirectional interaction between syntax and phonology is therefore ruled out by a strictly serialist approach.

However, Zec and Inkelas (1990) argue that the behaviour of some heavy dislocated constituents is evidence of how phonology may affect syntax, the relevant concept of weight relating to prosodic rather than syntactic branching: "a prosodic constituent is heavy iff it branches" (Zec and Inkelas 1990: 373). For example, in Serbo-Croatian, a syntactically branching prepositional phrase (28a) is not heavy enough to be a topic, in contrast to a prepositional phrase which also forms a complex prosodic constituent, such as the branching phonological phrase in (28b). (Brackets indicate prosodic constituency.)

(28) a. **(( Sa Petrom)) razgovarala=je samo Marija.* [Serbo-Croatian]
with Peter talk.PST=AUX only Mary
'To Peter, only Mary spoke.'

b. *(( Sa tim) (čovekom)) razgovarala=je samo Marija.*
with that man talk.PST=AUX only Mary
'To that man, only Mary spoke.'
(Zec and Inkelas 1990: 374)

The interface as characterized by, for instance, Selkirk (1995) and Truckenbrodt (1999) does not preclude possible interaction between syntax and phonology in both directions, and Zec and Inkelas (1990) explicitly propose a bidirectional model. Pullum and Zwicky (1988: 275–276) counter that heaviness effects are probably indicative of a processing-based preference for long or complicated constituents to appear non-finally, rather than evidence of some grammatical rule having applied though.

## 4.5. Conclusion

Accounting for syntax–phonology interface phenomena is a concern of researchers working in many different theoretical models (e.g. Kiaer 2006, Dynamic Syntax; Klein

2000, HPSG; Butt and King 1998, LFG; Szendrői 2003, Minimalism). It is clear that such research is key to increasing our understanding not only of the precise nature of the interaction between syntax and phonology, but also of grammar and its organization.

## 5. Syntax and semantics

### 5.1. Introduction

Using finite mental resources, a native speaker is able to determine for any one of an infinite number of sentences (i) whether it conforms to that language's syntactic requirements and thus is well formed, and (ii) what its meaning is. Accounting for a speaker's ability to associate a novel phrase or sentence with the appropriate meaning is a key issue in the study of the relationship between syntax and semantics. Debate has centred on how to define and delimit syntax, semantics and their interaction in accordance with the Principle of Compositionality (Section 5.2), whose interpretation and formalization in turn has important implications for the architecture of the grammar.

A wide variety of phenomena have been examined in light of proposals made concerning the interaction of syntax and semantics. As well as determining how the two are related, research has focused on where the boundary lies between syntax and semantics. For example, with regards to argument structure, there is debate over whether explanations should be framed in terms of syntactic or semantic relations (see e.g. Baker 1997; Goldberg 1995; Grimshaw 1990; Hale and Keyser 2002; Van Valin 2005). Other key topics include anaphora (Heim 1998; Reinhart 1983), coordination (Partee and Rooth 1983; Steedman 2000b), tense and aspect (Giorgi and Pianesi 1997; Guéron and Lecarme 2004), interrogatives (Comorovski 1996; Ginzburg and Sag 2000) and ellipsis (Dalrymple et al. 1991; Kennedy 2003).

In order to illustrate some of the issues faced by theories of the syntax–semantics interface, Section 5.3 reviews two approaches to the analysis of quantifier scope, a subject which has provided significant insights and continues to be the focus of research.

### 5.2. Compositionality

Also referred to as Frege's Principle (though attribution of the modern version has been questioned; see Cresswell 1973: 75, fn. 97; Janssen 1997: 420–421; Pelletier 2001; amongst others), the Principle of Compositionality (29) underpins a variety of theoretical approaches to the syntax–semantics interface.

(29) The Principle of Compositionality:
The meaning of a complex expression is a function of the meanings of its parts and of the way they are syntactically combined.
(Partee and Hendriks 1997: 20)

The Principle of Compositionality accounts for the productivity and systematicity of language in terms of the mind's finite resources: a speaker knows the meaning of smaller pieces of language and the rules which combine them to form larger, potentially novel

pieces of language; the meaning of the whole is composed of the meaning of its parts as they are put together in the syntax. Syntactic structure and semantic interpretation are thus proposed to be closely linked.

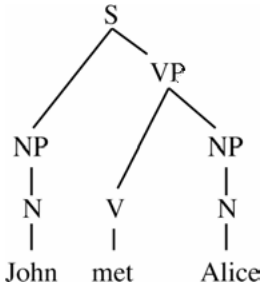
Precisely how the Principle of Compositionality should be interpreted continues to be debated because it is not framed in terms of a specific theory of either syntax or semantics, nor does it precisely define the nature of the relationship between the two (see e.g. Pagin and Westerståhl 2001). Theoretical approaches to compositionality may be distinguished on the basis of whether they characterize all syntactic-structure building as preceding semantic-structure building (the interpretive approach) or posit that syntactic and semantic structure are built in tandem (direct compositionality, also referred to as the "rule-to-rule" or "rule-by-rule" linking of syntax and semantics, e.g. Bach 1976; Partee [1984] 2004).

An interpretive theory (e.g. Heim and Kratzer 1998), assumes that semantics has access only to the fully assembled syntactic structure of a complex expression. As the basis for semantic composition is a completed syntactic structure, it is not the case that all expressions which act as input to syntactic operations, or indeed syntactic operations themselves, should have semantic relevance. This approach is usually framed within a transformational theory of grammar which posits that an expression's syntactic structure is interfaced with its semantic interpretation via Logical Form, a separate level of representation that is derived from the pronounced (overt) syntactic structure and consists of all and only the syntactic information relevant to interpretation. The interpretive approach has been criticised for involving unnecessary complexity because syntax and semantics are posited to operate on the same types of objects, the former applying before the latter. Jacobson (2002: 609–611) argues that it is not clear why this should be the case when syntax and semantics are assumed to be distinct combinatory systems.

Under direct compositionality, semantics operates in parallel with syntax. Directly compositional approaches such as Steedman (2000b) analyse the construction of a complex expression's syntactic and semantic structure as occurring simultaneously because "for every syntactic operation there must be a corresponding semantic operation" (Barker and Jacobson 2007: 1). Direct compositionality therefore requires every syntactic object and operation to have a semantic counterpart. The interaction between these two components of the grammar follows from this assumption of homomorphism. Modelling the interface in this way is not without its problems though. If the rules of syntax and semantics apply in tandem, the semantic structure of a complex expression is expected to reflect exactly its syntactic structure and how it was assembled. This is the case in (30). (Throughout, structures have been simplified for the purpose of exposition.)

(30) *John met Alice.*

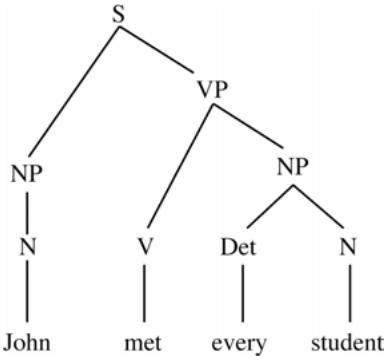
a. Syntactic structure



b. Semantic structure
λ*y*.λ*x*.meet(*x*, *y*)(alice) [syntax: object NP + V = VP]
λ*x*.meet(*x*, alice)(john) [syntax: VP + subject NP = S]
meet(john, alice) [syntax: S]

However, examples such as (31), which include an object quantifier phrase (*every student*), indicate that it is not always possible to account for the relationship between syntactic and semantic structure in terms of such a straightforward correspondence. In the sentence's syntactic structure (31a), the quantifier phrase *every student* combines with the verb *met* to form a verb phrase; the quantifier phrase thus occupies a lower syntactic position than the subject *John*. By contrast, in the sentence's semantic structure (31b), the quantifier phrase combines with the rest of the sentence to give its meaning and thus the quantifier takes scope over the individual *john*.

(31) *John met every student.*
a. Syntactic structure




b. Semantic structure
every(student, λ*y*.meet(john, *y*))

The differences between the syntactic and semantic structures in (31) are problematic for a directly compositional analysis because the object quantifier is not interpreted in situ, which runs contrary to the assumption that the syntactic and semantic combinatory systems operate in parallel. Some additional mechanism is therefore required to account for the interpretation of object quantifiers, increasing the complexity of a directly compositional analysis.

Directly compositional theories vary in terms of how strictly compositionality is assumed to apply. In its strongest interpretation (see e.g. Jacobson 1999), the Principle of Compositionality is taken to require that a strict homomorphism maps the structure of syntax onto the structure of semantics, and thus no reference can be made to a constituent's internal structure. It follows that complex expressions are constructed in the syntax only by the concatenation of strings (Barker and Jacobson 2007: 4).

Under a weaker version of compositionality, on the other hand, the internal structure of syntactic and semantic constituents can be accessed. This weakening is motivated by the need to account for examples of ambiguity which are not the result of lexical or syntactic ambiguity, as in cases of quantifier scope ambiguity (Section 5.3). The extent to which access is permitted varies, meaning that a number of different theories exist

which can be characterized as adopting weak direct compositionality. For example, at one end of the scale are approaches like that of Bach (1979, 1980) in which concatenation is augmented only by an infixation operation (Wrap). This requires a slightly weakened notion of compositionality because in identifying any point of infixation, reference must be made to the internal structure of the expression.

While a weaker version of direct compositionality permits reference to internal structure, it is not the case that such an approach must rely on a hierarchical conception of syntactic structure, such as that in (31a). The glue semantics approach (Dalrymple 1999) captures weak compositionality in a formally precise way without assuming that meanings are constructed in a rigid order on the basis of phrase structure alone. According to this theory of the syntax–semantics interface, meanings are assembled by linear logic (Girard 1987), which acts as the "glue" connecting an expression's syntactic structure and its semantic interpretation. Each word contributes a meaning, specified in logical terms; syntactic rules and parts of the syntactic structure may also contribute meanings. These meanings are combined by standard inference to give the meaning of the whole sentence. Syntactic structure thus constrains semantic composition without determining its order. Like the Principle of Compositionality itself, glue semantics is independent of the theoretical frameworks used to capture semantic composition and syntactic structure, and is therefore compatible with a range of syntactic and semantic formalisms. For example, glue analyses have been proposed within a standard Montague-type predicate logic (Dalrymple 2001) and Discourse Representation Theory (van Genabith and Crouch 1999), within LFG (Dalrymple 1999) and HPSG (Asudeh and Crouch 2002).

Interpretive theories and those which observe some version of direct compositionality are generally framed as opposing theories of the syntax–semantics interface, with the former offering a syntactic solution and the latter a semantic solution to the issue of apparent mismatches, though Barker (2007) argues that the two approaches can coexist within the grammar without introducing redundancy and proposes a grammar with the property of direct compositionality on demand.

## 5.3. Quantifier Scope

The test for any theoretical approach to the interaction between syntax and semantics is to provide an analysis of interface phenomena. One of the classic problems which must be addressed is accounting for quantifier scope construal.

### 5.3.1. Object quantifiers and quantifier scope ambiguity: the data

An intransitive verb such as *smiled*, which denotes a property, requires an argument such as *Al*, which refers to an individual, to give a sentence *Al smiled* whose meaning is a proposition and which can be represented as in (32).

(32) *Al smiled.*
smile(al)

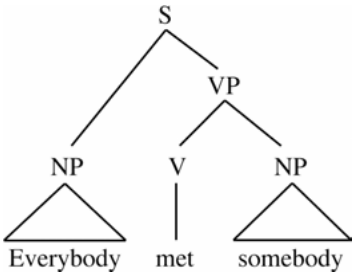
A quantifier such as *every student* does not refer to an individual or a set of individuals (see e.g. Heim and Kratzer 1998: 131−177), but is analysed as representing a property of properties, a higher-order property. For instance, in the meaning of the sentence in (33), *every student* describes that some property applies to every student, in this case the property of having smiled. (Contrast this with the meaning represented in [32], in which having smiled is a property which applies to the individual referred to by the subject *Al*.)

(33) *Every student smiled.*
every(student, λ*x*.smile(*x*))

Complications arise when a quantifier appears in object position, as in the sentence *John met every student* in (31), because of the mismatch between syntactic structure and semantic interpretation. In the syntactic structure in (31a), the object *every student* combines with the predicate *met*. However, the sentence's semantic structure, given in (31b), does not reflect this. The transitive verb *met* denotes a relation between individuals (e.g. *John met Alice*, as in [30]), but a quantifier like *every student* combines with a property to give a proposition, as in (33). Hence, it does not appear to be the case that the meanings of *met* and *every student* combine to give the meaning of the VP *met every student* in (31), in violation of the Principle of Compositionality.

A related issue is quantifier scope ambiguity. When two quantifiers appear in the same sentence, as in (34), two readings are available for a single syntactic structure (34a) in English because the relative scope of the quantifiers may differ. (This does not hold in all languages though. For example, Kiss 2001 shows that German is an exception.)

(34) *Everybody met somebody.*
a. Syntactic structure




b. Reading 1: 'for each person, there is at least one person that he/she met'
*everybody* takes scopes over *somebody*
every(person, λ*x*.some(person, λ*y*.meet(*x*, *y*)))

c. Reading 2: 'there is at least one person that was met by everyone'
*somebody* takes scopes over *everybody*
some(person, λ*y*.every(person, λ*x*.meet(*x*, *y*)))

Sentences like (34) are problematic because according to the Principle of Compositionality there should only be one semantic structure associated with any single syntactic

structure. A theory of the syntax–semantics interface must account for such instances of ambiguity and the different quantifier scope relations involved in data from a variety of languages, on the importance of which see Bach et al. (1995a, 1995b) and Matthewson (2001, 2008).

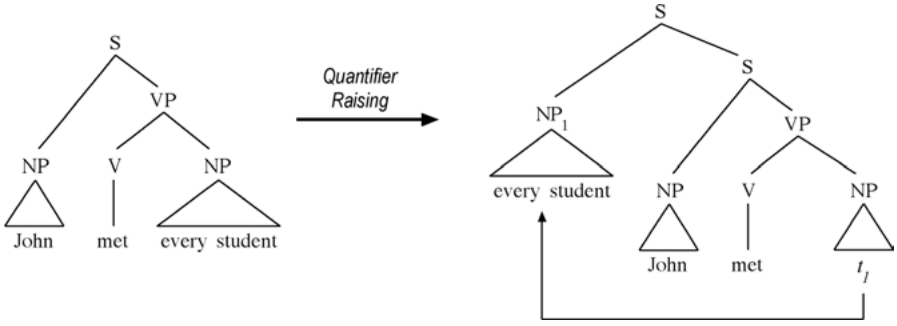
In Sections 5.3.2 and 5.3.3, two different theoretical approaches, one compatible with an interpretive analysis and one with direct compositionality, are reviewed in order to give an idea of how issues relating to quantifier scope have been addressed. Other approaches to quantification and the syntax–semantics interface, which are not covered for reasons of space, include Montague's (1974) "Quantifying In", Cooper Storage (Cooper 1975; Keller 1988) and continuations (Barker 2002).

### 5.3.2. The interpretive approach and quantifier raising

A widely adopted interpretive approach to quantification is that outlined in Heim and Kratzer (1998), in which a level of Logical Form is assumed and quantifier scope is accounted for in terms of syntactic movement of the quantifier from the position in which it was generated (where it leaves behind a trace *t* with which the quantified phrase is co-indexed) to a position consistent with the sentence's proposed semantic structure. This Quantifier Raising creates a structure at Logical Form within which the quantifier binds a variable that is located in the position originally occupied by the quantifier (Chomsky 1976; May 1977). A quantifier's scope corresponds to its c-command domain (see Reinhart 1976). In this way, the local and global aspects of a quantifier's interpretation are accounted for.

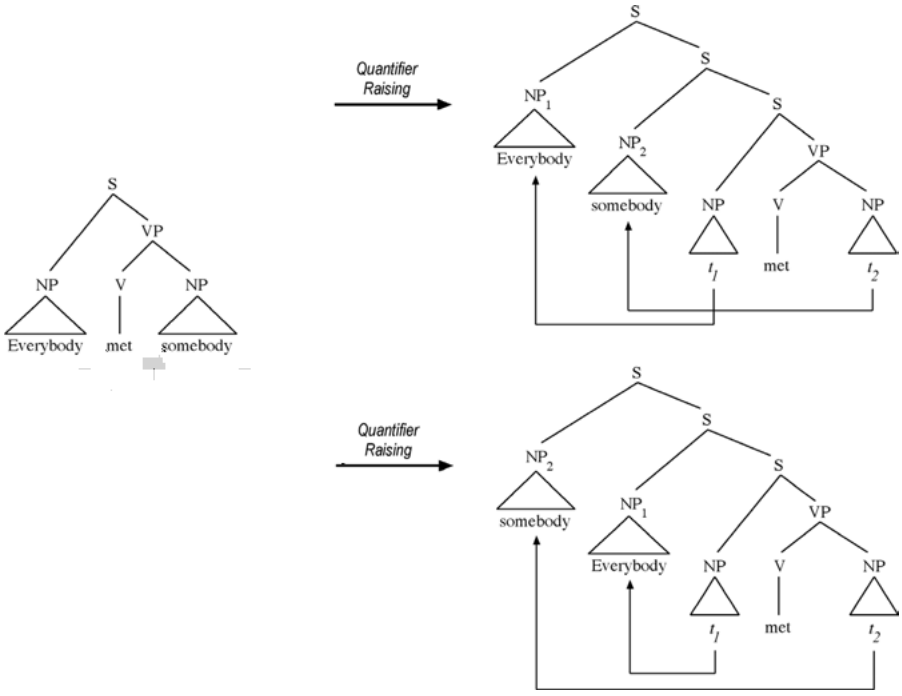
The Logical Form representation of the sentence in (31) is derived via Quantifier Raising as shown in (35). It is this Logical Form representation, rather than the initial syntactic representation, which is the input to semantic interpretation. Interpretation of a quantifier therefore occurs after Quantifier Raising has occurred and its scope has been determined, i.e. ex situ, meaning that although the VP *met every student* is a syntactic constituent, it does not have a corresponding semantic interpretation.

(35) *John met every student.*




The quantifier scope ambiguity exemplified in (34) is accounted for thus: *Everybody met somebody* represents a single syntactic structure from which two different LF representa-

(36) *Everybody met somebody.*




tions, each associated with a different meaning, may be derived depending on the order in which quantifier raising applies, as shown in (36).

Quantifier Raising deals with the mismatch between syntactic and semantic structure by increasing the complexity of the syntax. It is claimed that this is justified given independent evidence of movement and observed parallels between the covert movement of quantifier phrases and overt movement of elements such as question ("wh") phrases (see e.g. Aoun and Li 1993; May 1985). However, if they are instances of the same phenomena, the syntactic constraints which restrict the scope of quantifiers (see Heim and Kratzer 1998: 209–238) and those on movement should be identical. Ruys and Winter (2011) discuss data which indicate that at least one syntactic condition on movement, the Subjacency Condition (Chomsky 1973), does not apply to Quantifier Raising in the same way that it does to question words. Such divergence undermines a unified account of movement and Quantifier Raising, which is one of the main motivations for the Quantifier Raising analysis.

### 5.3.3. Direct compositionality, flexible types and type shifting

Hendriks' (1993) flexible types approach is a semantic solution to mismatches at the syntax–semantics interface, compatible with direct compositionality, which builds on Partee and Rooth's (1983) proposal that predicates are semantically ambiguous. Under this approach, transitive verbs do not uniformly denote relations between individuals;

this is simply their minimal type. Rather, the semantic type of a verb is flexible and type-shifting rules may apply to systematically change it depending on the context in which the verb occurs. This flexibility resolves the mismatch issue exemplified in (31) as sketched in (37). In a sentence such as *John met every student*, type-shifting rules apply to lift the type of the object position of the transitive verb *met*, so that the verb denotes a relation between an individual and a quantifier (a property of properties) and the object position has scope over the other argument position. In this way, the object quantifier can combine with the meaning of the transitive verb in such a way as to capture the facts about scope in accordance with direct compositionality. It is not necessary to posit any syntactic operation such as Quantifier Raising to account for these data. (Another possibility is type-shifting of the quantifier phrase; see Heim and Kratzer 1998: 180–182.)

(37) *John met every student.*
   a. *met* = $\lambda y.\lambda x.\text{meet}(x, y)$
      $\Downarrow$ TYPE LIFTING
      *met* = $\lambda P.\lambda x.P(\lambda y.\text{meet}(x, y))$
   b. *met every student* = $\lambda x.\text{every}(\text{student}, \lambda y.\text{meet}(x, y))$
   c. *John met every student* = $\text{every}(\text{student}, \lambda y.\text{meet}(\text{john}, y))$

With respect to quantifier scope ambiguity, the different versions of a verb's meaning which are available license the different scope relations that may exist between quantifiers in its argument positions. The order in which type-shifting rules apply ultimately determines which of the two quantifiers takes scope over the other in a sentence such as (34), thus accounting for the semantic ambiguity. In the case of Reading 1 (34b), a type-shifting rule applies to lift the type of the subject argument before the object argument and hence the object quantifier is in the subject quantifier's scope; in the case of Reading 2 (34c), the order in which this type-shifting occurs is reversed, and consequently so is the relative scope of the quantifiers.

A flexible types approach therefore addresses the issue of mismatch at the syntax–semantics interface at the cost of increasing the complexity of the semantics. It relies on the assumption of widespread polysemy and the introduction of type-shifting rules. Type-shifting is a powerful mechanism; it must be constrained in a principled manner in order to avoid overgeneration. Another concern is that a flexible types approach may be inconsistent with the self-reliance which is characteristic of direct compositionality according to Barker (2007: 106) because, rather than being self-contained, interpretation of a constituent can depend on looking ahead in the semantic analysis to relations that will exist between a constituent and some external element.

Under a glue semantics analysis (Section 5.2), the semantic ambiguity in (34) arises as a result of there being two possible ways in which the same semantic objects can be combined. No type-shifting rules are necessary; the flexibility is inherent in the combinatory mechanism. See Asudeh and Crouch (2002).

## 5.4. Conclusion

Accounting for quantifier scope construal represents a challenge for any theory of the syntax–semantics interface. The different approaches outlined, which take the Principle

of Compositionality as their starting point, each continue to contribute to our understanding of syntax, semantics, and the organization of the grammar as a whole, as well as the systematic and productive nature of human language.

# 6. Syntax and pragmatics

## 6.1. Introduction

It has been argued that to understand syntax and pragmatics, the two cannot be divorced as "pragmatics without syntax is empty; syntax without pragmatics is blind" (Huang 2007: 271), an allusion to Kant's (1781: 51) statement that "Gedanken ohne Inhalt sind leer, Anschauungen ohne Begriffe sind blind" ['thoughts without content are empty, intuitions without concepts are blind']. Discussing the syntax–pragmatics interface is complicated by the difficulties in defining pragmatics itself, as Levinson's (1983: 5–35) review of the term and its scope indicates. For the purposes of this overview, which can deal with only some of the relevant issues in general terms, pragmatics is regarded as the study of a sentence's meaning in context, and thus its interface with syntax is explored with regard to the effect that context may have on sentence structure and its acceptability.

The acceptability of sentences is not simply a matter of their being syntactically well formed or interpretable, as the examples in (38) illustrate. While the passive constructions in (38a–b) are both grammatical, (38b) is infelicitous in the context given in (38d); (38a), on the other hand, can appear in a similar context (38c).

(38) a. *He will be succeeded by Ivan Allen Jr.*
b. *The mayor will be succeeded by him.*
c. *The mayor's present term of office expires on January 1. He will be succeeded by Ivan Allen Jr. ...* (Brown Corpus)
d. *Ivan Allen Jr. will take office January 1. # The mayor will be succeeded by him.*

(Ward and Birner 2004: 169–170)

Ward and Birner (2004) account for the infelicity of the passive construction in (38d) in terms of the relative discourse status of the syntactic subject, *the mayor*, and the logical subject *him* (Ivan Allen Jr.) which appears in the postverbal *by*-phrase. They claim that in this and other such argument-reversing constructions, the syntactic subject must represent information which is at least as familiar as that represented by the logical subject in the *by*-phrase within the context of the discourse. In (38c) the mayor, the antecedent of the syntactic subject *he*, is old information, having been given in the first sentence, while Ivan Allen Jr. is new information; as a result, the passive construction is felicitous. In (38d), by contrast, the mayor (the syntactic subject) is new information while Ivan Allen Jr. (the antecedent of the logical subject *him*) is old information, having been mentioned in the first sentence; as a result, the passive, though grammatical, is infelicitous. (38d) thus exemplifies a mismatch at the syntax–pragmatics interface.

Passivization is only one example of a wide range of phenomena covered in the literature on the syntax–pragmatics interface. Other topics include ellipsis (Cann et al.

2007), evidentiality and logophoricity (Speas 2004), scalar implicatures (Chierchia 2004) and anaphora (Huang 2000). To highlight some of the relevant issues, Sections 6.2 and 6.3 focus on one aspect of the interaction between pragmatics and syntax: information structure.

## 6.2. Information structure

Information structure has been the focus of research in various sub-disciplines of linguistics and within a range of different theoretical frameworks. For example, the relationship between intonation and information structure is discussed by Büring (1997), Downing (2006), Mycock (2006), Skopeteas et al. (2009) and Steedman (2000a), while the relationship between semantics and information structure is the subject of work by, e.g., Heim (1988), Kamp ([1981] 1984), Krifka (1992), Rooth (1985, 1992), Strawson ([1964] 1971) and von Stechow (1991). The key issue is why it should be possible to express fundamentally the same meaning in a variety of ways. Languages with free word order illustrate this point well. Slovene, for example, has highly flexible word order: the grammatical function of a constituent is usually marked morphologically; grammatical functions do not appear to be associated with particular syntactic positions. Derbyshire (1993: 122) provides two versions of the same two-word sentence which vary in terms of their word order and precise interpretation. (Focus is indicated by small capitals in the translation.)

(39) a. *Moram brati.* [Slovene]
must.PRS.1SG read.INF
'I must READ.'

b. *Brati moram.*
read.INF must.PRS.1SG
'I MUST read.'
(Derbyshire 1993: 122)

While the sentences in (39) may both be translated into English as *I must read*, this does not capture the fact that the relevant information is packaged in a particular way which results in subtle differences in emphasis and possible usage. As Ward and Birner (2004: 153) observe, "the speaker's choice of constructions (…) serves to structure the informational flow of the discourse". Thus, the syntax reflects pragmatic factors. The effects that such packaging of information may have on syntax are not arbitrary and are attested in a wide range of languages. For example, the most common ordering of grammatical functions in Slovene is SVO according to Greenberg (2006: 124), Herrity (2000: 333) and Priestly (1993: 428), inter alia. However, this tendency is likely to be a consequence of a stronger ordering restriction best expressed in terms of discourse functions rather than grammatical functions such as subject and object. A number of proposals have been made with regard to the organizing principles and primitives of information structure which have consequences not only for syntax, and thus the analysis of data such as (39), but also for the architecture of grammar as a whole.

### 6.2.1. Information structure primitives

Information structure (Halliday 1967), sometimes also referred to as information packaging (Chafe 1976), is broadly concerned with how linguistic structures serve to indicate the relationship of an utterance and its contents to the wider discourse context. Establishing what the primitives of information structure are has been a concern at least since Mathesius ([1929] 1983), whose work has been followed up by linguists such as Daneš (1974), Firbas (1964) and Sgall (1967) within the Prague School tradition, and has influenced many others, including Bolinger (1965), Kuno (1972) and Vallduví (1992). The primitives of information structure continue to be the subject of debate and a range of different definitions, terminology, and divisions exist in the literature, as the summary provided by Kruijff-Korbayová and Steedman (2003: 254) and the inventories provided by Erteschik-Shir (2007) show. Even so, key to many accounts of information structure and its interaction with syntax are two concepts which are usually referred to as topic and focus. While it is not within the scope of this section to provide a comprehensive summary of all the relevant definitions in the literature, it is possible to outline what is broadly meant by these two terms.

Topic and focus relate an utterance to the wider discourse context and reflect the communicative requirements of the discourse participants. A topic specifies what an utterance is about; the rest of a sentence or utterance represents the speaker's comment on that topic. It is widely assumed that for an element to be a topic, and thus for it to be available for comment, it must be given or old, that is it must represent an entity whose meaning the speaker and the addressee can retrieve, for example, from previous experience or from the immediate discourse context. (Gundel and Fretheim 2004 review the given-new distinction and claim a more fine-grained analysis is required to account for attested differences; see also Prince 1981 for more on the given/new distinction.)

Focus has also been defined in terms of givenness: focus represents information new to the addressee, presented in terms of its relation to information that is (or can be assumed to be) given or old to him/her (background information). Any topic is old in this sense too, so the focus/background and topic/comment dichotomies may overlap, as the answer to the question in (40) shows. (Vallduví 1992 conflates topic/comment and focus/background into a trinomial hierarchical articulation of the information structure of an utterance.)

(40) Q: *What did Charlie bring?*
A: *He brought chocolate.*

| TOPIC | COMMENT | |
|---|---|---|
| *He* | *brought* | *chocolate* |
| BACKGROUND | | FOCUS |

The standard test for focus/background involves a constituent ("wh") question, as in (40), because the answer constituent represents information new to the addressee and hence the focus of the utterance. Tests for topic status are less clear-cut, as Erteschik-

Shir (2007: 19–22) shows. In (40) though, it is clear that the question requires the answer to be about Charlie and because he has been mentioned in the question, Charlie is given information. The pronoun *he* in the answer has properties of givenness and aboutness, consistent with it being a topic.

In some languages, there is a particularly close relationship between syntax and information structure. Hungarian is an example of such a discourse-configurational language (É. Kiss, this volume): there is syntactic marking of aspects of discourse structure, but otherwise word order is relatively free. In Hungarian, a single focused item appears immediately preverbally and is preceded by any topics, as in (41).

(41) [*Anna*]$_{\text{TOPIC}}$ [*Péter-nek*]$_{\text{TOPIC}}$ [*könyv-et*]$_{\text{FOCUS}}$ *adott.* [Hungarian]
Anna.NOM Peter-DAT book-ACC give.PST.3SG
'To Peter, Anna gave a BOOK.'
(Lipták 2001: 10)

Aspects of the canonical order of constituents in Hungarian are therefore best expressed in terms of their information structural status rather than their grammatical function. This is also the case in other languages. For example, the fact that SVO is the most common ordering of constituents in Slovene (Section 6.2) is likely to be related to the more general cross-linguistic tendencies for old information to precede new information and for the subject to be the default topic (Lambrecht 1994; Li and Thompson 1976; Reinhart 1982).

Huang (2007: 271) states that the degree to which there is interaction of pragmatics and syntax varies typologically. He asserts that in pragmatic languages such as Chinese, Japanese and Korean, principles of language usage rather than rules of grammatical structure are key to understanding some phenomena which have been analysed purely in terms of syntax. This indicates that the precise location of the border separating syntax from pragmatics may differ from language to language, undermining universalist syntactocentric conceptions of grammar.

Even in a language in which canonical word order can be captured in terms of grammatical functions such as English (SVO), the effects of the interaction between information structure and syntax can be identified, as in (42).

(42) a. Topicalization (O S V)
G: *Do you watch football?*
E: *Yeah.* [*Baseball*]$_{\text{TOPIC}}$ *I like a lot better.*
(Ward and Birner 2004: 161)

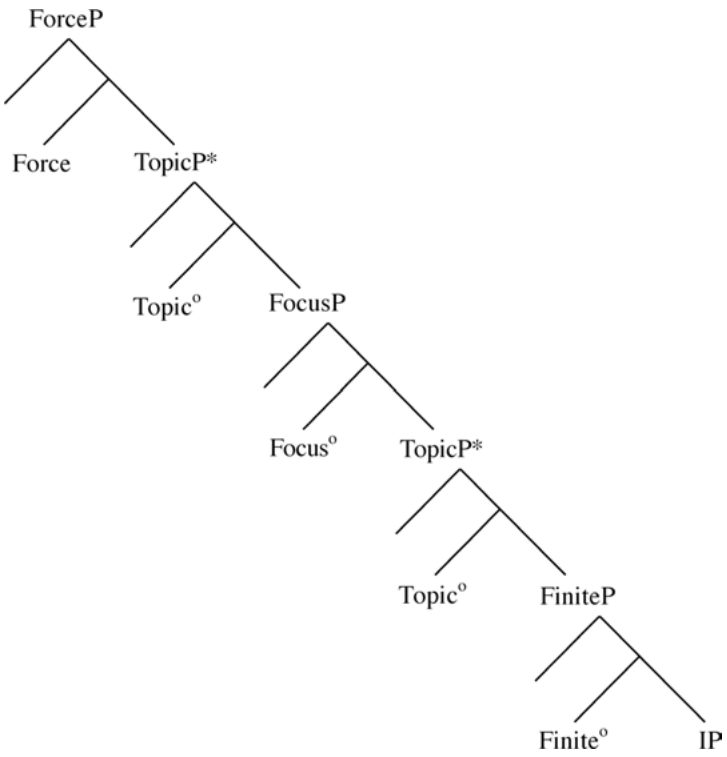
b. Inversion (ADJ V S)
*We have complimentary soft drinks, coffee, Sanka, tea, and milk. Also complimentary is* [*red and white wine*]$_{\text{FOCUS}}$.
(Ward and Birner 2004: 171)

Thus, the information structure status of constituents may be the reason for their occurrence in a non-canonical position.

## 6.3. Analyzing information structure

Theoretical approaches to information structure and, more generally, to pragmatics can be divided into two main types based on whether the architecture of grammar is posited to be multi-level. The architecture assumed in the Minimalist Program (Chomsky 1995) has the syntactic computation interact separately with Phonetic Form (PF) and Logical Form (LF). There is no separate level of pragmatics; information structure which has an effect on the syntax is thus part of the syntactic computation itself. Non-canonical word order is the result of the movement of constituents, which is triggered by the need to check and delete uninterpretable features (by having them matched with interpretable features) before PF and LF in the fine structure of the clause's left periphery, outlined in an influential paper by Rizzi (1997) and pursued in the cartographic approach (e.g. Benincà 2001; Rizzi 2004; for a different theoretical approach within the Minimalist framework, see Reinhart 2006.) For example, Rizzi (1997: 297) proposes the articulated structure for the complementizer system in (43), which includes recursion of Topic Phrases (indicated by the asterisks), to account for ordering constraints in a clause's left periphery.

(43)




(Rizzi 1997: 297)

However, this approach to non-canonical constituent ordering has led to some analyses which, while descriptively accurate, are based on a proliferation of functional projections whose explanatory adequacy has been questioned (Erteschik-Shir 2007: 86–101).

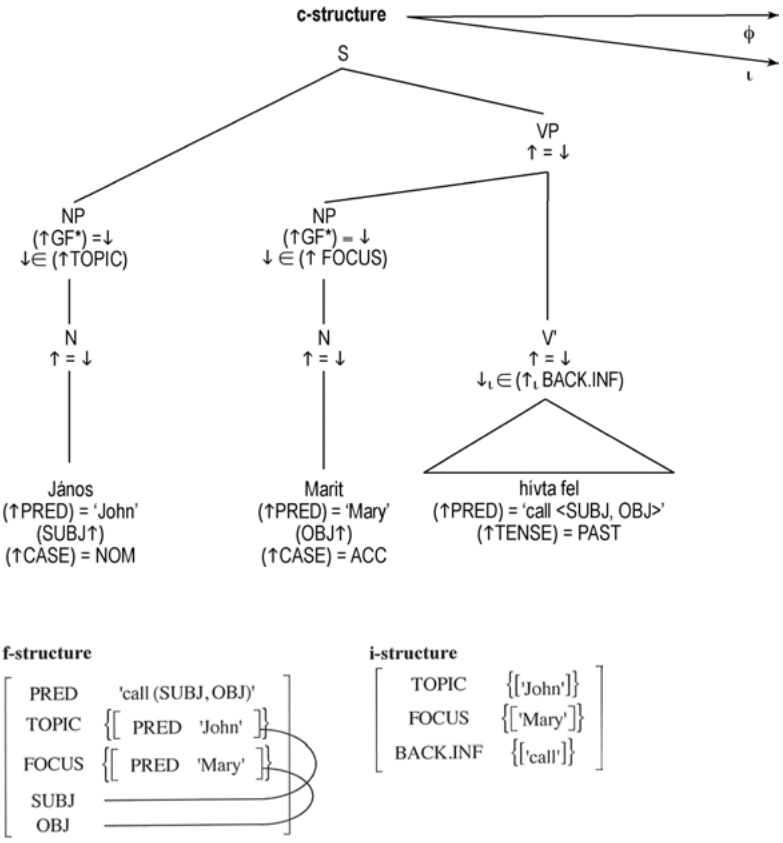
Huang (2007: 271) points out that constraints on syntax which are rooted in pragmatics tend to be general and violable and thus appear to be fundamentally different from the rules of syntax themselves. He suggests that OT syntax may offer a way forward for modelling the interaction between syntax and pragmatics in the Chomskyan generative tradition.

The idea that pragmatics and syntax are distinct is modelled straightforwardly in those approaches which posit a multi-dimensional grammatical architecture. Such multi-level systems can be further divided into those which posit that information structure, with its own rules and primitives, represents an independent level of linguistic structure (LFG; Erteschik-Shir's 1997 focus-structure theoretical framework) and those which do not (Construction Grammar, Dynamic Syntax, HPSG, RRG).

In the non-derivational framework of LFG, those features of information structure which result in non-canonical syntactic constructions are represented as grammaticized discourse functions at the level of f(unctional)-structure (Bresnan and Mchombo 1987). Discourse functions overlay grammatical functions such as subject and object, in order to relate an element to the wider discourse context. The discourse functions topic and focus are integrated into the meaning of a sentence by binding an element which bears an argument function (the Extended Coherence Condition; see e.g. Dalrymple 2001: 390). Thus at f-structure the value of two functions may be the same subsidiary f-structure. As focus and topic cannot necessarily be straightforwardly defined in terms of syntactic constituents − if they affect the syntax at all − researchers including Butt and King (1997), Choi (1999) and Mycock (2006) have argued for a separate level of i(nformation)-structure in the LFG parallel architecture. If an independent i-structure representation is part of the grammar, King (1997) points out that the issue arises of whether any information about discourse functions should be included at f-structure at all. This point remains to be fully explored.

The argument function of a constituent in a non-canonical syntactic position cannot be determined directly by reference to local information such as subcategorization frames. It is therefore necessary to resolve the grammatical role of the constituent in non-canonical c-structure position. At the syntactic level of c(onstituent)-structure, the relevant node, which is annotated with functional equations, associates that c-structure position with (i) the appropriate discourse function, and (ii) a grammatical function (GF) at f-structure. In (44), for instance, the functional equation $\downarrow \in (\uparrow \text{FOCUS})$ associates the immediately preverbal c-structure position with the function FOCUS at the levels of f-structure and i-structure simultaneously (every grammaticized discourse function bearing the corresponding discourse function at i-structure by definition), while the functional equation $(\uparrow \text{GF}^*) = \downarrow$ associates it with a grammatical function at f-structure (in this case, object). This means that the value of the grammatical function OBJ and the discourse function FOCUS is the same at f-structure in (44); the structure sharing involved is represented by a solid line linking the two functions. The relations between the immediately relevant levels of linguistic structure are represented in (44) by arrows; the correspondence function φ relates c-structure nodes to f-structures, and the correspondence function ι relates c-structure nodes to i-structures (see Dalrymple 2001).

(44) [*János*]$_{\text{TOPIC}}$ [*Mari-t*]$_{\text{FOCUS}}$ *hív-t-a* *fel.* [Hungarian]
John.NOM Mary-ACC call-PST-DEF.3SG VM
'John called MARY.'

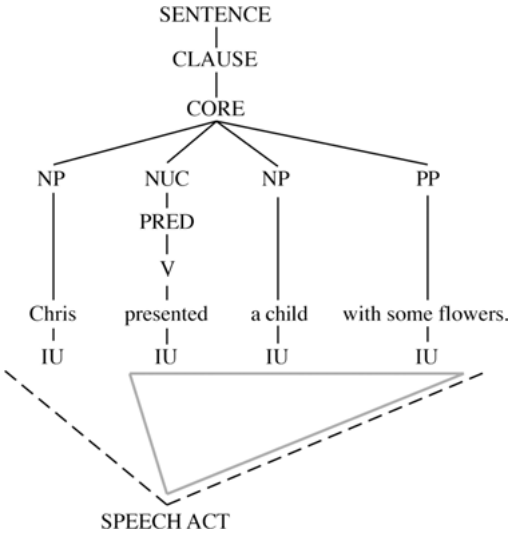



As Mycock (2006: 81, 90–91) notes, the possible values of functions such as FOCUS at i-structure and how exactly information-structure relates to semantic-structure in LFG's parallel, correspondence-based architecture remain to be determined.

Choi (1999) also investigates information structure within the LFG framework, but provides an OT analysis of the universal mapping principles which link syntax and information structure. Choi (1999) argues that word-order variation is due to the interaction of syntactic constraints, which are responsible for canonical word order, and information structuring constraints. The two are ranked relative to one another, with the exact ranking determined on a language-by-language basis. This captures the insights that the influence of information structure on word order varies cross-linguistically and that pragmatic constraints tend to be violable rather than absolute (cf. Huang 2007: 271).

Role and Reference Grammar (RRG; Van Valin and LaPolla 1997; Van Valin 2008) adopts a different approach to the syntax–pragmatics interface and therefore information structure. The communicative functions of grammatical structures are central to this approach, according to which syntactic knowledge is stored in constructional templates specified for morphosyntactic, semantic and pragmatic properties. According to RRG, which builds on the approach to information structure outlined in Lambrecht's (1994) influential work, a construction is assigned a focus structure which, like the constituent projection and the operator projection, is represented as a separate projection of the

(45)




(Van Valin 2005: 77)

clause. Focus structure is analysed in terms of syntactically defined, information structural units (IUs), following Lambrecht (1994). For example, in (45), *Chris* functions as the topic while the remainder of the sentence functions as the comment, referred to in RRG as the focus domain. The speech act node acts as an anchor for the focus structure projection, within which the Potential Focus Domain (dashed lines) and the Actual Focus Domain (the grey triangle) are represented. The Actual Focus Domain is determined in relation to the utterance in question.

A distinction can be made between specialized and unspecialized constructional templates. In the case of the latter, assignment of the appropriate focus structure to a sentence is to some extent context dependent, as is the case in (45). When a specific sentence type is associated with a particular focus structure though, as in the case of constituent ("wh") questions (Van Valin 2005: 171), the two are stored together as a specialized template.

Erteschik-Shir (2007) discusses some issues which remain to be addressed in future work on the syntax–pragmatics interface within the framework of RRG. She points out that the mapping from syntax to focus structure in RRG may be stipulated rather than motivated, and without constraints it would be too permissive (Erteschik-Shir 2007: 147). There is also the issue of whether it is always possible to define information (focus) structure solely in terms of syntactically defined units.

## 6.4. Conclusion

Much progress has been made but as research continues into the wide range of phenomena, including information structure, which exemplify the interaction between syntax and pragmatics, Bar-Hillel's (1971: 405) words of warning are still relevant: "Be more careful with forcing bits and pieces you find in the pragmatic wastebasket into your

favorite syntactico-semantic theory. It would perhaps be preferable to first bring some order into the contents of this wastebasket". The analysis of non-canonical syntax and its relation to context is key to defining and understanding the scope of pragmatics, the scope of syntax, and the organization of grammar as a whole.

## 7. Conclusion

This chapter has given an overview of syntax and its relationship with other components of the grammar. The modules which are proposed to comprise the theoretical construct of the grammar could be taken to define and delimit domains of enquiry and hence sub-disciplines of the field of linguistics. However, the issue of interfaces shows that this cannot always be the case. In this sense, interfaces are the theory-internal correspondent of the wider matter of inter-disciplinarity. Providing as it does insights into a wide range of empirical and theoretical issues, not least the structure of linguistic knowledge itself, investigation into the interfaces of syntax with other modules of the grammar represents an important area of contemporary research that will continue to stimulate debate between linguists from across the field working within a variety of frameworks.

## 8. Abbreviations

| | | | |
|---|---|---|---|
| BACK.INF | background information | LV | light verb |
| DO | direct object | PUNC | punctual |
| FACT | factual | VM | verb modifier |
| FS | final suffix | | |

## 3. Acknowledgements

This work was supported by a British Academy Postdoctoral Fellowship. I would like to thank Miriam Butt, and Susana Afonso, Mary Dalrymple, Bethwyn Evans, Tibor Kiss, Aditi Lahiri, Atsuko Masuda, Yo Matsumoto, Sandra Paoli and Nigel Vincent for their time, insights and comments on drafts of this chapter.

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