Information structure and its relation to syntax, semantics, and reference

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Contents

Foreword (17 March 2021)

This study, starting from section 1, is a reprint of Chapter 1 (Introduction) to Šimík (2021) – my cumulative habilitation submitted for consideration at the Charles University in January 2021 (expected defence: 2022). Despite the tight relation to Šimík (2021), this paper can be read and cited as a self-standing manuscript. The reader is kindly asked to pay attention to the following remarks:

- Unlike the introduction to Šimík (2021), this paper contains a self-standing bibliography.

- A section detailing the individual authorial contributions in collaborative papers, which has been included in the Introduction for purposes of habilitation evaluation, has been left out in this paper.

- The chapter-by-chapter overview (section 5) has been kept, as the individual chapters are frequently referenced in this paper and the reader might find it useful to take a quick look at what they are about.

- The chapters have all been (or soon will be) published, so the reader can read them even without having access to the habilitation.

- Formulations like "this habilitation" have mostly been replaced by the appropriate reference, namely Šimík (2021).

I hope that this paper could be of interest for a number of reasons. Besides the concise characterization of the core information-structural oppositions used especially in formal approaches to syntax and semantics – focus–background (2.1), given–new (2.2), and topic–comment (2.3) – it contains a survey of various other notions that have been used in information structure research, which includes a discussion of how these other notions are related to the core notions assumed here (section 2.5). Throughout this paper, I pay attention not just to the international discourse, but also to the various strands of information structure theorizing in the Czech linguistic tradition. By highlighting the main similarities and differences, I hope to contribute to the mutual understanding among different frameworks and approaches. Section 3 is a survey of the existing theoretical approaches to the interfaces between information structure and syntax (section 3.1) and information structure and semantics (section 3.2). I am not aware of a concise survey of this kind in the published literature. Hopefully it will be of some use to interested researchers.

I would like to express my gratitude to Jan Chromý, Eva Lehečková, Jakub Sláma, and Šárka Zikánová for their help and support.

1   Relation between information structure and syntax/semantics

The central research question of my cumulative habilitation (Šimík 2021) is formulated in (1).

(1)   What is the relation between information structure and syntax/semantics?

The habilitation represents an argument for the hypothesis in (2).

(2)   Information structure and syntax/semantics are related only very loosely.

Let me provide three simple examples which illustrate the hypothesis and which – among other phenomena – will be discussed in the chapters of Šimík (2021) at length. The first example concerns **word order**. Word order alternations, esp. in so-called free word order languages, have traditionally provided evidence that syntax, which generates the alternations, is tightly related to information structure, which motivates them. One such motivation comes from the hypothetical need to place given expressions before new ones. In Czech, for instance, patients are by default placed before goals, as illustrated in (3a). The reverse order (3b) is, however, readily available, or even required, if the goal – *(na) parapet* '(on) the windowsill' in (3) – has been mentioned in the immediately preceding discourse and is therefore discourse-given. If given expressions must precede new ones, this observation is accounted for. However, this hypothesis, which is an instance of a direct relation between word order (syntax) and information structure, must be contrasted with a competing hypothesis, whereby information structure is related to prosody and prosody, in turn, is related to word order. If given expressions must not bear prosodic prominence and if prominence is placed clause-finally, given constituents which would normally be clause-final will have to evacuate this position in order not to receive prosodic prominence. Two of the chapters in Šimík (2021) – chapter 4 [Šimík & Wierzba 2015] and chapter 5 [Šimík & Wierzba 2017] – address this issue and provide experimental evidence for the prosodic hypothesis.

(3)   a.   Postavil květináč   na parapet.
              placed   flower.pot on windowsill
              'He placed the/a flower pot on the windowsill.'
       b.   Postavil na parapet   květináč.
              placed   on windowsill flower.pot
              'He placed the/a flower pot on the windowsill.'

Many languages possess what is sometimes called **focus particles** or **focus morphemes**. The existence of such linguistic units – apparently dedicated to grammatical encoding of information structure – is often turned into an argument that (morpho)syntax and information structure collaborate closely. An example of such a focus particle is provided in (4). It comes from the Grassfields Bantu language Awing, in which constituents in focus can be preceded by the particle *lə́*.

(4)   Ayafor a-   yó- yíə   **lə́** ndé_F nɨ́   ŋkáp   ʒíə.
       Ayafor SM- F1- come LE house with money his
       'It is to the house that Ayafor will come with his money.'

Yet a closer empirical scrutiny – involving a detailed study of the morphological, syntactic, and semantic properties of the so-called focus particles – often reveal that their function is distinct from what we normally understand under "focus" and that treating them as "focus particles" is an inadequate simplification. In chapter 3 [Fominyam & Šimík 2017] we show that the Awing particle *lə́* does not just encode information structure, but rather contributes semantic presuppositions. Chapter 2 [Leffel et al. 2014] analyzes a focus morpheme in the Bantu language Basaá. While that morpheme comes quite close to a putative "focus particle", it involves a different

kind of an issue: the morpheme is not dedicated to encoding information structure; it takes the form of a personal pronoun. I interpret this as evidence that information structure does not access morphosyntax directly, but rather via the independently existing mechanism of reference.

My last example involves the relation between information structure and semantics and more particularly the **semantics of nominal phrases**. Many researchers have come to the conclusion that languages with no articles in their grammars can, nevertheless, express article semantics. One of the ways of achieving this is by resorting to information structure. More particularly, if a determinerless nominal phrase is topical, it is assigned the semantics of definite descriptions. This accounts for the kind of observation presented in (5) (the observation builds on the common idea that clause-initial (unaccented) nominal phrases are topics).

(5)   a.   Na stole je **kniha**.
             on table is book
             'There is **a** book on the table.'

       b.   **Kniha** je na stole.
             book   is on table
             '**The** book is on the table.'   (Krámský 1972: 42)

Using corpus evidence, chapter 7 [Šimík & Burianová 2020] confirms the tendency for clause-initial nominals to be interpreted as definites. This apparently direct information structure–semantics relation presents a problem for the hypothesis in (2). Can we be sure, however, that *being used* as definite descriptions really amounts to *having the same semantics* as definite descriptions? Using experimental evidence, chapter 8 [Šimík & Demian 2020] argues for a negative answer. More particularly, while clause-initial determinerless nominals are consistent with the pragmatics of definite descriptions, we have found no trace of definiteness semantics in them. This result is, after all, consistent with the central hypothesis of Šimík (2021).

Let me now take a step back and provide some **theoretical motivation** for the hypothesis. I take (2) to be the null hypothesis of a particular view of the grammatical system, one where information structure is part of discourse pragmatics, which in turn is part of how language is used – so-called linguistic PERFORMANCE, while syntax and semantics constitute a system that is largely independent of language use and is part of what is often called linguistic COMPETENCE. Proving the null hypothesis, or in this case proving the absence of a relation, can rightfully be considered a daunting task. It is therefore more helpful to think of the enterprise as finding out how far the hypothetical absence of a relation can bring us in terms of empirical coverage.

While the performance–competence dichotomy remains an axiom in the generative paradigm (which includes most formal semantics and (Neo-)Gricean pragmatics) and (post)structuralist approaches more generally, it has been criticized or even rejected in the usage-based paradigm (see, e.g., Bybee 2010; Diessel 2017; Divjak 2019).[1] It is not my intention to frame my habilitation as an argument for a particular paradigm for two particular reasons. First, the question of the relation between information structure and syntax/semantics divides even generative linguists (see section 3). Second, although the body of theoretical assumptions I rely on stems from generativism, I am very sympathetic to the usage-based enterprise and believe that the two approaches are more compatible than normally assumed. Finally, I believe the hypothesis is a meaningful answer to the research question in both paradigms.

Let me now unpack the core notions used in the research question and in the hypothesis, in order to fill them with more substance.

Information structure is understood as a set of discourse-pragmatic concepts relevant for structuring utterances in a context. I will work with three core concepts – FOCUS, GIVENNESS, and TOPICALITY, each of which enters into an opposition of its own – FOCUS–BACKGROUND, GIVEN–NEW, and TOPIC–COMMENT. These concepts will be defined in section 2 using tools stan-

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[1]For some philosophical and methodological underpinnings of this controversy, as reflected in the Czech linguistic discourse, see Čech (2005, 2012); Beneš (2015).

dard in formal semantics and pragmatics. Section 2 also introduces the core notions pertaining to reference.

Syntax is understood as a set of syntactic categories and features (properties of categories), their mutual relations, whether conventionally encoded (such as their mutual ordering – the so-called functional sequence) or emergent in a phrase structure (sisterhood, dominance, c-command), and the operations defined on them (such as agreement or movement). I work with a phrase structure syntax which is standard in generative grammar, but a good portion of Šimík (2021) is framework-independent and bears implications for all kinds of syntactic systems, including dependency grammars. This is so because in some of the studies syntax is reduced to word order, and hierarchical syntactic relations play only a minor role. An introduction to syntax is not part of this introductory chapter.[2]

My assumptions about **semantics** are embedded in a framework known as formal semantics and in the way it is coupled with generative syntax.[3] Syntax and semantics are considered to function in close cooperation, and although semantics primarily has an interpretive status – syntactic structures including the lexical meanings of their terminal nodes are used as input to deriving the truth-conditions, presuppositions, and conventional implicatures of sentences – it has become common to postulate semantically motivated (often phonologically empty) syntactic operators with more or less specified syntactic properties. I therefore take syntax and semantics to be essentially one integrated system.

Semantics needs to be distinguished from **pragmatics**, along the lines of Grice's (1975) seminal proposal and its Neo-Gricean incarnations. While semantics deals with meanings rooted in lexical items and the phrases and sentences constructed from them (particularly entailments, semantic presuppositions, and possibly conventional implicatures), pragmatics deals with meanings that arise as a consequence of the interaction of sentences (their form and semantics) with the properties of the situation in which they are uttered, including the properties of discourse participants, their mutual relations, their beliefs, wishes, and discourse intentions. The two core types of pragmatic meanings are pragmatic presuppositions (closely related to Stalnaker's 1972; 1973; 1974 common ground) and conversational implicatures.[4] My own assumptions about the semantics–pragmatics interface are – I believe – relatively unspecific and compatible with a range of approaches. What is important is that I consider information structure to be part of discourse pragmatics – a subfield of pragmatics that deals with utterances in relation to those that surround them (the context), with discourse development, discourse coherence, and the like.

The relation between **information structure and syntax** is tight if information structure concepts are represented as syntactic categories or features and thus affect or even determine syntactic relations and operations. It is loose if information structure concepts remain in the realm of discourse pragmatics and thus have no way of affecting syntactic relations and operations. Seen from the opposite perspective, syntax operates with no access to information structure. The relation comes about in an indirect and non-deterministic fashion.

Likewise, the relation between **information structure and semantics** is tight if infor-

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[2]I refer the interested reader to standard introductions such as Adger (2003), Haegeman (2005), or Koeneman & Zeijlstra (2018). Müller (2019: Chapter 4) provides a brief overview of current approaches in the generative framework, in the context of other syntactic theories, including dependency grammars (Chapter 11), which might be familiar to Czech syntacticians. The most comprehensive account of Czech syntax from the generative perspective to date is Veselovská (1995).

[3]The most influential introductory text to this syntax–semantic endeavor is Heim & Kratzer (1998). A recent and freely available alternative is Coppock & Champollion (2020). Other recent introductions – oriented more towards semantics and less towards the syntax–semantics interface – include Portner (2005); Elbourne (2011); Winter (2016). For a brief historical survey of how and in what context formal semantics came to exist, see Partee (2011).

[4]For a recent survey of (Neo-)Gricean pragmatics see Huang (2017). For a discussion of the semantics–pragmatics interface, see Schlenker (2016). For a survey of two core pragmatic inferences – implicatures and (pragmatic) presuppositions – see Davis (2019) and Beaver & Geurts (2011), respectively.

mation structure concepts are represented as semantic categories (such as quantificational operators), semantic relations (such as predication or quantification), or have a direct effect on semantic entailments (such as presuppositions). It is loose if information structure concepts are in principle independent of these core semantic notions and if any interactions between information structure and semantics are mediated in a highly constrained fashion.

In section 3 I will show – based on numerous examples of existing approaches to the syntax/semantics–information structure interface – that the "tightness" of the relation is a scalar rather than categorical property. The relation is completely tight if information structure concepts are represented as syntactic categories (such as information structural syntactic heads and phrases) or as semantic relations such as the relation between a predicate and its argument. It is completely loose if there is no information structure-related information in syntax or semantics whatsoever. Besides these two extremes, there is a whole range of approaches affording syntax and semantics some limited access to information structure concepts. An example of this is the idea that the syntactic structure of a clause is divided into two parts, each of which bears a certain information structural property, such as a topical vs. focal area.

My own **hypothesis**, expressed in a simplified way in (2), is that information structure is represented in syntax and semantics in a highly impoverished way, in the form of quasi-referential indices which have nearly no syntactic properties except that they index syntactic objects and can sometimes be realized by pronominal morphology (see chapter 2 [Leffel et al. 2014] and section 4). Any syntactic reflexes of information structure are thus argued to only be apparent and to come about indirectly – as a result of syntax complying with constraints that are in and of themselves independent of information structure. A prime example of this is the tendency for focused expressions to be placed clause-finally, which results from two independent constraints: clause-final placement of prosodic prominence (Daneš 1957; relation between syntax and prosody) and focus-internal placement of prosodic prominence (Daneš 1960; relation between prosody and information structure). The relation between information structure and semantics is hypothesized to be a little tighter, as information structure piggybacks on the semantic concept of referential indices/variables, as originally proposed by Kratzer (1991).

The central research question is by no means new. Most information structure researchers – independently of their theoretical convictions – have taken a stance on this issue. **Czech linguists** were ahead of others thanks to the long-standing and systematic interest in information structure, initiated by Mathesius (1907, 1939, 1941), coupled with relatively early interest in formal approaches to syntax and semantics, represented especially by Daneš (1964b) and his sentence and semantic patterns (culminating in Daneš & Hlavsa 1981) and Sgall (1967) and his and his colleagues' functional generative description. Daneš (1964b), following the spirit of Mathesius (1936, 1942), assumes a strict division between the grammar of *sentences,* represented in the form of abstract sentence patterns which only include syntactic and semantic information, and the information structure of *utterances* (or more precisely "utterance events") – particular realizations of sentences reflecting discourse-pragmatic properties. Sgall (1967) and colleagues, on the other hand, argue that information structure should be integrated within the syntactic description of sentences. The idea is, more particularly, that information structural properties are part of the tectogrammatical syntactic level, the level where sentential semantics is encoded.[5] Empirical support for this position comes from the close interaction between information structure and truth-conditional and presuppositional semantics (documented for Czech in Hajičová's 1973, 1974, 1984 work) – a phenomenon known since Jackendoff (1972) as association with focus. I will come to this issue briefly when discussing the relation between information structure and semantics (section 3.2).

The issue of syntax–information structure interface entered the **Chomskyan discourse** quite early, too (see e.g. Jackendoff 1972, whose position was very similar to that of Sgall and

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[5]The tectogrammatical level of the functional generative description corresponds to the deep structure in generative semantics (e.g. Lakoff 1972). See also Sgall et al. (1973).

Hajičová, but cf. Chomsky 1971), but the major incentive came with the advent of the so-called cartographic approach to information structure. Rizzi (1997), building on previous syntactic approaches to the phenomena of focus fronting and topicalization, defended a very strong position in this debate, in particular the idea that information structure concepts are represented as functional syntactic categories – Foc(us) and Top(ic) – with their dedicated position in the sequence of functional categories in the extended verb projection (the so-called syntactic "cartography" of the clause), capacity to project phrasal categories (FocP and TopP), carry formal features ([±foc/top]) triggering syntactic operations, etc. Rizzi's influential proposal has gained a lot of followers, but also triggered many critical reactions, thereby starting a fruitful and still ongoing debate. Among the prominent critics are Fanselow (2006), Neeleman & van de Koot (2008), or Horvath (2010), all of whom argued for a significantly weaker association between syntax and information structure or, indeed, no direct association at all. Thanks to the conflicting argumentation, the debate has become distinctly empirical and has recently been enhanced by experimental methods, a new tradition to which I subscribe, as is evident from Šimík (2021).

2 Core notions of information structure and reference

I will characterize three basic information structure notions – focus, givenness, and topic – and the associated clausal "partitions" they may give rise to – focus–background, given–new, and topic–comment. The relevance of these three notions (oppositions) has been fairly uncontroversial in formally oriented literature (generative syntax and formal semantics/pragmatics) in the past 20 years, mainly thanks to three influential contributions – Rooth's (1992) for focus, Schwarzschild's (1999) for givenness, and Reinhart's (1981) for topic (and, in addition, Büring's 2003 for contrastive topic). A well-respected, although somewhat more inclusive survey building on this tradition can be found in Krifka (2008).[6] My survey is complemented by a section on reference – the central notion mediating information structure (or more generally discourse pragmatics) and semantics and also the topic of some chapters of Šimík (2021).

The above-mentioned information structure notions are conceived of as discourse-pragmatic properties of linguistic forms – constituents or more generally (parts of) utterances. Their definitions crucially make no reference to form (morphology, syntax, prosody); for instance, definitions such as "focus is the final/accented constituent in the sentence" or "topic is the sentence-initial constituent" are not adopted. It is this strict divide between information structure (as part of discourse pragmatics) and form which makes the present research question possible and renders it non-trivial. It also provides grounds for cross-linguistic comparison: we can ask how information structure is expressed in individual languages without presupposing any particular formal device. Without going into detail, I should note that this is not a necessary property of information structure theories. Some theories – like the one of Firbas (1992) – take some aspects of form (word order, prosody, the form of referring expressions) to be part of what defines information structure (or functional sentence perspective in Firbas's terms). In this respect, my approach is closer in spirit to the one of Sgall and colleagues, who carefully distinguish between function and form (see Hajičová 2012 for relevant discussion), and is in line with the absolute majority of formally oriented approaches.

Let me finish this introduction by a brief disclaimer. The notions are defined in terms of their discourse pragmatics, but – possibly to the surprise of some readers – not relative to discourse participants (speaker and hearer) and their communicative intentions. Admittedly, the use of information structure does depend on the intentions and motivations of discourse participants. I would argue, however, that this is true not just of information structure but of all language use; the choice of particular morphemes, words, constructions, prosody, etc. – all of that can be performed more or less intentionally. The definitions assumed here are general and therefore

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[6]The article is more easily accessible as Krifka (2007). Other recent survey articles include Valldoví (2016) and Féry & Ishihara (2016a). See also Féry & Ishihara's (2016b) *Oxford handbook of information structure.*

compatible with a whole range of communicative intentions – from saying the truth, through doing that as effectively as possible, to trying to imply meanings without explicitly conveying them (trigger implicatures).

The rest of this section is organized as follows. The three notions of information structure are characterized in sections 2.1, 2.2, and 2.3, respectively. In section 2.4 I briefly discuss the possibility that the pool of information structure-related notions might eventually be reduced to a single core, a possibility entertained in the work of Wagner (2009, 2012b). In section 2.5 I sketch how the notions assumed here relate to a broader pool of information structure notions, including those entertained among Czech linguists. Finally, section 2.6 includes a survey of the core notions of reference.

2.1 Focus–background

A constituent is FOCUSED if it gives rise to alternative denotations relevant in the current discourse. In the first of Ben's responses (B$_1$) to A(lice)'s query in (6), the subject *Dave* is focused because it gives rise to the alternative denotation CELIA and possibly other relevant individuals, including A(LICE) and BEN. In Ben's second response the object *Paris* is focused because it gives rise to alternatives BERLIN, MOSCOW, etc.[7]

(6)   A   Did Celia visit Berlin?

        B$_1$ [Dave]$_F$ visited Berlin.

        B$_2$ Celia visited [Paris]$_F$.

In Rooth's (1992) terms, Ben's first answer (B$_1$) conveys two kinds of meaning, expressed in standard possible world semantics in (7):[8] (i) an ORDINARY SEMANTIC VALUE (marked by the subscript o) – the proposition that Dave visited Berlin – and (ii) a FOCUS SEMANTIC VALUE (marked by the subscript f) – the set of propositions that x visited Berlin, for any individual x. Ben's second response (B$_2$) has the same ordinary semantic value but differs in the focus semantic value; see (8). Notice also that in Rooth's (1992) system (and my assumptions are similar; see section 4) prosodic information is not part of the formal information that enters the semantic component; the prosody–semantics correspondence is mediated by F-marking.[9]

(7)   a. $[\![\text{Dave}_F \text{ visited Berlin}]\!]_o = \lambda w[\text{VISITED}(\text{DAVE}, \text{BERLIN}) \text{ in } w]$

        b. $[\![\text{Dave}_F \text{ visited Berlin}]\!]_f$

               $= \{\lambda w[\text{VISITED}(x, \text{BERLIN}) \text{ in } w \mid x \in D_e]\}$

               $= \{\lambda w[\text{VISITED}(\text{DAVE}, \text{BERLIN}) \text{ in } w],$
               $\quad \lambda w[\text{VISITED}(\text{CELIA}, \text{BERLIN}) \text{ in } w],$
               $\quad \lambda w[\text{VISITED}(\text{BEN}, \text{BERLIN}) \text{ in } w],$
               $\quad \dots\}$

(8)   a. $[\![\text{Dave visited Berlin}_F]\!]_o = \lambda w[\text{VISITED}(\text{DAVE}, \text{BERLIN}) \text{ in } w]$

        b. $[\![\text{Dave visited Berlin}_F]\!]_f$

               $= \{\lambda w[\text{VISITED}(\text{DAVE}, x) \text{ in } w \mid x \in D_e]\}$

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[7]I use the following notational conventions. In running text, italics indicate object language (words, constituents, (parts of) utterances). Underlining indicates prosodic prominence. Where relevant, small caps indicate metalinguistic translations of the corresponding object language (e.g. the word *Alice* denotes/refers to the individual ALICE). The subscript F indicates the focused expression/constituent. These conventions hold for this introductory chapter. Further chapters/papers introduce their own conventions.

[8]The foundations of possible worlds semantics were laid by Kripke (1963). It has become a standard part of the formal semantic toolbox and is handled in most semantic textbooks; see footnote 3.

[9]For a system that does away with any kind of F-marking and lets prosody be interpreted directly, see Büring (2015).

$$\begin{aligned}
= \{ &\lambda w[\text{VISITED}(\text{DAVE}, \text{PARIS}) \text{ in } w], \\
&\lambda w[\text{VISITED}(\text{DAVE}, \text{BERLIN}) \text{ in } w], \\
&\lambda w[\text{VISITED}(\text{DAVE}, \text{MOSCOW}) \text{ in } w], \\
&\ldots \}
\end{aligned}$$

The non-focused part of a clause is referred to as the BACKGROUND (to its focus). The background in B_1 is *visited Berlin;* the background in B_2 is *Dave visited.* Informally speaking, the background is what remains constant in the focus semantic value. It is defined negatively (= whatever is not focused) and it does not have to correspond to a constituent in the syntax (cf. the utterance *Dave [visited]$_F$ Berlin*). Some researchers have argued or assumed that the background gives rise to an existential presupposition (see esp. Geurts & van der Sandt 2004 for explicit discussion); for B_1, the presupposition would be that somebody visited Berlin ($\exists x[\text{VISITED}(x, \text{BERLIN}) \text{ in } w_0]$). This assumption is too strong; it would rule out utterances such as *[Nobody]$_F$ visited Berlin,* which cannot possibly presuppose that somebody visited Berlin. For more arguments, see the responses to Geurts & van der Sandt (2004) in the dedicated issue of *Theoretical Linguistics* and Sæbø's (2016) recent survey. Also see section 3.2. There is an ongoing controversy on whether the background is always given; see section 2.4.

Rooth (1992) argued that this "weak" alternative semantics of focus, which systematically correlates with prosodic prominence, underlies various uses of focus. The core uses include answerhood focus, used in answers to wh-questions (9a), contrastive focus, which involves contrasting two or more alternatives all of which are explicitly mentioned or at least highly contextually salient (9b), corrective focus, involving the negation of previously mentioned alternatives (9c), identificational focus, identifying the correct value among possible alternatives (9d), or bound focus, involving association with so-called focus-sensitive particles (9e).

(9)   a.   A   Who visited Berlin?   *answerhood*
               B   [Dave]$_F$ visited Berlin.

       b.   A [Czech]$_F$ diplomat spoke to a [Russian]$_F$ diplomat.   *contrastive*

       c.   A   I heard that Celia visited Berlin.   *corrective*
               B   No, [Dave]$_F$ visited Berlin.

       d.   It was [Dave]$_F$ who visited Berlin.   *identificational*

       e.   Only/Also/Even [Dave]$_F$ visited Berlin.   *bound*

The lines between these different uses are not sharp. For instance, contrast can be a property of basically all of the above-mentioned focus uses; correction can be accompanied by the use of focus-sensitive particles, etc.

Different "sizes" of focus are sometimes distinguished, giving rise to terms such as narrow or broad focus, as illustrated in (10). The current thinking is that these are mere taxonomic categories and that there is no "deep" category of focus size.

(10)   a.   A   Which city did Dave visit?   *narrow/object focus*
               B   Dave visited [Berlin]$_F$.

       b.   A   What did Dave do?   *broad/VP focus*
               B   Dave [visited Berlin]$_F$.

       c.   A   Why did Alice call you?   *broad/clause-size focus*
               B   Because [Dave visited Berlin]$_F$.

As already mentioned, the primary **formal expression** of focus is prosodic prominence – at least in English and many other European languages. The generalization is that focus must

contain the most prominent stress in the clause (for Czech, see Daneš 1959, 1960).[10] Chapter 6 [Groeben et al. 2017] attempts to refine the definition of the focus–stress correspondence. The idea that focus-related alternative semantics is expressed by morphological means in some languages remains controversial. Although many scholars have made such assumptions, these rarely (if ever) survive careful empirical scrutiny. As pointed out by Fanselow (2006) or Szendrői (2017), putative focus morphemes are rarely an obligatory part of every sentence (cf. prosodic prominence) and if they occur, they contribute more than mere focus alternatives. In Šimík (2021), the issue is discussed in chapter 2 [Leffel et al. 2014] and chapter 3 [Fominyam & Šimík 2017]. The issue of putative syntactic focus marking is similar. Focus-related syntactic manipulations (such as focus fronting) are rarely (if ever) obligatory and if they occur, they express more than mere focus alternatives.

The brief introduction above will hopefully be sufficient for the reader to understand what is understood in Šimík (2021) by the term focus. The crucial pragmatic concept behind focus involves alternative denotations. Concepts like new information, important information, or the like may be related (see section 3 for some discussion), but are by no means an essential part of what focus means in Šimík (2021).

The study of the concept of focus has become a rich field of its own. I cannot possibly do justice to everything, so let me just finish by providing some references for the interested reader. Alternative semantics for focus has – to some extent – competed with the so-called structured-meanings approach (e.g. Krifka 2001), but the two are not incompatible and can even be combined in a single system; see Krifka (2006). The alternatives-based approach to focus semantics has been a highly successful endeavor and has recently been supported by psycholinguistic evidence (Braun & Tagliapietra 2010; Gotzner et al. 2016; Gotzner 2017; a.o.). Besides Rooth's (1992) two-dimensional approach (working with two semantic values), it has been implemented within a question-based approach (Velleman & Beaver 2016) or the inquisitive-semantic approach (Ciardelli et al. 2019). See also Riester et al. (2018) and De Kuthy et al. (2018), who have taken the question-based approach as the departure point for corpus annotation studies. Personally, I explore Kratzer's (1991) index-based variant of Rooth's approach; see section 4. For a recent survey of the interface between focus and prosody, see Wagner (to appear). For more information on focus sensitive particles and quantifiers, see Beaver & Clark (2008); Beck (2016).

2.2 Given–new

A constituent is GIVEN if it has a synonymic or hyponymic antecedent in the immediately preceding discourse. In Ben's response in (11), the word *walnuts/nuts* is given because Alice's lead-in utterance contains the word *walnuts,* a synonym/hyponym of *walnuts/nuts* in Ben's utterance, respectively.[11] Whatever is not given is NEW. In Ben's utterance, it is the adverb *unfortunately,* the subject+copula *I'm,* and the predicate *allergic to.*

(11) A   I prepared a salad with goat cheese and walnuts.
      B   Unfortunately, I'm <u>allergic</u> to [walnuts]$_G$ / [nuts]$_G$.

For comparison, consider the exchange in (12). In Ben's utterance *walnuts* is not given because there is no synonymic or hyponymic antecedent; the word *nuts* in Alice's utterance is only a hyperonym.

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[10]This holds only in the specific (albeit most frequent) case in which the focus–background structure corresponds to the whole clause. If it corresponds to, say, a nominal phrase, as in (9b), then focus contains the most prominent stress in the nominal phrase.

[11]Synonymy is understood as semantic identity. From this perspective, it is coherent (albeit unusual) to say that one occurrence of *walnuts* is synonymic with another occurrence of *walnuts.*

(12) A   I prepared a salad with goat cheese and nuts.

      B   I'm allergic to <u>walnuts</u>. (I hope you didn't use those?)

It is clear from the contrast above that the **formal expression** of givenness involves the lack of prosodic prominence. Ben's response in (12), where nothing is given, exhibits default prosody – stress on the final constituent. In (11), where that same constituent is given, stress is realized on the predicate *allergic.* Notice that this is, arguably, not because *allergic* is focused (no alternatives to the predicate need to be evoked, although they presumably could), but because its argument *walnuts/nuts* is given. What (13) shows is that there is no general ban on stressing given constituents. Given constituents must not be the most prominent ones in the clause. They may carry phrasal stress – esp. in prenuclear positions – as long as sentence stress is realized elsewhere.[12]

(13) A   I prepared a salad with goat cheese and walnuts.

      B   [<u>Walnuts</u>]G / [<u>Nuts</u>]G are <u>great</u>!

While there is arguably no documented case of morphological givenness marking, it has often been argued that givenness may be encoded by word order.[13] It has virtually been a dogma – shared across frameworks and more than a century of research – that utterances are organized in accordance with the so-called given-before-new principle. An example of this is provided in (14), which exhibits a non-canonical predicate-final order. Compare this to the canonical order of (15), in which there is nothing given.

(14) *Czech*

      A   Připravila jsem   salát s   kozím sýrem a   vlašskými ořechy.
          prepared AUX.1SG salad with goat   cheese and wal-   nuts
          'I prepared a salad with goat cheese and walnuts.'

      B   Já jsem bohužel   na {[vlašáky]G / [ořechy]G} <u>alergický</u>.
          I   am unfortunately to   walnuts   nuts   allergic
          'Unfortunately, I'm allergic to walnuts/nuts.'

(15) *Czech*

      A   Připravila jsem   salát s   kozím sýrem a   ořechy.
          prepared AUX.1SG salad with goat   cheese and nuts
          'I prepared a salad with goat cheese and nuts.'

      B   Já jsem alergický na <u>vlašáky</u>. (Snad   jsi   tam žádné nedala?)
          I   am allergic   to walnuts   hopefully AUX.2SG there any   NEG.gave
          'I'm allergic to walnuts. (I hope you didn't put any in?)'

An issue that immediately springs to mind is that there is a prosodic confound. Ben's utterance in (14) involves a non-canonical order, but it is also characterized by the lack of sentence stress on the given constituent. Chapter 4 [Šimík & Wierzba 2015] and Chapter 5 [Šimík & Wierzba 2017] evaluate the two competing hypotheses experimentally and conclude that even in Slavic languages, which are characterized by free constituent order, givenness is primarily expressed prosodically, not by word order.

Givenness can be a property of constituents of all types and sizes, not just nominal phrases. The examples in (16) illustrate VP- and clause-sized givenness, respectively. Also in these cases it holds that the given constituent – no matter how big – does not carry sentence stress.

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[12]When phrasal vs. sentence stress need to be distinguished in this introduction, I use single vs. double underlining, respectively.

[13]There are arguments that some languages use morphological encoding for background to focus; see e.g. Grubic (in preparation). To the extent that background must be given (cf. section 2.4), this may also be an argument for morphological givenness encoding.

Synonymy is defined as semantic identity. For predicates, this means identical extension – in (16a), ⟦prepare a salad⟧ = ⟦prepare one⟧; for propositions, it means mutual entailment. For predicates, hyperonymy is defined in terms of the proper subset relation, whereby the extension of the given constituent is a proper superset of the extension of its antecedent. For propositions, it is defined in terms of asymmetric entailment, whereby the given clause is entailed by its antecedent; in (16b), ⟦Dave prepared a salad⟧ entails ⟦he prepared something for the brunch⟧. As is clear from the examples, givenness is a property that cannot be determined by merely inspecting the lexical meanings. The resolution of the reference of anaphoric expressions (*one, he*) and various pragmatic presuppositions (that *prepare a salad* in (16a) amounts to the pragmatically enriched meaning 'prepare a salad for the brunch') plays an important role.

(16) a. I was worried that nobody would prepare a salad, but fortunately, <u>Dave</u> [prepared one]$_G$.

b. Dave prepared a salad and Celia <u>knew</u> [he prepared something for the brunch]$_G$.

The information structural category of givenness must not be conflated with the semantic categories of referentiality or presupposition. Given expressions do not need to be referential and need not invoke any presupposition. In our examples above, e.g. in (11), the nominal *nuts* in Ben's response is given without being referential or semantically anaphoric. Ben does not intend to convey that he is allergic to the particular walnuts that Alice put into the salad; he says that he is allergic to nuts in general. The fact that predicates or clauses can also be given further supports this point. The implication does not hold in the opposite direction either: it is not the case that referential/presuppositional expressions, such as definite descriptions, are automatically given. This is illustrated in (17) (which can be understood as a continuation of, say, (13)), where the noun phrase *the blue bowl* is new despite being formally definite, semantically referential, and possibly (visually) identifiable by and familiar to both Alice and Ben in the discourse situation.

(17) A I'll put the salad into the blue <u>bowl</u>.

These considerations support the presently entertained strict division between semantics and discourse-pragmatics.

In sum, givenness is defined in terms of a semantic relation (synonymy or hyperonymy) to a linguistic antecedent. This notion of givenness is, admittedly, relatively narrow, but has the advantage of having a well-detectable formal effect, namely the lack of prosodic prominence. Other notions often implicated in discussions of givenness, e.g. the psychologically rooted concept of salience or activation, or the above-mentioned referentiality, familiarity, or identifiability, which in turn belong to the realm of semantics and pragmatics, are only loosely related to the presently assumed information structural notion of givenness. See section 2.5 for a brief discussion of notions surrounding the concept of reference.

The literature on the notion of givenness assumed here is relatively sizeable. Chafe (1974, 1976) is sometimes credited with establishing givenness as a *bona fide* information structure category, defined in terms of previous mention, and as independent of topicality, focus, but also referentiality/definiteness (allowing non-referential/indefinite given constituents). The pioneering work on the prosody of givenness includes Ladd (1980, 1983), who argued that the givenness of constituents has an effect on prosody that cannot be attributed to other information structural categories such as focus or contrast. The notion was used under the term "c-construability" by Rochemont (1986), who is also the author of the most recent survey article on givenness (Rochemont 2016). Schwarzschild's (1999) study was a major incentive for the integration of givenness into formal semantics and pragmatics. It also initiated debates about the relation between givenness and focus, which have culminated in the work of Wagner (2012b). Givenness has mostly been defined in terms of (generalized) entailment (partly reflected by the above discussion of synonymy and hyperonymy; see also chapter 5 [Šimík & Wierzba 2017]).

While Schwarzschild (1999) and Wagner (2012b) define givenness as being inherently tied to focus, Kratzer & Selkirk (2020) offer a self-standing entailment-based definition, also assumed (in an earlier version) in the present work. The interface between givenness and syntax (word order) was explored in Neeleman & Reinhart (1998), Wagner (2006), Kučerová (2007, 2012), or Stevens (2013), and is also the topic of chapter 4 [Šimík & Wierzba 2015], chapter 5 [Šimík & Wierzba 2017], and partly chapter 6 [Groeben et al. 2017]. For a corpus-based study of givenness and its interaction with prosody, see e.g. Baumann & Riester (2013) and the references therein. The impact of givenness and prosodic manipulations on brain activity during sentence processing was studied, e.g., by Schumacher & Baumann (2010) or by Baumann & Schumacher (2020).

2.3   Topic–comment

A constituent is the TOPIC of an utterance/sentence (also "sentence topic") if its denotation is what the utterance is about. The rest of the utterance is referred to as the COMMENT, which is defined as what is being said about the denotation of the topic. The decision to formulate an utterance as being *about* some entity is a speaker's decision closely related to the properties of the current discourse, which makes aboutness part of discourse pragmatics. In B_1, Ben introduces Celia as a referent of particular interest to the current discourse. The pronominal *she,* referring to Celia, is then the topic of Ben's second utterance, with the rest – *didn't show up at Dave's birthday party* – being the comment.[14]

(18) B_1 I'm worried about Celia.
         B_2 She$_T$ didn't show up at Emily's birthday party.

Since Reinhart (1981), the ABOUTNESS relation is typically understood in terms of discourse representation theory (Kamp 1981; Kamp & Reyle 1993), where the common ground (i.e., discourse participants' shared beliefs) is organized on "file cards" belonging to individual referents (see e.g. Krifka & Musan 2012b).[15] If *she* is the topic of B_2, for instance, the information that Celia didn't show up at Emily's birthday party will be stored on Celia's file card. I find this characterization – however common – lacking, as it seems inadequate not to store the relevant information on the cards of the other referents mentioned as well – that of Emily's and that of Emily's birthday party. Suppose, for instance, that Alice is Ben's addressee in (18). If somebody later asks Alice what she knows about Emily's birthday party, she will experience no difficulties to convey the relevant information that Celia didn't show up at the party without any obvious motivation to assume that Alice had to "draw" this information from Celia's file card. In other words, the file card-based aboutness relation seems to be too weak in that it fails to single out the topic: utterances tell us information not just about the topic referent, but about any referent mentioned.[16]

It is perhaps no wonder that this overly weak topic notion has received relatively little empirical support over the many years of research (see Büring 2016b for a recent critical evaluation; cf. Tomioka's to appear carefully optimistic view). It has been noticed repeatedly that the putative diagnostics for aboutness topic in fact diagnose more specific topic notions – perhaps such that they are closer specifications of the baseline aboutness relation.[17] These more specific

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[14]For some of the studies in Šimík (2021), the notion of topic situation is particularly important. See section 2.6 for some discussion.

[15]While Reinhart's (1981) contribution introduced aboutness into formal semantics and pragmatics, the idea of defining topic via aboutness is older; see, e.g., Ammann (1925–28), Mathesius (1939), Kuno (1972), Sgall et al. (1973), or Gundel (1974).

[16]For some critical discussion of aboutness, see, e.g., Jacobs (2001).

[17]A parallel to Rooth's (1992) weak focus notion and its pragmatic specifications offers itself. Nevertheless, while alternatives-inducing focus has a clear formal (prosodic) expression in many languages, this is demonstrably not the case for aboutness topic.

notions include continuation topic or shift topic (cf. the issue of "thematic progression"; Daneš 1974a), frame setters, and the notion of contrastive topic.

Büring (1997, 2003) is widely considered the father of the modern formal notion of contrastive topic.[18] According to his proposal, a CONTRASTIVE TOPIC is semantically closely related to Rooth's (1992) focus in that it gives rise to alternative denotations. The difference is that while the background to focus is semantically constant (see section 2.1), the comment to a contrastive topic necessarily contains a focus. Utterances with contrastive topics therefore give rise to two kinds of alternative denotations – Büring's (2003) CONTRASTIVE TOPIC-VALUE (CT-value), which in turn contains a set of Rooth's (1992) focus semantic values – one focus semantic value (set of alternative propositions) for each CT-alternative.

Consider the minimal pair in (19). The first version of Ben's response (B_1) is an ordinary answer to the stated wh-question, resolving Alice's dilemma of which of the two friends showed up (say, at Emily's birthday party). Out of the two focus alternatives jointly implied by the wh-question and the sentence stress on *Dave* (ending in a falling tone), Ben chooses one, entailing that Dave showed up and, by Gricean pragmatic reasoning, Alice can conclude that Celia did not. Ben's other response (B_2) contains two accents – the prenuclear one on *Dave* – followed by a rising tone – and the nuclear one on *did,* ending in a falling tone. The prenuclear rising accent gives rise to contrastive topic alternatives which correspond to two sets of focus alternatives containing two propositions each, as indicated in (i) under B_2. By placing the rising accent on *Dave,* Ben explicitly answers only one part of Alice's question, namely whether Dave showed up (he did), while remaining agnostic (at least for the moment) about the other part, namely whether Celia showed up. Ben thus decides to "divide" Alice's question into two subquestions – one about Dave and the other about Celia – and only answers one of them.

(19) A Who showed up – Dave or Celia?

  B_1 [Dave↓]$_F$ did.

  (i) $\{\lambda w[\text{SHOWED UP}(\text{DAVE}) \text{ in } w], \lambda w[\text{SHOWED UP}(\text{CELIA}) \text{ in } w]\}$

  focus alternatives

  (ii) $\lambda w[\text{SHOWED UP}(\text{DAVE}) \text{ in } w]$ *entailment*

  (iii) $\lambda w[\neg\text{SHOWED UP}(\text{CELIA}) \text{ in } w]$ *implicature*

  B_2 [Dave↑]$_{CT}$ [did↓]$_F$.

  (i) $\{\{\lambda w[\text{SHOWED UP}(\text{DAVE}) \text{ in } w], \lambda w[\neg\text{SHOWED UP}(\text{DAVE}) \text{ in } w]\},$
  $\{\lambda w[\text{SHOWED UP}(\text{CELIA}) \text{ in } w], \lambda w[\neg\text{SHOWED UP}(\text{CELIA}) \text{ in } w]\}\}$

  contrastive topic alternatives

  (ii) $\lambda w[\text{SHOWED UP}(\text{DAVE}) \text{ in } w]$ *entailment*

  (iii) $\lambda w[\text{SHOWED UP}(\text{CELIA}) \vee \neg\text{SHOWED UP}(\text{CELIA}) \text{ in } w]$ *implicature*

In the example just given, the contrastive topic is the subject and the focus lies on the auxiliary, expressing polarity. At the same time, the comment to the contrastive topic happens to be identical to the focus. That, of course, is just an example. Both the size of focus and the size of contrastive topic can in principle be arbitrarily large and the focus can be just a proper part of the comment. Example (20) represents a case where the comment (subscripted as C) belonging to the contrastive topic contains the focus as its proper subpart. Such comments are characterized by having constituents whose denotation remains constant in both the CT-value and the focus semantic value.

(20) [The man suspected of a murder]$_{CT}$ [shouted at [the judge]$_F$]$_C$ and [the judge]$_{CT}$ (in turn) [shouted at [his advocate]$_F$]$_C$.

A particularly popular way of representing contrastive topics, initiated by Büring (2003), is by means of so-called discourse trees (Roberts 1996, 2012). Under this view, focus gives rise to a set

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[18]Contrastive topic in Czech was studied by Hajičová et al. (2003) and Veselá (2007).

of propositional alternatives which correspond to the meaning of a wh-question, and contrastive topic gives rise to a set of question alternatives (a set of sets of propositional alternatives), which in turn correspond to the meaning of a multiple wh-question. Illustrative discourse trees representing the propositional and question alternatives of the two examples in (21) and (22) are provided in Figure 1 and Figure 2, respectively.

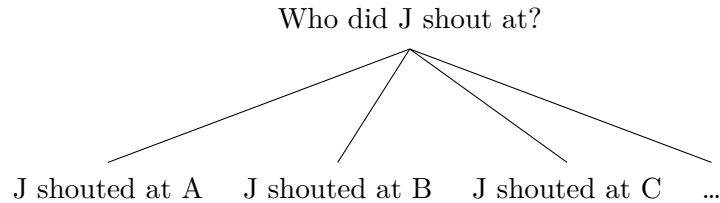(21)   The judge shouted at [the advocate]$_F$.

Who did J shout at?

J shouted at A   J shouted at B   J shouted at C   ...

Figure 1: Discourse tree representing the focus semantic value of (21)

(22)   [The judge]$_{CT}$ shouted at [the advocate]$_F$.

Who shouted at who?

Who did J shout at?   Who did K shout at?   ...

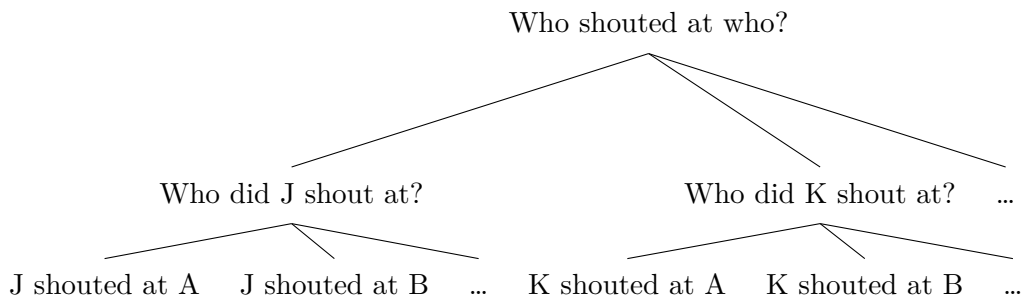J shouted at A   J shouted at B   ...   K shouted at A   K shouted at B   ...

Figure 2: Discourse tree representing the CT-value of (22)

Büring's (2003) semantics for contrastive topics is general enough to be considered to lie at the heart of various (contrastive) topic types. On the most neutral use, an utterance containing a contrastive topic addresses one subquestion in a discourse tree like Figure 2, while leaving the other (sibling) subquestions unanswered. This is the case of B$_2$ in (19). Another type of contrastive topic use is one where two or more subsequent/coordinated utterances address multiple sibling subquestions, each being about a different topic value. This is the case in (20). Contrastive topics can be further semantically or pragmatically specified by the use of various constructions, particles, or connecting devices. A relevant Czech example is provided in (23). The clause-initial particle *zato* (or its shorter variant *to*) precedes a contrastive topic. Importantly, however, it can only accompany a contrastive topic if a sibling subquestion (about a different referent) has already/just been answered. Placing *(za)to* before *Alice,* even if the right prosody is used, is infelicitous, if at all interpretable.

(23)   Alice   byla za pět minut   venku. (Za)To [Bena]$_{CT}$ [si   tam   nechali půl
        Alice.NOM was in   five   minutes outside PRT   Ben.ACC   REFL there kept   half
        hodiny]$_F$.
        hour
        'Alice was inside only for five minutes. Ben, they kept in for half an hour.'

This behavior of *(za)to* is of course reminiscent of the behavior of focus-sensitive particles. A focus-sensitive particle operates on focus alternatives and generates an inference based on them (see section 2.1); *also,* for instance, conveys that there is an alternative proposition other than

the uttered one that is true. In a parallel fashion, a contrastive topic-sensitive particle operates on the set of alternative subquestions and conveys something about them; the Czech *(za)to,* in particular, conveys that a different subquestion than the one addressed by the subsequent utterance has just been answered.

For recent surveys on the notion of (contrastive) topic, see the already cited Büring (2016b) and Tomioka (to appear). These papers contain a wealth of references and a rich discussion of different topic constructions, particles, and types. Technical alternatives and possibly improvements to Büring's (1997, 2003) original proposal can be found in Wagner (2009, 2012a) and Constant (2014), both of whom seek to reduce the notion of contrastive topic to the notion of focus, building on the fact that both imply alternative denotations. Cook & Bildhauer (2011, 2013) report on German annotation studies and the largely failed attempts to come up with a quality procedure of identifying aboutness topics in corpora. These results underscore the worry (expressed e.g. in Büring 2016b) whether plain aboutness topic is a real linguistic category at all.

2.4 An aside on a potential unification

Having focus, givenness, and topic in one's information structural toolbox has proved extremely useful. Given the cross- and intra-linguistic variety of strategies of expressing information structure, it is likely that multiple information structural notions are needed. Still, plausible and relatively successful attempts have been made at reducing the ontology to a single opposition – that of focus–background. The linguist who deserves the credit for contributing the most to these reductionist efforts is Michael Wagner. Without going into detail, let me briefly suggest how a reduction to a single opposition works.

Unifying focus and givenness

Consider the simple conversation in (24). In Ben's response, *Celia* is the focus and the rest of the utterance – *baked one* – is the background. Yet the background is not just a background to a focus, it is also given according to the standard definition (see section 2.2).

(24)   A   Who baked a cake?
       B $[Celia]_F$ $[baked one]_{B/G}$.

Indeed, cases of (partly) new backgrounds are not easy to find and typically do not sound very natural. Example (25), for instance, would be relatively natural if *for Dave* were treated as a contrastive topic and hence not part of the background. Making it part of the background amounts to saying that Ben, effectively, treats Alice's question as one about baking a cake *for Dave,* not just baking a cake in general, because all the focus alternatives contain the benefactive. This is not impossible – but also not easy – to accommodate. But once such focus alternatives are accommodated, one could argue, the phrase *for Dave* is *treated* as given. The prosodic realization of Ben's response in (25) might support this.

(25)   A   Who baked a cake?
       B $[Celia]_F$ $[[baked one]_G$ for Dave$]_B$.

Wagner's (2012b) response to such and similar considerations is to postulate that the background to a focus is always given. Importantly, the implication is bidirectional according to Wagner (2012b). He states that the syntactic sister of a given constituent is automatically focused. In other words, focus and givenness always go hand in hand. The position is further supported by the formal realization of focus and givenness – while the former must contain stress, the latter must not.

Wagner's (2012b) hypothesis is attractive but not generally accepted. Chapter 6 [Groeben et al. 2017] presents an argument for treating focus and givenness separately.

Unifying focus and contrastive topic

There is a notable semantic similarity between focus and contrastive topic – both involve the implication of alternative denotations. The difference is between the focus's background and the topic's comment: only the latter contains another alternatives-evoking constituent. Wagner (2009, 2012a) proposes that contrastive topic is nothing else than a focus with a background which involves another focus–background pair. See the approximation in (26) and consult Wagner (2012a) for a proper formal implementation.

(26) $[\text{Celia}]_{F1}$ $[[\text{baked}]_{B2}$ $[\text{a cake}]_{F2}]_{B1}$.

An idea similar in spirit but implemented differently can be found in Constant (2014).

2.5   Relation to notions used elsewhere

The three notions of information structure characterized above are, of course, not the only ones that have been used. The landscape of information structure notions is extremely rich, both conceptually and terminologically. The purpose of this section is to show how other information structure notions relate to the ones used here and thereby provide a bridge to other frameworks, theories, or approaches to information structure. Upon reading the following lines, it is important to keep in mind that there are two kinds of deviations from the approach taken here: (i) terminological ones – different terms for essentially the same concepts, in which case the different use of terminology often implies allegiance with a different framework or theory, and (ii) conceptual ones, which come in two flavors – either notions that cut the essentially identical information structural "pie" in a different way (sometimes using the same terms), or notions covering concepts that have not been covered above, implying a broader or different perspective of what information structure is.

The terminological and conceptual survey below is by no means exhaustive. For other attempts and perspectives see, e.g., Daneš (1974b); Chafe (1976); Molnár (1993); Kruijff-Korbayová & Steedman (2003); Krifka (2008); Krifka & Musan (2012a); Hajičová (2012).

I start by discussing the terms used here (information structure, focus, givenness, and topic) and point out the different ways they have been defined or understood. Then I move on to other terms and show how the concepts they stand for relate to the ones that I have assumed.

Information structure   The term information structure originated in Halliday (1967), for whom it had a narrower extension – it only referred to the given–new/focus opposition, which overlapped with the background–focus opposition (which later became dominant in formal approaches). The topic–comment division, considered a communicative rather than information status device, fell outside of information structure proper and was referred to by Halliday by theme–rheme (see below). An analogous division had been previously made by Daneš & Dokulil (1958) and can be traced back to Mathesius (1939). Halliday's understanding of information structure survived for quite some time (see e.g. Sasse 1987), but its meaning has gradually broadened to the present one – encompassing all three oppositions.[19]   My conjecture is that a major contributor to this broadening was Lambrecht's (1994) monograph, entitled *Information structure and sentence form,* which has been influential across different frameworks and incorporated many previous insights from both the formal and functional perspective. Recent works that have further contributed to the standardization of the term information structure include Krifka (2008), Vallduví (2016), and Féry & Ishihara (2016b).

Focus   Jackendoff's (1972) focus–presupposition opposition corresponds to Halliday's (1967) information structure – the new/focus–given opposition. Focus is thus understood in terms of

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[19]The current broad understanding of information structure arguably has its roots in Chafe's (1976) notion of information packaging; see below.

newness (Jackendoff 1972: 3). In formal linguistics, this approach has largely been replaced by Rooth's (1985, 1992) alternatives-based approach, where focus and newness are orthogonal (focused expressions may also be given; cf. section 2.4 for a dissenting view). There have also been attempts to identify the notion of focus with some core semantic concepts, such as the nucleus of (adverbial) quantifiers (where the background corresponds to the quantificational restrictor; see Partee 1992, Herburger 2000, and also section 3.2) or as the predicate (with the background being the subject; see Ogihara 1987; Wedgwood 2003, 2006; É. Kiss 2006; cf. section 3.2), which is reminiscent of very early treatments of information structure in terms of predication (Weil 1844; Paul 1880). While alternatives-based accounts admit non-trivial interactions of focus (in terms of alternatives) with quantification and predication, the relation is not a direct one (see Beaver & Clark 2008 for relevant discussion). Yet another approach to focus has to do with the idea (in principle inverse to the predication approach) that sentences are represented as ordered pairs of the form ⟨focus, background⟩, where the background denotes a predicate and the focus its argument. This so-called structured meanings approach to the focus–background structure, defended in Dahl (1974), von Stechow (1982, 1991), or Krifka (2001) has enjoyed an intensive comparison with the alternatives-based approach. According to Krifka (2006), the two approaches are not incompatible and can even complement each other. Sgall and colleagues (see, e.g., Sgall et al. 1973, 1986) have always resorted to a single topic–focus opposition (originally called topic–comment), with a relatively broad understanding of both notions. In their approach, focus can stand for newness, comment, as well as for focus in the sense used here. Their "topic–focus articulation" is complemented by Firbas's (1971) concept of communicative dynamism (see below). For Erteschik-Shir (1973, 1997, 2007), focus is the part of an utterance to which "the speaker intends to direct the attention of his/her hearer(s)" (Erteschik-Shir 2007: 38). This essentially cognitive definition of focus does not find a direct correlate in the notions assumed here, which are more narrowly linguistic, but it is likely that the activation of semantic alternatives correlates with attention attraction in sentence processing; in other words, the alternatives-based approach is not in conflict with an attention-based approach, they might well be two facets of a single notion.[20] Lastly, some linguists understand focus in terms of importance, considering it the most important part of the utterance. This view was common in the early days of studying information structure (see e.g. Trávníček 1937; Mathesius 1947; Daneš 1957) and is occasionally still assumed, esp. in the Brno school (Svoboda 2007). There is no obvious correlate of importance in my approach. I have not yet seen a way of operationalizing the notion of importance so that it becomes clearly detectable or testable.

Givenness The notion of givenness has had a very complicated history. The extension of the term has varied significantly across approaches and frameworks. The present approach, where givenness is understood in terms of a relation to a discourse antecedent (though not necessarily a referential one) – called discourse givenness for the current purpose – is among the narrowest ones. Its major advantage is a relatively tight relation to the lack of prosodic prominence. As mentioned above, Halliday (1967) did not distinguish between givenness and background to focus, an approach recently revived in Wagner (2012b). A focus-independent notion of discourse-related givenness was assumed, e.g., in Chafe (1976), Ladd (1980), and Rochemont (1986) (the last under the term c-construability). A broader notion of givenness – encompassing not just what was previously mentioned, but also what is known or taken for granted by the discourse participants (a notion related to Stalnakerian 1973 common ground) was assumed, e.g., in Haviland & Clark (1974); Clark & Haviland (1977). Constituents which are given in this weaker sense (e.g. definite descriptions) can be easily prosodically prominent.[21] Givenness is sometimes – esp. in psycholinguistic studies – understood as visual presence in the extra-linguistic discourse

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[20]Early psycholinguistic evidence for focus affecting attention can be found in Cutler & Fodor (1979). I refer the reader to Gotzner (2017) for an in-depth discussion and references.

[21]An early survey of the above-mentioned types of givenness can be found in Prince (1981).

situation. This – what is sometimes called visual givenness – can be considered a special case of the knowledge-based givenness. Like knowledge-based givenness, it does not correlate with the lack of prosodic prominence (see Baumann 2006 for experimental evidence). Unfortunately, discourse and visual givenness are often not sufficiently distinguished, which leads to highly problematic interpretation especially of many experimental studies. In the present work, givenness is understood strictly as discourse givenness, independent of focus. Knowledge-based or visual givenness fall outside the realm of what I understand under information structure.

Givenness is sometimes treated as a cognitive category related to mental activation of concepts (which is pretty much on a par with focus being treated in terms of attention). The idea that givenness (or in fact information structure as a whole) is ultimately of a cognitive nature has been assumed for a long time and has led to scalar notions of givenness and to discussions of how scalar notions can be represented in a categorical system such as syntax and semantics (Slioussar 2007). A cognitive perspective was taken by Chafe (1974, 1976), who later (Chafe 1987, 1994) introduced three givenness levels – given (active), accessible (semi-active), and new (inactive). Related research drew further subdivisions and often brought in a variety of factors, including cotextual, formal, and cognitive ones (see, e.g., Prince 1981; Givón 1983; Ariel 1988; Gundel et al. 1993; Arnold 1998).[22] As suggested by the terminology, mental activation is considered to closely correlate with referent accessibility – the ease or difficulty with which the appropriate referent can be identified (typically by the hearer). My own approach to givenness is categorical (in line with the early approach of Chafe), but it is not incompatible with a scalar approach. In particular, given constituents in my approach denote highly activated referents (or concepts, if non-referential) because they have been mentioned in the immediately preceding discourse.

Topic Leaving terminology aside for a moment, the concept of aboutness topic is probably the oldest and most stable information structure concept of all. It goes back to the 19th century (Weil 1844; von der Gabelentz 1869; Paul 1880), where the idea was introduced that sentences are constructed not just by means of grammar (as grammatical predications), but also from a "psychological" perspective, from which a "psychological subject" (i.e., topic) – what the speaker is thinking (and hence speaking) about – is the argument of a "psychological predicate" (i.e., comment) – what the speaker is thinking (and hence saying) about it. The psychological perspective was abandoned – in favor of a more linguistic one – by Mathesius (1907, 1939) and much subsequent research, but the basic idea remained intact and has survived to these days.[23] The terminological opposition topic–comment can be traced back to Hockett (1958: Chapter 23) and Chao (1958), whose understanding of the concept was very modern (unsurprisingly, given what I just said). The opposition was also adopted in Sgall et al. (1973), who, however, use topic in a broader sense, encompassing not just aboutness, but also givenness and background to focus.[24] Later on, prominent proponents of the term/opposition topic/topic–comment include Dahl (1974), Reinhart (1981), or Molnár (1993), thanks to whom it gradually became the dominant term for the aboutness relation.

The absolute majority of researchers agrees on the basic concept behind the topic notion (i.e., aboutness; though cf. Jacobs 2001), although, of course, substantial disagreements exist in more specific properties of topics, such as their position in sentences (initial or also non-initial?), their obligatory presence (always present or optionally absent?), the possibility of multiple topics, and their relation to givenness (is topic the "most given" element or can topics be even new?). Also, as was briefly hinted at in section 2.3, different kinds of topic have been assumed to exist.

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[22]The mixture of factors that enter the definition of givenness are reminiscent of Firbas's (1992) approach.

[23]The psychological perspective was, in a way, reintroduced in modern psycholinguistic approaches; see above for the discussion of givenness.

[24]The "topic–comment articulation" was gradually (and partly already in Sgall et al. 1973, where comment and focus are used as synonyms), replaced by "topic–focus articulation" in Sgall and colleagues' school, though without a dramatic conceptual shift; see, e.g., Hajičová et al. (1998) or Hajičová & Sgall (2004).

Functional sentence perspective   Functional sentence perspective is sometimes thought of as a synonym of information structure associated with a different framework – that of functional (rather than formal) linguistics. The notion of functional sentence perspective is most concisely summarized in Firbas (1992).[25] It certainly covers the same kind of empirical phenomena (such as prosody, word order, particles) and relies on comparable notions (such as theme vs. rheme; see below). Still, there are important conceptual differences.[26] According to Firbas (1992), functional sentence perspective is not only concerned with discourse pragmatics (e.g. context-dependence), but also with semantics, dealing with event structure, argument structure, or the referential status of nominals. Another important difference is that the notions of functional sentence perspective (theme, transition, rheme, and their subtypes) are not defined only pragmatically (or semantically), but also by reference to form (word order, prosody). Lastly, the notions are not understood in terms of discrete oppositions, but rather as a continuum on the scale of communicative dynamism (see below), which finds no direct correlate in my approach to information structure.

Information packaging   The term information packaging was introduced by Chafe (1976) and prominently used by Vallduví (1992). I have not been able to trace significant conceptual differences between this notion and my understanding of information structure, beyond notions specific to particular theories (such as Vallduví's 1992 link and tail). Together with Krifka (2008), I take information packaging to be a synonym of information structure, which lines up with the fact that – conceptually – Chafe's (1976) approach comes very close to the current understanding of information structure in that it distinguishes between multiple oppositions, including given–new, topic–comment, and contrast–background, the last of which is closely related to focus–background.

Communicative dynamism   Communicative dynamism is the core notion of Firbas's (1992) functional sentence perspective. It is a scalar property borne by all meaningful elements in an utterance and is understood in terms of the degree to which an element contributes to communication: the more dynamic, the bigger the contribution. As discussed above in connection with functional sentence perspective, a variety of factors contribute to communicative dynamism, including linear order (communicative dynamism is, by default, progressing from the beginning towards the end of utterances), prosody (prosodically prominent expressions are more dynamic than non-prominent ones), valency (subjects are less dynamic than objects), form of referring expressions (pronouns are less dynamic than full nominal phrases), but also information structural ones (given/contextually bound elements are less dynamic than new/unbound ones; thematic elements are less dynamic than rhematic ones). There is no direct correlate of communicative dynamism in my approach to information structure.

Theme–rheme   The theme–rheme opposition can be traced back to Ammann (1925–28), in whose work it was synonymous with the present topic–comment opposition. It was critically picked up by Mathesius (1939), who distinguished the theme from the "starting point (of the utterance)" (*východisko;* complemented by the "core (of the utterance)" – *jádro*), which roughly

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[25]The term itself started its life as an alternative to Mathesius's (1939) hard-to-translate Czech term *aktuální členění větné* (roughly 'the division of a sentence motivated by the current utterance situation') and arguably stems from Mathesius's (1929) German term *Satzperspektive.*

[26]It is good to realize that functional sentence perspective was, for some time (in the 1960s and 1970s), the primary term for information structure used by Czech linguists in their English texts (cf. Firbas 1964, 1971; Sgall 1967; Daneš 1974b). Yet, the term meant different things for different people and gradually became associated, more or less exclusively, with Firbas's Brno school. Sgall and colleagues' Prague school quickly switched to the term topic–comment/focus articulation (see Sgall et al. 1973), adopting only a part of Firbas's framework, namely the concept of communicative dynamism.

corresponded to some (not clearly defined) version of givenness.[27] In his later work (e.g. Mathesius 1941), Mathesius returned to a single opposition – base–core (*základ–jádro*), which combined the properties of all three oppositions used here, thus constituting a conceptual precedent to Sgall and colleagues' topic–focus articulation. In a later development, Daneš & Dokulil (1958) (see also Daneš 1964a) found two distinct oppositions useful and understood theme–rheme (or theme–core) in terms of topic–comment, while using Mathesius's (1939) "starting point" for a context-dependent property. Meanwhile Firbas (1964) incorporated the notion of theme–rheme into his theory of functional sentence perspective, where it gradually lost the character of a binary opposition and developed into a scalar (and multifactorial) notion instead (as evidenced by the early introduction of the concept of "transition" between theme and rheme; Firbas 1965); see also the notion of communicative dynamism. Like Daneš (and colleagues), Firbas and colleagues have also distinguished between (the scale of) thematicity and a context-related notion – that of context dependence (similar to givenness). It is notable that the above-mentioned approaches relied on two types of oppositions (or scales), which begs the question of how they relate to the three oppositions assumed here. While theme–rheme corresponds to topic–comment, and starting point–core (or context-dependence–independence) to given–new, the opposition focus–background does not have an independent status. Focus most closely corresponds to rheme, but not in cases where the complement of rheme is theme, understood as topic. What comes closer is rheme excluding the transition (where transition can be understood as the part of the comment that is not properly rhematic), or what is sometimes called rheme proper (both taken from Firbas's approach).

In the international discourse (chiefly in functionally oriented approaches; e.g., Kuno 1973; Halliday 1967, 1985), the theme–rheme opposition has mostly been used as a synonym of topic–comment. However, to add to the confusion, some authors have used theme–rheme to stand for given–new (and thus used it side-by-side with topic–comment; see Molnár 1993), and yet others for background–focus (see Vallduví 2016, whose use of theme–rheme is ambivalent between background–focus and topic–comment).

Importance   Importance is sometimes taken to be a defining property of focus or rheme, in the sense that the focus of an utterance is the most important part of it (see, e.g., Trávníček 1937; Mathesius 1947; Daneš 1957). Although I am not aware of a useful definition of importance, it seems to me to come close to Firbas's (1992) communicative dynamism (a view supported by Svoboda 2007, for instance). There is no correlate of importance in my approach to information structure.

Categorical vs. thetic statements   Categorical statements contain the topic–comment division; thetic statements are topicless, i.e., they are "all-comment"; see Sasse (1987) for an influential discussion of theticity. It is usually assumed that despite the absence of an overt topic, there is an implicit topic referent. The referent can be an individual entity, but also a time interval ("topic time") or a particular situation ("topic situation"). The categorical vs. thetic opposition is fully compatible with my approach to information structure and is in fact assumed in some of the studies in Šimík (2021) (see esp. chapter 8 [Šimík & Demian 2020]). However, since theticity is not easy to control for contextually, I usually use all-focus/all-new statements as a proxy for thetic statements.

Context dependence/boundness   The notion of context dependence (used chiefly by Firbas and colleagues) or context boundness (used chiefly by Sgall and colleagues) comes close to broadly conceived givenness, encompassing discourse givenness, associative anaphora (*a car–the steering wheel*), as well as familiarity of reference (as typically expressed by definite expressions). The notions of referent familiarity (or identifiability) as well as associative anaphora fall outside

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[27]Chafe (1987) uses the term starting point for topic.

the realm of information structure, as assumed in Šimík (2021). I take these notions to be primarily grounded in semantics and the part of pragmatics that is primarily not discourse-based; they typically amount to semantic or pragmatic presuppositions (cf. Stalnaker 1973, 1974).

Emphasis Emphasis is a notion that is closely associated with focus and contrast. If a constituent is focused, and esp. contrastively focused, it is sometimes said to be emphasized. Like focus and contrast, emphasis is also often treated as ambivalent – potentially referring to meaning (contrast or possibly importance) and/or to form (prosodic prominence). Emphasis is rarely used technically – as a precisely defined notion. I avoid the term here completely in favor of better defined notions.

Presupposition Presupposition – similarly to givenness – has been used in a variety of different ways. The term entered the realm of information structure in the late 1960s/early 1970s in the sense of a background to focus (see, e.g., Chomsky 1971; Jackendoff 1972; Hajičová 1973; Hajičová 1974). The main problem of using presupposition in the sense of a background to focus is that it raises the expectation that it is related to (or even identified with) presupposition as defined in logic and formal semantics (starting from Strawson 1950 and having roots in Frege 1892; see Beaver & Geurts 2011).[28] This relation, however, is loose and often accidental (see section 3.2 for discussion and references). The term presupposition is used in Šimík (2021), but in the logical/semantic way, not in the sense of a background to focus.

Contrast Contrast as a *bona fide* information structural notion has been defended by Vallduví & Vilkuna (1998); Molnár (2002); Molnár & Winkler (2010); Vallduví (2016); Kratzer & Selkirk (2020). The chief properties of contrast are highlighting, membership in a limited set of alternatives, and explicit mentioning of alternatives (Molnár 2002). I do not take contrast to be among the core information structural notions, but admit that it can be a significant *property* of topic or focus constituents, which seems to be the majority view; see Repp (2010).

2.6 Core notions of reference

Reference is one of the core areas of semantics and pragmatics, which deals with the way syntactic constituents – typically noun phrases – refer to entities. My approach to reference is couched in standard model-theoretic formal semantics (see footnote 3 for a list of introductory texts), which has its roots in (propositional and predicate) logic and analytic philosophy and still uses its core instruments. Since the 1970s the field of formal semantics, studying the meaning of natural language (rather than logical statements), has emancipated from its forerunners and has developed its own theoretical toolbox. The area of reference (and quantification) is certainly one that has undergone significant development. In this section I will attempt to provide a basic overview of the core notions that will be needed to understand Šimík (2021). While the study of reference is by far not as chaotic as the study of information structure, the meaning of some notions and terms is not perfectly settled across the field. Unfortunately, my own work has undergone a terminological development in the past few years, so Šimík (2021) is terminologically not fully internally consistent. I will point out the basic inconsistencies in this section. And – to be on the safe side – the reader is kindly asked to read the chapters as self-contained for these purposes.

My approach to reference is relatively conservative, although it goes beyond the canonical literature in specific assumptions. The formal-semantic canon on reference includes Montague (1970, 1973) (the first formal treatment of a fragment of English), Carlson (1977) (reference to

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[28]Hajičová (1973) is aware of this issue and admits that she applies the term "in a somewhat broader sense" (cited from Hajičová 2017: 62).

kinds), Barwise & Cooper (1981) (the standard theory of generalized quantifiers), Heim (1982) (NP interpretation in discourse), Fodor & Sag (1982) (on so-called specific indefinite NPs), Partee (1987) (a theory of type-shifting, relating different denotations of a single NP), Carlson & Pelletier (1995) (an influential collection of articles on generic reference), or Chierchia (1998) (reference to kinds across languages). Hlavsa (1975) is a monograph on reference containing a logico-linguistic analysis of Czech. Hlavsa's analytical tools exhibit a certain overlap with early formal semantics and with late philosophy of language.

There are, of course, many other extremely influential works on reference and NP semantics, but the more specific one gets, the less easy it is to choose what could be considered the canon.

Recent surveys on reference include Dekker & Zimmermann (2016) (reference generally), Heim (2011) ((in)definiteness), Brasoveanu & Farkas (2016) (indefiniteness), Dayal (2011) (interpretation of so-called bare (determinerless) NPs), and Farkas & Brasoveanu (2020) ((non)specificity).

Referentiality A noun phrase (NP), pronoun, or in fact any syntactic constituent, is REFERENTIAL if its denotation is an entity. In type theory, we would say that referential NPs are of type *e*. An NP is not referential, or NON-REFERENTIAL, if this is not the case. The two main types of non-referential NPs are PREDICATIVE NPs, which are standardly considered to denote characteristic functions of sets of entities (type $\langle e, t \rangle$ = function from entities to truth values), and QUANTIFICATIONAL NPs, which characterize sets of properties (type $\langle \langle e, t \rangle, t \rangle$ = function from predicate denotations to truth values). Examples of these three kinds of NPs are given in (27). *Český premiér* 'the Czech Prime Minister' in (27a) refers to a particular entity (at a given temporal index, such as now) and thus counts as referential. The NP *dobrá hráčka pokeru* 'a good poker player' in (27b) does not refer to a particular entity. Instead, it characterizes the set of good poker players and Alice is claimed to be a member of that set. Finally, *nejméně pět osob* 'at least five people' in (27c) does neither of the two above. It characterizes the set of properties that at least five people have and the sentence is true if being missing is a member of that set of properties.

(27) a. [NP Český premiér]   přijel   včas.   *referential*
          Czech prime.minister arrived in.time
          'The Czech Prime Minister arrived in time.'

      b. Alice je [NP dobrá hráčka pokeru].   *predicative*
          Alice is   good player poker.GEN
          'Alice is a good poker player.'

      c. [NP Nejméně pět osob]   se   pohřešuje.   *quantificational*
          at.least five people REFL miss
          'At least five people are missing.'

The examples above show that, canonically, referential and quantificational NPs are arguments, and predicative NPs are parts of copular predicates. However, a line between referential and non-referential NPs is sometimes drawn also within argumental uses of NPs. The sentence in (28) is ambiguous, which is brought out by the continuations in (a) and (b). On a referential reading of *nějakou Francouzkou* 'a Frenchwoman', the NP refers to a particular Frenchwoman, called Madelaine, as we learn from (28a). On a non-referential reading, the NP does not refer to a particular Frenchwoman. The sentence is true if Ben wants to marry a Frenchwoman, without even knowing one yet, as is made clear by (28b). The two types of indefinite NPs below are often referred to as SPECIFIC and NON-SPECIFIC, respectively.

(28) Ben se   chce   oženit s   [NP nějakou Francouzkou].
      Ben REFL wants marry with   some   Frenchwoman
      'Ben wants to marry a Frenchwoman.'

a. Jmenuje se   Madelaine.   *specific*
   call   REFL Madelaine
   'Her name is Madelaine.'

b. Ještě ale ani   žádnou nezná.   *non-specific*
   still   PRT even.NCI no.NCI NEG.knows
   'But he doesn't even know one yet.'

The term SPECIFICITY is among the most complicated ones in the study of reference. There are many different senses of the term and I cannot possibly do justice to the complexity of the phenomenon. I refer the interested reader to the most recent survey, namely Farkas & Brasoveanu (2020). What makes the matter even more complicated is that the specificity contrast illustrated in (28) does not need to be accounted for in terms of referentiality. Some analyses treat the NP in (28) as referential, independently of its specificity, and others as non-referential (quantificational), independently of its specificity. For instance, upon the continuation (28b), the NP 'some Frenchwoman' can be understood as referential if the denoted entity only exists in Ben's imagination (not in reality). The specific use, brought out by the continuation (28a), can in turn be understood as non-referential if it is analyzed as a wide-scoping existential quantifier (there is a Frenchwoman that Ben wants to marry). As these considerations suggest, the notion of referentiality enjoys a certain pre-theoretical status and as such must be handled with a grain of salt. In Šimík (2021), I mostly rely on the above definition (in terms of entity denotation). Also the notion of specificity is treated very carefully and is often avoided in favor of better defined notions.

In some chapters of Šimík (2021), I adopt the term (IN)DETERMINATE (from Coppock & Beaver 2015), for essentially the same concept as (non)referentiality. This term comes very close – in both its literal and technical meaning – to the Czech *určenost* 'determinacy/determinedness' (see, e.g., Hlavsa 1975: 19). Its advantage is also the departure from another use of referentiality, one related to Donnellan's (1966) opposition between referential and attributive uses of definite NPs.

Before I move on, I should say a word about KIND-DENOTING NPs, illustrated in (29). Since Carlson (1977) it has been popular to think of kind-denoting NPs – like *nosorožci* 'rhino' – as referential. This implies the existence of kinds as abstract entities which stand in some non-trivial correspondence to the particulars that instantiate these kinds. One of the (many) arguments in favor of this approach is the existence of predicates which express properties of kinds, but not of their instantiations. One such predicate is used in (29) – being threatened by extinction can hold of a kind, not of one or more of its instantiations.[29]

(29) [NP Nosorožci]   hrozí   vyhynutí.   *kind*
          rhino.SG.DAT threaten extinction
      'The rhino is threatened by extinction.'

Definiteness   The category of definiteness has played a major role in the study of referentiality. Definiteness is primarily anchored in morphosyntax and is related to the presence of definite or indefinite articles, such as *the* or *a* in English. We then speak of DEFINITE or INDEFINITE NPs if these are determined by definite or indefinite articles/determiners, respectively, e.g. *the/that dog* vs. *a/some dog*.[30] Over the years, it has become increasingly common in formal semantics (and syntax) to use the terms (in)definite to refer not just to NP *form* but also to NP *semantics* – even

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[29]Chierchia (1998) put forth a generalization of Carlson's (1977) idea, arguing that all kinds of NPs – even those that effectively refer to particulars – can start out their semantic lives as kinds, which can be shifted to other types if needed.

[30]In the philosophical, logical, and formal-semantic traditions, it is more common to use the term DEFINITE DESCRIPTION rather than definite NP (see, e.g., Elbourne 2013). I use the two as synonymous.

in the absence of overt (in)definite determiners.[31] The polysemous and admittedly somewhat confusing use of the term (in)definite is probably due to English bare plural NPs (*dogs*), which have no determiner, but are functionally close to indefinite NPs.

In my own work, I initially used the broader sense of definite (definite formally and/or in meaning; see chapter 4 [Šimík & Wierzba 2015] or chapter 7 [Šimík & Burianová 2020]), but recently switched to the narrower – and arguably less confusing sense where definiteness is a property of forms only (chapter 8 [Šimík & Demian 2020]).

The semantics of definiteness and indefiniteness represents a rich subfield – or in fact two rich subfields – of the study of reference. Many semantic theories of definite and indefinite NPs have been put forth, often with very different predictions. The issue is not resolved and has recently been informed by a wealth of new cross-linguistic, corpus, and experimental data, which present many long-standing theories with new challenges. In what follows I briefly discuss two main types of semantic theories of definiteness – one based on uniqueness and maximality, and the other on familiarity.[32]

Uniqueness and maximality   Ever since Frege (1892) there has been the prominent idea that a definite NP like *the dog* not only refers to a dog, but also conveys that the dog it refers to is UNIQUE, in the sense that it is the only dog in the relevant situation.[33] This theory has nearly become the standard within formal semantics (see Elbourne 2013). Since Sharvy (1980) and Link (1983), the uniqueness theory of singular definite NPs has been complemented with a MAXIMALITY theory of plural definite NPs. According to this theory, the NP *the dogs* refers to the group containing all the dogs in the relevant situation (where a group is a non-atomic entity). Among the major advantages of the uniqueness/maximality theory is the fact that definite NPs successfully refer even in situations where the discourse participants have very limited knowledge about the referent. In (30), for instance, the speaker uses the NP *the thief/thieves* without having any idea who the thief/thieves was/were and without any possibility to identify them. Apparently, in order for the definite NP to be useable, it is sufficient to assume the existence of a thief or multiple thieves that had entered the crime scene. If a single one is assumed, the singular definite NP refers to that single thief (uniqueness). If multiple ones are assumed, the plural definite NP refers to all of them (maximality).

(30)   *Situation:* At a crime scene, where the only imaginable entrance is a ventilation shaft.
        [NP The thief/thieves] must have been very small.

Familiarity   In most functionally oriented literature, definite NPs are considered to refer to entities that are FAMILIAR to the discourse participants. This idea is usually attributed to Christophersen (1939), but has also been popular in more recent formal approaches (see, e.g., Heim 1982; Roberts 2003). The concept of familiarity is intuitively clear. If (31a) is used in a conversation between two students, for instance, the speaker assumes that the hearer is familiar with the puzzle she refers to. Yet the concept of familiarity has proved very difficult to define. In which sense, for instance, is the thief (are the thieves) in (30) familiar? A similar issue is raised even by mundane examples such as (31b), where neither the speaker nor the hearer need to be "familiar" – in any reasonable sense of the word – with the capital of Turkmenistan. They do not need to know where it is, what it is like, or even what its name is. Finally, there is a class of examples, represented by (31c), which seem highly problematic for the uniqueness theory, but can be relatively easily accommodated in (a version of) the familiarity theory. In (31c) the

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[31]For instance, Dayal (2011) – a survey article on bare NPs (= NPs without overt determiners) – contains formulations like "[...] the bare NP [has] definite rather than indefinite readings." (p. 1090)

[32]The semantics of *indefiniteness* is rather peripheral to Šimík (2021) and is, therefore, not discussed here.

[33]Frege's (1892) analysis has always competed with the one of Russell (1905), who adopted the idea of uniqueness, but held the view (i) that uniqueness is asserted (rather than presupposed) and (ii) that definite NPs are not referential but quantificational.

bracketed NP *the philosopher* successfully refers to the entity introduced by *another philosopher*. This entity can be considered "familiar" in the sense of just having been mentioned. At the same time, it seems hopeless to consider the entity the unique philosopher – clearly, there is another one in the relevant situation – the agent of asking.

(31) a. I solved [NP the puzzle] yesterday.
    b. There was a terrorist attack in [NP the capital of Turkmenistan].
    c. A philosopher met another philosopher and asked [NP the philosopher] a question.

The dilemma between uniqueness and familiarity was recently resolved in a very peaceful way by Schwarz (2009), who argued that both theories are in fact needed, each for a different type of definite NPs. More particularly, Schwarz provided a semantic analysis of the two definiteness forms in German (and some Germanic dialects), illustrated in (32). He argued that *dem Haus* must satisfy the familiarity condition (defined largely in terms of discourse anaphoricity), whereas *-m Haus* – with a phonologically weak form of the article attached to the preposition *zu* – must satisfy the uniqueness condition.

(32) a. Hans ging zu dem Haus.   *strong definite article*
        Hans went to the house
        'Hans went to the house.'

    b. Hans ging zum   Haus.   *weak definite article*
        Hans went to.the house
        'Hans went to the house.'

Meanwhile, Schwarz's (2009) theory of definiteness has been successfully applied to many different languages and phenomena (see Schwarz 2013, 2019 for an overview). Chapter 9 [Šimík 2016] applies Schwarz's (and Elbourne's 2008) analysis to Czech demonstratives. Chapter 10 [Šimík to appear] puts forth an alternative analysis.

Reference in languages without articles   Czech, like most other Slavic languages and in fact many other languages in the world (Dryer 2013a,b), manages reference without the aid of articles. The predominant view in the literature – cutting across the functional vs. formal divide – is that ARTICLELESS LANGUAGES have the same expressive power as languages with articles. That is, the meaning of definite NPs is in principle independent of definite articles; in their absence, it is expressed by other means. This thesis was defended e.g. by Krámský (1972), but seems to enjoy the status of received wisdom, if not a dogma. Using experimental evidence, chapter 8 [Šimík & Demian 2020] sheds doubt on this dogma.

In any case, the question remains: How is reference managed in articleless languages? Articleless languages often have rich determiner systems. While indefinite and definite determiners cannot be equated with articles, they certainly play an important role in reference management. See chapter 9 [Šimík 2016] and chapter 10 [Šimík to appear] for analyses of Czech demonstratives. There are other ways in which the absence of articles can be made up for – or so goes the argument at least. One example is the interaction between grammatical aspect (perfective vs. imperfective) with the referential properties of internal arguments. In particular, perfective verbs are sometimes claimed to trigger definite-like interpretations of their objects (e.g. Krifka 1989).[34] An important role is attributed to word order and/or information structure. It has repeatedly been noticed that preverbal/sentence-initial/topical bare NPs correspond to definite NPs, while postverbal/sentence-final/non-topical do not. This last point touches upon the central hypothesis of Šimík (2021) (2): If the relation between information structure and semantics is a very loose one, we do not expect a strong and systematic impact of information structure on the semantic aspects of reference. The results presented in chapter 8 [Šimík &

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[34]We now know that the matter is far from this simple. See Filip (1999) for a critical discussion.

Demian 2020] are consistent with the hypothesis: we find no evidence that information structure (topicality) affects the uniqueness or maximality inferences associated with referential bare NPs. In other words, topicality – a discourse pragmatic notion – cannot be compared to articles – a morphosyntactic category – in its impact on semantics. Interestingly, and apparently in contrast to what I just said, chapter 7 [Šimík & Burianová 2020] presents corpus evidence that referential properties of bare NPs do depend on word order and, in fact, quite strongly so. This is in line with the common assumption that reference is not just a matter of semantics, but also a matter of pragmatics. Definite-like interpretations of bare NPs can be triggered by information structure, but if this happens, the interpretations do not arise via manipulating NP semantics, but "directly" via pragmatics. Chapter 10 [Šimík to appear] puts forth a proposal of how bare NPs can correspond to definites or indefinites without any significant manipulation of their semantics.

Situations   Reference always takes place relative to some SITUATION.[35]   Following Schwarz (2009), I call the situation relative to which an NP is interpreted its RESOURCE SITUATION. One possible value a resource situation can have is the UTTERANCE SITUATION. If I say *The waiter is slow,* the reference of *the waiter* will vary together with the utterance situation. But the resource situation of an NP does not need to be the utterance situation. If I am planning a trip and say *We will meet at 10am at the train station,* there does not need to be a railway station in the utterance situation. Clearly, what I (and my conversation partner) have in mind is the railway station we implicitly agree on; the resource situation is part of our common plans (which, in turn, are part of our conversational common ground). We can call this situation the TOPIC SITUATION – the situation the sentence/conversation is about, in this case our meeting the next day. During that meeting, we are located in a particular town at a particular time in the future. The position and time are properties of the topic situation and in that situation, there is a train station, to which I refer by the definite NP *the train station.* Finally, in some cases the resource situation of an NP is not the utterance situation, nor a topic situation, but rather a situation that is introduced as part of what is being said. Consider the sentence *Ben thinks that we are at the train station.* It could be, of course, that the train station is part of the utterance situation (or topic situation) and that Ben thinks that we are at that train station. Imagine, however, that there is no train station in the utterance situation (or the relevant topic situation). Ben just thinks there is one. In that case, *the train station* refers to the entity which is present in Ben's thoughts but not in reality. In other words, verbs like *think* can introduce a situation of their own – a situation compatible with what Ben thinks (and not necessarily with what is actually the case) – and that situation can become the resource situation of the NP *the train station.*

Resource and topic situations and their properties are a crucial component of chapter 10 [Šimík to appear].

Pronominal reference   I finish this survey of the core concepts of reference by saying a few words about the reference of personal pronouns. The meaning of pronouns is known to be highly underspecified. While the NP *the Czech prime minister* refers to Andrej Babiš (at the time of writing) and possibly to other individuals – depending on the choice of the resource/topic situation, the reference of a pronoun like *he* is dependent on more than just the choice of the reference time or situation. Consider the example *Nobody showed us his bedroom.* This sentence is multiply ambiguous depending on what *his* refers to. The pronoun can in principle refer to any male individual. It could, for instance, refer to the Czech prime minister, so that the sentence would be semantically equivalent to *Nobody showed us the Czech prime minister's bedroom.* This type of pronominal reference is sometimes referred to as free – the reference depends on

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[35]I follow standard situation semantics. See Kratzer (2014) for a survey. What is discussed below builds on the research of Musan (1997); Percus (2000); Keshet (2008); Schwarz (2009); and others.

something that is external to the sentence. But imagine that our example utterance is preceded by *Ben, Dave, and Paul were all very secretive.* That context makes salient an interpretation of *his* which is called bound. Our example will then be true if Ben didn't show us Ben's bedroom, Dave didn't show us Dave's bedroom, and Paul didn't show us Paul's bedroom. Note that this is a kind of interpretation that is not available to something like *the Czech prime minister,* which is dependent on its resource situation, but cannot depend on the individual that we "fill in" for *nobody.*

These considerations have led to an analysis of pronouns under which their interpretation is dependent on the value of an index. As schematically represented in (33), different indices on *his* lead to the formation of different properties (here represented by lambda terms). If the index 2 is mapped (by the so-called variable assignment function) to the Czech prime minister, (33a) involves the property of showing us the Czech prime minister's bedroom. The whole sentence is true if nobody has this property. If *his* is indexed by 1, however, the derived property is showing us one's own bedroom. On that indexing, the sentence is true if nobody has that property, i.e., if nobody showed us his own bedroom.

(33) a. Nobody λx_1 [x_1 showed us his$_2$ bedroom]. *free pronoun*

     b. Nobody λx_1 [x_1 showed us his$_1$ bedroom]. *bound pronoun*

In section 4 I will show, based on evidence from Kratzer (1991), that focus exhibits a similar behavior, which in turn motivates its indexical (pronominal) analysis. The indexical analysis is then put to use in chapter 2 [Leffel et al. 2014].

3 Approaches to the syntax/semantics–information structure interface

Despite the fact that the interface between syntax/semantics and information structure has been studied intensively, relatively little consensus has been reached. Currently, there are many different theories on the market, which coexist and are often taken for granted without being compared to one another. The available evidence often appears to be compatible with many different approaches. The extremely complex conceptual and terminological landscape of information structure is an important part of the problem: if basic information structural notions are insufficiently defined, it is easy to make claims about them without getting committed to clear predictions.

As already suggested in section 1, I start out from what I take to be the null hypothesis, namely that the relation between information structure and syntax/semantics is very loose. The heuristic is then to see how far one can get in terms of empirical coverage or, in fact, whether one can achieve better predictions than with a theory in which information structure is closely intertwined with syntax and/or semantics.

The aim of this section is to provide a quick survey of the various theories of the syntax/semantics–information structure interface. I start by looking at syntax; then I turn to semantics.

3.1 Syntax–information structure

Syntax is normally assumed to have the following core properties.[36] First, it creates complex objects from simpler ones. The way this structure building proceeds is not arbitrary – it follows a recursive procedure, incrementally building ever more complex objects from simpler ones – morphemes are connected into words, words are connected into phrases, phrases form clauses,

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[36]I take much of morphology to be part of syntax; it might therefore be useful – at least for some readers – to understand "syntax" as "morphosyntax".

clauses form sentences. In other words, syntax operates on constituents. Second, building constituents comes with some essential syntactic relations, particularly sisterhood, dominance, and c-command (a useful extension of the previous two). Third, constituents belong to different categories, such as NP or VP. There is unanimous agreement that some categories are relevant for syntax (they are "syntactic categories") while others are not. Noun, verb, but also preposition, case, number, tense, or mood are cross-linguistically common syntactic categories. Vowel quality, color, or weight – while categories of linguistic or extra-linguistic entities – are normally rarely (if ever) syntactic categories. Fourth, there are non-trivial relations between these categories. Tense, for instance, is a category that generally requires a verb (but not conversely); case requires a noun (but not conversely). More generally, syntactic categories are organized in a so-called functional sequence, whereby one category may presuppose the presence of another.

If information structure is related to syntax, we expect information structure notions to interact with the core syntactic properties above. It can, of course, also be the case that information structure is related to syntax only to an extent. It could be related to some of its properties, but not others. Below I go through the existing (and partly hypothetical) theories of syntax–information structure interface, looking at the strength of the relation defined in terms of the above-mentioned syntactic properties.

The discussion below is not meant to be critical in the sense that it would favor one theory over another. I provide a very rough outline of each type of theory, along with the core empirical arguments in their favor. For related comparative discussions – though often arguing for one particular approach – see Fanselow (2006, 2008); Slioussar (2007); Erteschik-Shir (2007); López (2009); Aboh (2010); Horvath (2010).

No relation   What would one expect if there was no relation between syntax and information structure? Take focus, for instance. One could take any arbitrary subpart of an utterance – completely ignoring its syntactic structure – and communicate that alternative denotations to that subpart are relevant for the current discourse. One such hypothetical assignment of focus, possibly mediated by extra prosodic prominence on *brother* or *French,* is illustrated in (34a). If the focus-sensitive particle *only* is included, we would expect (34b) to be a possible intended inference of (34a).

(34)   a.   Ben (only) gave Celia's [brother a French]$_F$ novel.
       b.   Intended inference: 'Ben didn't give Celia's sister a German novel.'

It is my impression that the above focus assignment is not really possible. And – even though normally mentioned in this way – it is probably the reason why the no-relation thesis has rarely, if ever, been defended.

That said, there are arguments that the relation between information structure and syntax is rather loose. As noted by Krifka (2008) and many others, focus can target subparts of words – not just morphemes, parts of (phone) numbers, but even phonetic units.

(35)   I said he's interest[ed]$_F$, not interest[ing]$_F$.
(35)   – Did you say 391? – No, 3[8]$_F$1.
(35)   I said [m]$_F$ixed feelings, not [f]$_F$ixed feelings.
(35)   It's not pronounced [Ber]$_F$lin, it's Ber[lin]$_F$.

These focus assignments have a certain metalinguistic quality to them – they typically appear in corrections of what has been said or how something was formulated. Still, they clearly indicate that focus (and hence information structure) is not fully dependent on syntax proper.

Sensitivity to constituents   Example (34) suggested that focus is a property of constituents, not just linear strings of words. Indeed, string-identical structures where focus is assigned to a constituent, illustrated in (36), seem non-problematic. Figure 3 provides the phrase structure

and F-marking for (36a), emphasized by framing for clarity.[37] That tree also makes clear why the F-marking in (34a) is not available: there is no constituent that corresponds to *brother a French.*

(36) a. Ben (only) gave [Celia's brother]$_F$ a French novel.
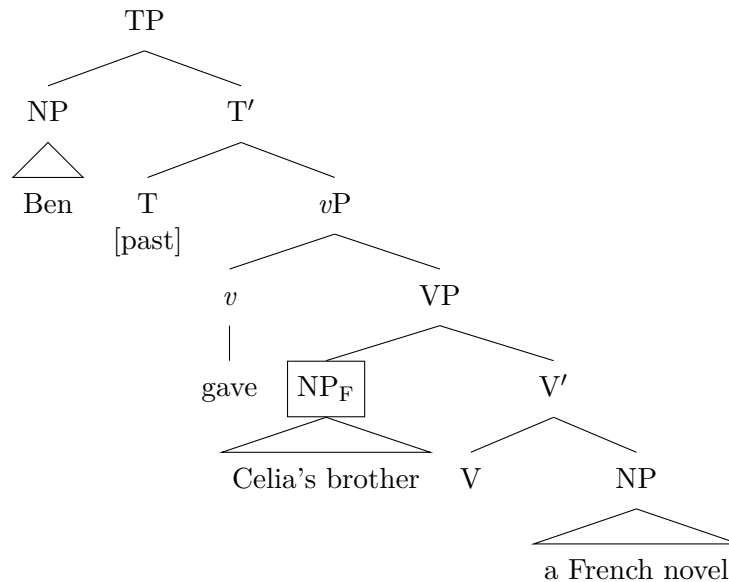   b. Ben (only) gave Celia's brother [a French novel]$_F$.

Figure 3: Syntactic and focus representation of (36a) (à la Jackendoff 1972)

Jackendoff's (1972) theory exemplifies this kind of approach, as it assumes that F-markers are assigned to syntactic constituents (at S-structure; see p. 240). It does not assume much more than that though, which makes the relation between information structure and syntax rather loose. A very similar assumption is made by Selkirk (1984) (dealing with focus phonology) and Rooth (1985) (dealing with focus semantics); Rooth (1985) considered the assumption "standard" (p. 10). This position is, however, not dominant among syntacticians, who usually assume a tighter relationship between information structure and syntax; see below. Yet, there is some fairly prominent syntactic work that represents and often explicitly argues for this (kind of) position; see, for instance, Szendrői (2001, 2003); Reinhart (2006); Fanselow (2006, 2008); Horvath (2010); Fanselow & Lenertová (2011); Struckmeier (2014, 2017). It is also the position that I assume in Šimík (2021). Let us now turn to approaches which assume a tighter relation between information structure and syntax.

Sensitivity to syntactic relations The above-mentioned theory relies on the assumption that while focus can (or must) be represented in syntax – by F-marking the focused constituent – its background does not need to be. Notice that the background to the focus *Celia's brother* is *Ben gave [...] a French novel.* Figure 3 makes it clear that the background is not a constituent. This is, of course, just fine if we do not intend to assume that background has some syntactic reality. Yet there are scholars who believe just that.

The idea, defended in some form in Drubig (1994), Krifka (2006), Neeleman & van de Koot (2008), and many others, is that focus and background must be syntactic sisters.[38] This

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[37]The structure is consistent with a broadly accepted analysis of English double object constructions, where the verb *give* is represented as consisting of two verbal categories, where v expresses causation, and V the possessive relation. See, e.g., Harley (2002); Pylkkänen (2008); Citko et al. (2017).

[38]This formulation is only an approximation made here for the sake of illustration; individual analyses differ in important details from what is presented here and also from one another.

implies that Figure 3 is not a syntactic representation appropriate for the encoding of the focus–background structure. The required structure is in Figure 4, where the focus has moved to the sister position of its background and where – therefore – not just the focus forms a constituent, but its background does too (focus and background highlighted for clarity). The resulting syntactic representation is the so-called LF (from "logical form", a syntactic concept which goes back to May 1977) – a representation which is the input to semantic (and here also information structural) interpretation but is invisible to phonological processes.
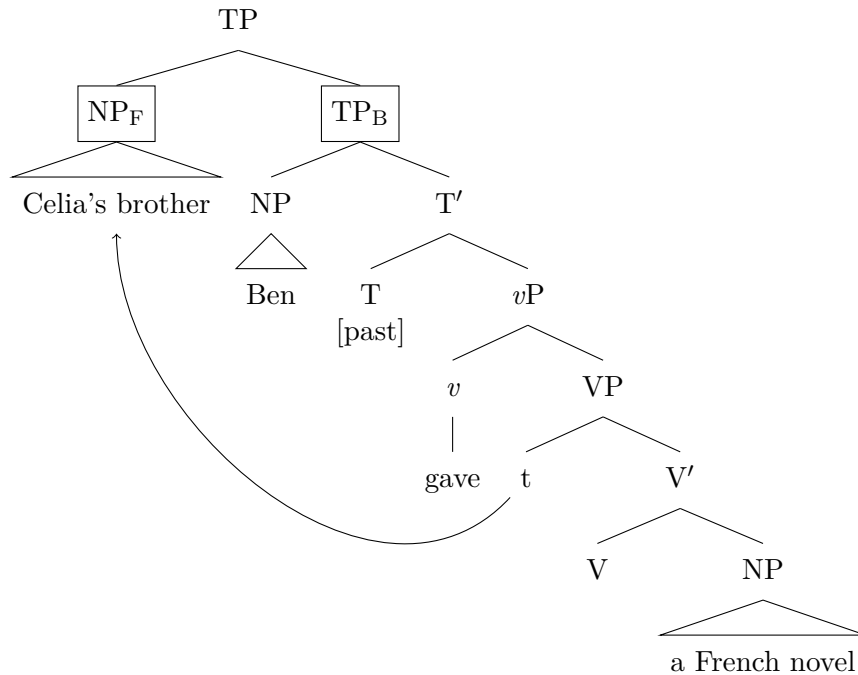
Figure 4: Syntactic and focus–background representation of (36a) (à la Drubig 1994)

Another example of a theory of this kind is Kučerová's (2007) theory of syntactic encoding of givenness. Kučerová proposes that in Czech (and other Slavic languages; see Kučerová 2012), the clause is obligatorily divided into two parts: a given and a new part.[39] The given and the new part of the clause are not syntactic sisters; the relation is mediated by a specialized G-operator, which takes the new part as its sister and marks everything which is not dominated by its sister as given. The syntactic relation that the G-operator is sensitive to is thus c-command: given constituents must be outside of its c-command domain. Figure 5 is the representation of (37b), which is supposed to be a continuation of (37a) and where *lízátko* 'lollipop' is given. The configuration in Figure 5 affords the placement of the G-operator in which its c-command domain contains no given constituent. If, on the other hand, the object 'lollipop' stayed in its base position (marked by t = trace, and illustrated in the infelicitous (37c)), G could not be placed anywhere. This is what motivates the displacement of the object. Effectively, Kučerová's (2007) theory offers a syntactic response to the long-standing observation that given expressions precede new ones. Chapter 4 [Šimík & Wierzba 2015] and chapter 5 [Šimík & Wierzba 2017] test Kučerová's (2007) predictions experimentally.

(37) a. Na zemi   leželo lízátko.
          on ground lay   lollipop
          'There was a lollipop on the ground.'

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[39]Kučerová's (2007) concept of givenness is a more specific version of Schwarzschild's (1999) givenness. See chapter 4 [Šimík & Wierzba 2015] for a critical discussion.
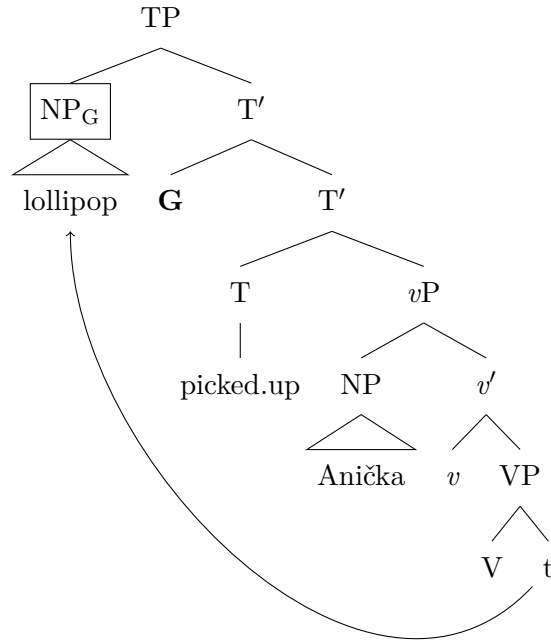
Figure 5: Syntactic representation of (37b) (à la Kučerová 2007)

b. Lízátko_G zvedla   Anička.
    lollipop   picked.up Anička
    'Anička picked up the lollipop.'
c. #Anička zvedla lízátko_G.

Finally, I should note that theories which approach information structure via the predicative relation (e.g. Wedgwood 2003) or via quantification (e.g. Herburger 2000) also fall into this class because both predication and quantification are crucially based on particular syntactic relations: the argument–predicate relation is a sisterhood relation; the quantificational restrictor and nucleus are the first and second argument of a quantificational element, respectively. These theories are discussed in more detail in section 3.2.

Sensitivity to syntactic categories The above-mentioned theories require information structure concepts to be encoded by particular syntactic relations (such as sisterhood or c-command), but do not impose any categorial constraints: the relevant syntactic partitions can be achieved anywhere in the structure – all that matters is the configuration (see, in particular, Kučerová 2007 and Neeleman & van de Koot 2008 for an explicit argument to this effect). There are theories which impose stricter requirements on the information structural syntactic partitions. Most of the theories go back to the seminal proposal of Diesing (1992b), who put forward what she called the Mapping Hypothesis. In somewhat updated terms, the hypothesis says that NPs dominated by the VP (or its functional equivalents, e.g. vP or PredP) are non-presuppositional (non-specific), while NPs not dominated by the VP are presuppositional. Example (38), taken from Diesing (1992a: 370), illustrates the empirical contrast: while (38a) presupposes the existence of sharks and simply makes a generic (admittedly somewhat uninteresting) statement about them, namely that they are visible, (38b) is used to introduce a new discourse referent – a plurality of particular sharks which happen to be visible. Figure 6 demonstrates the two syntactic positions which are assumed to lead to these two interpretations: the PredP-external one to the presuppositional one and the PredP-internal one to the non-presuppositional one (Pred is used here instead of V because we are dealing with a nonver-

bal predicate). The implicit assumption is that German particles (like *ja, doch*) are located at the edge of VP/PredP/*v*P.

(38) a. … weil Haifische ja   doch sichtbar sind.
         since sharks   PRT PRT visible   are
         '… since sharks are visible.'

   b. … weil ja   doch Haifische sichtbar sind.
         since PRT PRT sharks   visible   are
         '… since there are sharks visible.'

CP
├─ C
│   │
│   since
└─ TP
    ├─ ⟨NP⟩
    │   △
    │   sharks
    └─ T'
        ├─ PredP
        │   ├─ Prt
        │   │   │
        │   │   ja doch
        │   └─ PredP
        │   ├─ ⟨NP⟩
        │   │   △
        │   │   sharks
        │   └─ Pred
        │   │
        │   visible
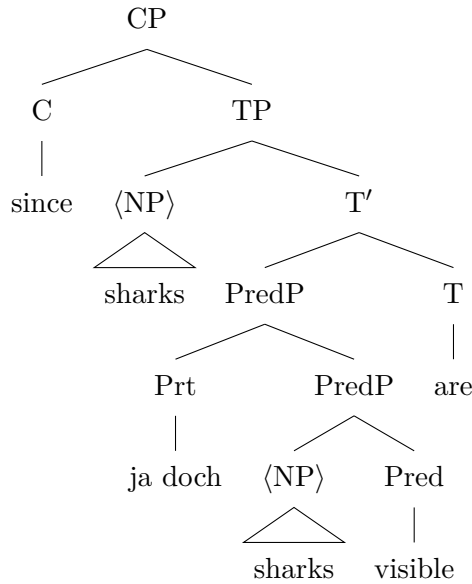   └─ T
             │
            are

Figure 6: Syntactic representation of (38)

Although Diesing's (1992b) concern was primarily semantic, her analysis was influential in information structural research as well, where scholars generalized Diesing's distinction presupposed vs. non-presupposed to concepts such as given vs. new. Analyses of this kind can be found in Späth (2003, 2006), Biskup (2006, 2009), López (2009), or Mykhaylyk (2011).

Having the status of syntactic features Rooth (1985) opens his discussion of how focus is represented in syntax by the following statement:

> My assumptions about the representation of focus in the grammar are standard. That is, I assume that focus is a feature marked on syntactic phrases (cf. Jackendoff 1972, Selkirk 1984).

The term "feature" used by Rooth does not have a technical meaning, it is to be understood simply as a certain – information structural – property of a syntactic phrase. With the advent of Chomsky's (1992; 1995) minimalist program, however, so-called formal features were brought into the center of generativist theorizing. Features were conceived of as attributes of syntactic categories – whether of lexical or functional nature, whose properties (values) were held responsible for triggering syntactic operations such as the structure-building operation merge (external or internal – also known as movement) or the feature-manipulating operation agree. This development was closely tied to the shift from representational models of syntax (with its different levels of representation, such as D-structure, S-structure, and LF) to derivational models, where

syntax is seen as a process of deriving sentences.[40] To give a classic example, consider the contrast between English and Japanese in (39). While English does not tolerate positioning wh-objects in their canonical (postverbal) position in embedded interrogatives, Japanese routinely keeps its wh-objects in the canonical (preverbal) position in such structures. Standard minimalist theories modeled this difference by resorting to different properties of embedded-interrogative C(omplementizer) heads: the English C head needs to enter into a local syntactic relation (called Spec-Head) with a wh-word, resulting in the displacement of the wh-object into the clause-initial position, while the Japanese interrogative C (realized as *ka*) has no such requirement. This requirement is modeled as the so-called wh-feature on the C head, which may be "strong" or "weak".[41]

(39)   a.   John knows [$_{CP}$ what$_1$ C$_{[strong\ wh]}$ Mary bought t$_1$].

       b.   John-ga   [$_{CP}$ Mary-ga   nani-o   katta   ka$_{[weak\ wh]}$] sitteiru.
          John-NOM   Mary-NOM what-ACC bought Q   knows
          'John knows what Mary bought.'

An analogous logic is sometimes applied to word order alternations which arise due to information structure manipulations. Hungarian played a major role in this development (see Horvath 1986; Brody 1990, 1995). Hungarian is known for placing focused objects in a preverbal position, although their canonical position is postverbal. This is illustrated in (40) (from Horvath 1986: 91).[42] Figure 7 provides a simplified syntactic analysis of this phenomenon, as implemented in a feature-based theory: the object undergoes syntactic movement to the specifier of the inflection projection (IP). The movement is motivated by the assumed [foc] feature (akin to the [wh] feature), which is licensed in a local syntactic relation with an F-marked constituent.

(40)   a.   Attila félt   a   földrengéstől.
          Attila feared the earthquake.LOC
          'Attila was afraid of the earthquake.'

       b.   Attila a   földrengéstől   félt.
          Attila the earthquake.LOC feared
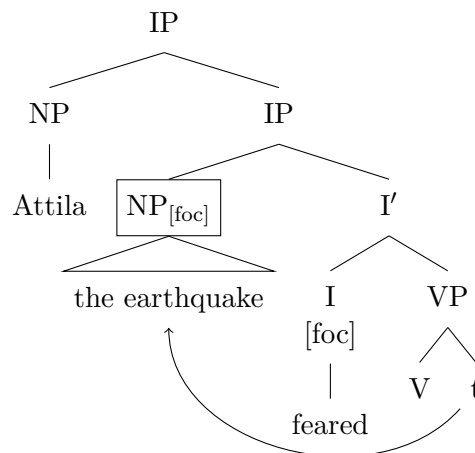   'It was the earthquake that Attila was afraid of.'

Figure 7: Syntactic representation of (40b) (à la Brody 1990, 1995)

[40]This "process" of sentence "derivation" must not be confused with the real-time mental production (or comprehension) of sentences, although there have been attempts to adapt minimalist theories to that (see esp. Phillips 1996). Minimalist derivation should rather be seen as an algorithm that systematically relates form with meaning.

[41]This type of analysis is now commonly recognized as merely descriptive – it does nothing more than describe the observed facts by the tools offered by the syntactic theory (in this case: the properties of formal features). For a recent attempt to find a motivation (particularly a prosodic motivation) for wh-word displacement, see Richards (2010).

[42]For an in-depth survey into syntactic focus marking building mainly on Hungarian data, see Szendrői (2017).

The feature-based approach must reconcile the apparent paradox that information structure categories target phrases (of any size), but formal features are properties of atomic categories (such as N, V, C, etc.). The idea is, then, that a feature like [foc] starts out as a property of an atomic syntactic category (a head) and then can "percolate" to larger phrases. Feature percolation is assumed for comparable features (like the [wh] feature, whose percolation gives rise to wh-phrases; see Heck 2008 for a critical discussion) and is sometimes held responsible for phenomena such as nominal feature concord (Norris 2014). For relevant discussion about syntactic information structural features, see Irurtzun (2006); Aboh (2010).

Having the status of syntactic categories   Since 1980s, generative grammar has witnessed a gradual rise of interest in so-called functional categories. It has been recognized, for instance, that tense need not just be a feature of the verb, but a self-standing functional category which projects its own tense phrase. Nowadays, it is normal or even standard to see "features" like aspect, causation, definiteness, number, or case analyzed as self-standing syntactic heads, with their own selectional properties and fixed positions in the functional sequence. The so-called cartographic program (see Cinque & Rizzi 2010 for a recent survey) aims at providing a detailed "map" of how functional categories are organized in a syntactic hierarchy. In line with this program, Rizzi (1997) proposed that information structural categories should be represented not just as features, but as heads – in particular Foc and Top, whose specifiers host focused and topic constituents, respectively. The syntactic complements of Foc and Top are then the background and comment, respectively. The syntactic cartography proposed by Rizzi is provided in Figure 8 – representing the Italian sentence in (41) (adapted from Rizzi 1997: 291).

(41)   A Gianni, <u>questo</u> gli   dovrete   dire.
       to Gianni <u>this</u>   him should.2SG say.INF
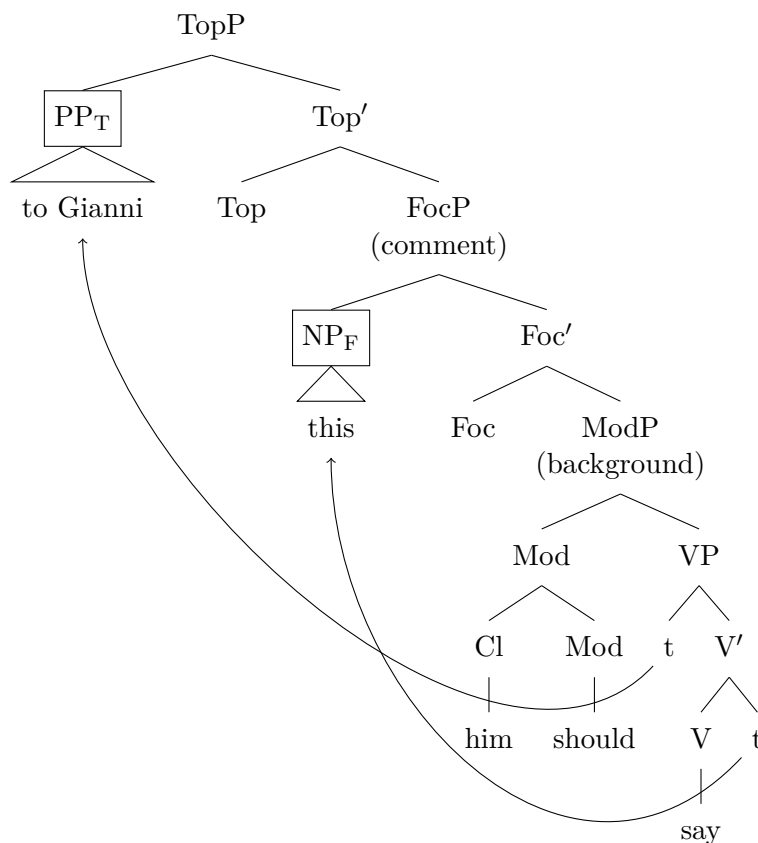   'You should tell this to Gianni.'

Figure 8: Syntactic representation of (41) (à la Rizzi 1997)

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The cartographic approach to information structure can be viewed as an even more restricted version of the feature-based approach. While features are features of categories and can thus in principle be features of different categories (varying with language or type of feature), postulating information structural categories, as Rizzi (1997) did, comes with the commitment that they have a fixed place in the clausal functional sequence. Just as T (tense) is hierarchically above V (verb), or a determiner (D(et)) above N (noun), Foc and Top also have their dedicated position. Rizzi (1997) argues that Foc, indeed, does have a completely fixed position in the so-called left periphery of the clause. Top, on the other hand, is an untypical syntactic head in that it can appear in multiple positions. The particular sequence proposed by Rizzi is given in (42), where Force hosts complementizers (in embedded clauses) or speech act-related information (in root clauses), Fin encodes finiteness, and Top and Foc are "sandwiched" in between. The asterisk on Top means that it can project multiple times (i.e., multiple topics in a single clause are available).

(42)   Force > Top* > Foc > Top* > Fin > …

Rizzi's (1997) proposal has been hugely influential and has been applied to information structural phenomena in many different languages. Yet it remains controversial and it has been criticized as overly restrictive, whether in wrongly predicting the obligatoriness of focus or topic movement or in their fixed placement in the clause. See, e.g., Neeleman & van de Koot (2008) or Horvath (2010) for discussion. See also chapter 3 [Fominyam & Šimík 2017] of Šimík (2021).

Summary   The study of the syntax–information structure relation has yielded a host of proposals – from those where the relation is very loose, to those where it is very tight. The diagram in Figure 9 lays out the tightness of the relationship by means of a series of yes-no questions. The more yes-answers, the tighter the relationship. My own approach falls together with Rooth (1985); see section 4.[43]
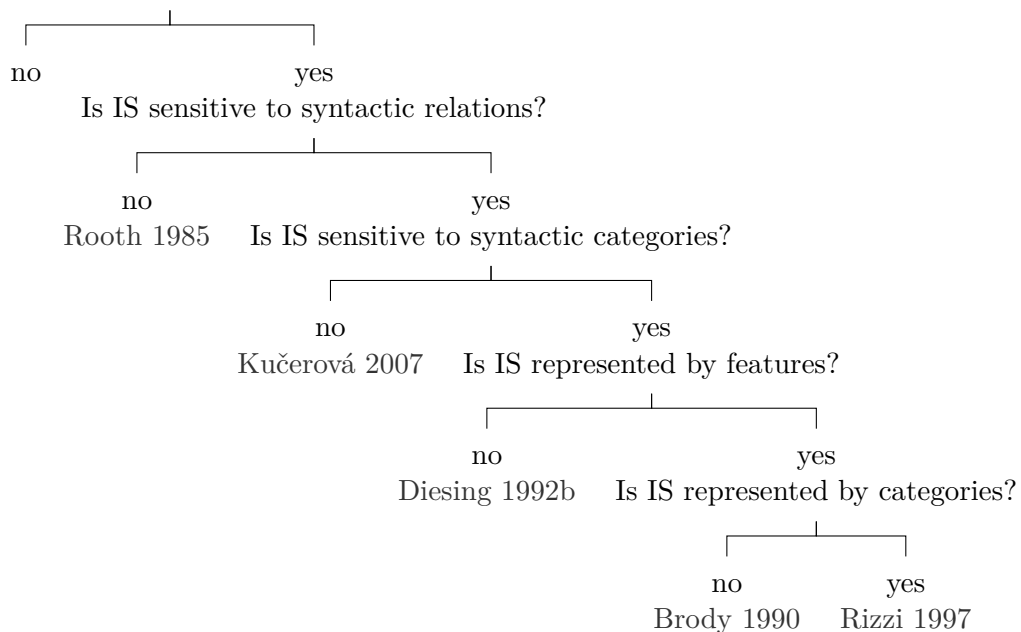

Figure 9: Types of theories of the syntax–information structure interface

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[43]The diagram presupposes that categories are a special case of features, namely features which can project their own phrases and (typically) have a fixed position in the functional sequence.

A note on information structural syntactic levels   Right before or around the advent of generative minimalism, some researchers pondered the possibility of there being a syntactic representation dedicated to the encoding of information structure. Vallduví (1992), for instance, proposed that information structure is a syntactic level on a par with D-structure, S-structure, or LF. More particularly, he assumed that the S-structure is mapped to two abstract levels – LF (standard since May 1977) and IS. The former is used as input to the derivation of truth conditions, the latter is an interface to discourse pragmatics. Similar proposals were made by Bailyn (1995) (functional form), Erteschik-Shir (1997) (focus structure), Zubizarreta (1998) (assertion structure), and, in a way, as early as in Daneš (1964b) (utterance organization). Seen from the perspective of the above discussion, these kinds of approaches usually align with those sensitive to syntactic relations. The extra syntactic level is designed to encode information structural partitions (such as focus–background) by syntactic relations – typically sisterhood (à la Neeleman & van de Koot 2008), at least where this has not been achieved at S-structure. Yet, having an extra syntactic level for information structure encoding is a relatively serious step towards integrating information structure in the syntax and thus bears the burden of evidence from the perspective of the null hypothesis, namely that information structure is part of (discourse) pragmatics and pragmatics interacts with syntax loosely.

3.2   Semantics–information structure

The role of semantics is to interpret sentences and their parts – phrases, words, morphemes. The meaning of a sentence corresponds to its truth conditions; as Wittgenstein (1922: 4.024) put it, "To understand a proposition means to know what is the case, if it is true." Moreover, truth conditions are derived compositionally: "One understands [the proposition] if one understands its constituent parts." (*ibid.*) Czech speakers will know that (43a) is true if and only if David offended Ben. These truth conditions are derived from the meanings of *David, urazil,* and *Ben(a).* Czech speakers will also know that the truth conditions of (43b) are different, despite the same words being used. The meanings are logically independent – (43a) can be true without (43b) being true, and conversely. This simple example shows that morphosyntax (case, subject-/objecthood) affects truth conditions in a critical way – it affects the way in which simple meanings are composed into more complex ones. But that is no surprise – we know that syntax and semantics interact very closely.

(43)   a.   David   urazil   Bena.
             David.NOM offended Ben.ACC
             'David offended Ben.'

       b.   Ben   urazil   Davida.
             Ben.NOM offended David.ACC
             'Ben offended David.'

The last main component of semantics has to do with semantic presuppositions. Semantic presuppositions are conveyed by particular expressions, such as *(ne)přestal* '(didn't) stop(ped)' in (44). Notice that the presence of negation affects the truth conditions of (44): if negation is present, the sentence is true if and only if David (still) calls Ben. If it is absent, it is true if and only if David doesn't call Ben (anymore). Yet one part of the meaning remains unaffected, namely the presupposition that David used to call Ben.

(44)   David   (ne-)   přestal   telefonovat Benovi.
        David.NOM NEG- stopped calling   Ben.DAT
        'David didn't stop calling Ben.'

Now consider the pair of utterances in (45). They clearly differ in focus placement and it is likely that (45b) involves a (contrastive) topic, which is not necessarily present in (45a) (ultimately depending on the utterance situation and context). Despite the difference in information structure, the two utterances have indistinguishable truth conditions: both are true if and only if David offended Ben. Importantly, the two do not differ in presuppositions either. While it might seem at first that (45a) presupposes that David offended somebody, whereas (45b) presupposes that somebody offended Ben, simple context manipulations show that these are at most pragmatic inferences, not presuppositions. For instance, (45a) can be used as a reaction to the claim that David never offended anyone.

(45) a. David   urazil   [Bena]$_F$.
          David.NOM offended Ben.ACC
          'David offended Ben.'

      b. [Bena]$_{(C)T}$ urazil   [David]$_F$.
           Ben.ACC   offended David.NOM
          'David offended Ben.'

This informal discussion clearly suggests that there is no (direct) relation between semantics and information structure. That is to be expected if information structure is part of pragmatics and if pragmatics and semantics interact only very loosely.

   The only systematic interaction between semantics and information structure has to do with the phenomenon of association with focus. The two sentences in (46) have different truth conditions (as evidenced by the entailments below the examples) and this is due to the different placement of focus.

(46) a. Dave only introduced [Celia]$_F$ to Ben.
          $\models$ Dave didn't introduce anybody else (than Celia) to Ben.

      b. Dave only introduced Celia to [Ben]$_F$.
          $\models$ Dave didn't introduce Celia to anybody else (than Ben).

Despite this kind of evidence, semanticists have been hesitant in allowing semantics too much access to information structure. The problem is that focus sensitive particles like *only* seem to represent a closed and unproductive class of expressions. While there have been attempts to treat adverbial quantifiers (such as *always, usually*) as focus sensitive, too (which would open the class significantly), the general consensus among semanticists is that focus sensitivity is a highly restricted phenomenon. Beaver & Clark (2008: 153), for instance, put forth the contrast in (47) (building on previous observations of Rooth 1992 and von Fintel 1994), which illustrates that *always* – unlike *only* – does not associate with focus in a direct way.

(47) a. ??People who [grow]$_F$ rice only [eat]$_F$ it.
          Intended: 'People who grow rice eat nothing but rice.'

      b. People who [grow]$_F$ rice always [eat]$_F$ it.
          'Whenever people who grow rice eat, they eat rice.'

The brief discussion above, centered around the notion of focus, gives a rough impression of how information structure and semantics are (not) related. For a recent survey of this relation which concentrates not just on focus, but also on givenness and topicality, see Hinterwimmer (2011). Hinterwimmer comes to the conclusion that the relation is indirect.

   In the rest of this section, I give a quick overview of a few (types of) theories which differ in the degree to which information structure is integrated in semantics (and syntax). Again, my goal is not to evaluate these theories, but rather to provide a sense of how the semantics–information structure interface has been implemented.

Rooth's (1992) pragmatic theory Rooth (1992) proposed a pragmatic theory of focus interpretation, which is still widely adopted. The theory postulates two points of contact between information structure and semantics: the F-marker, which gives rise to focus alternatives (the focus semantic value; see section 2.1), and the abstract $\sim$ operator (called the "squiggle"), which interprets the focus alternatives by relating them to some contextually salient set of alternatives (C). Consider the question–answer pair in (48), where Ben's answer is formulated as the logical form (i.e., it includes the squiggle operator and the C variable). As indicated in (49), the squiggle introduces the semantic presupposition (= definedness condition) that the focus semantic value of its complement (*Celia called*) is a superset of a contextually salient set of alternatives – the value of the variable C_3, as provided by the assignment function g. In (48), this presupposition is satisfied because the value of C_3 is the denotation of the wh-question, which happens to be the set of two propositions (simplifying a bit), namely that Dave called and that Celia called. The focus semantic value is the set of all propositions of the form x called, for any individual x. (Note that this is a formalization of the so-called question–answer congruence.) The ordinary semantic value of Ben's answer is then identical to that of the squiggle's complement – *Celia called.*

(48)   A   Who called – Dave or Celia?
           B $\sim_{C_3}$ Celia$_\text{F}$ called.

(49) $[\![\sim_{C_3}$ Celia$_\text{F}$ called$]\!]^g_o$ is defined if $[\![$Celia$_\text{F}$ called$]\!]_f \supseteq g(3)$; if defined, then
          $[\![\sim_{C_3}$ Celia$_\text{F}$ called$]\!]^g_o = \lambda w[\text{CALLED}(\text{CELIA}) \text{ in } w]$

The association of particles with focus is then treated indirectly: the squiggle operator relates the focus semantic value with the context, and focus sensitive particles quantify not directly over focus alternatives, but over contextually provided alternatives – the value of C_3. An example is provided in (50).

(50)   a.   Only$_{C_3}$ $\sim_{C_3}$ Celia$_\text{F}$ called.
          b. $\forall p[p \in g(3) \wedge p(w_0) = 1 \rightarrow p = \lambda w[\text{CALLED}(\text{CELIA}) \text{ in } w]]$

Rooth's (1992) theory has undergone various refinements (including by Rooth himself; see Rooth 1996, 2016), the most significant of which is probably the transition from association with focus to association with question under discussion. The idea, which has its roots in Roberts (1996) (also published as Roberts 2012) and which is, in a sense, a generalization of Rooth's (1992) analysis of the question–answer case, gained momentum by the publication of Beaver & Clark (2008). The basic tenets of Rooth's (1985; 1992) alternative semantics have also been adopted by scholars who have attempted to get rid of F-marking in syntax and have proposed that information structure properties are read off directly from phonological (and possibly morphological) representations; see esp. Reinhart (1997, 2006); Szendrői (2001); Büring (2015, 2016a).

Structured propositions (and predication-based theories) According to the structured propositions theory, the information structural partitions correspond to syntactic and semantic partitions. This kind of theory has been proposed for modelling the topic–comment division (Dahl 1974; Reinhart 1981) and the focus–background division (von Stechow 1982, 1991; Krifka 2001, 2006). On the syntactic side, the theory of structured propositions corresponds to those theories which assume sensitivity to syntactic relations. In semantics, structured propositions are represented as ordered pairs (or more generally tuples), where focus and background (or topic and comment) are represented as members of that ordered set, and are sometimes complemented by another member, representing the set of alternatives to the focus, as schematically demonstrated in (51). (52b) is then an example of the representation of the utterance in (52a). As the example makes evident, the background is represented as a predicate and the focus as its argument. A standard proposition can thus be derived from the structured proposition by

applying the focus to its background.

(51) ⟨background, focus, alternatives⟩

(52) a. Alice visited [Ben]$_F$.
      b. ⟨$\lambda x \lambda w[\text{VISITED}(\text{ALICE}, x) \text{ in } w]$, BEN, {BEN, DAVE, CELIA}⟩

Structured propositions represent a more powerful instrument that Rooth's (1992) alternative semantics and the issue is still under debate whether the power is needed or whether it overgenerates; the debate is mostly oriented towards the meaning of questions and their answers – see Dekker et al. (2007); Krifka (2011); Roelofsen (2019).

The tool of structured propositions (or more generally structured meanings) was proposed in the early days of formal semantics (e.g. Cresswell 1973) and has been used for genuinely semantic purposes such as belief ascriptions or control (see, e.g., Chierchia 1989). From this perspective, modelling information structure by structured propositions presupposes a relatively tight relation between information structure and semantics.

Structured meanings are related in spirit to modern **predication-based approaches** to focus (Wedgwood 2003, 2006; É. Kiss 2006).[44] The only substantial difference is that the predicate–argument relation is reversed: focus functions as the predicate and its background as the argument. Various semantic effects of focus (mainly exhaustification, for Wedgwood, and identification, for É. Kiss) are assumed to follow from this.

Quantification-based theories Quantification-based theories attempt to assimilate information-structural clausal partitions to the clausal partition imposed by the mechanism of restricted generalized quantification. In the theory of generalized quantification (Barwise & Cooper 1981), propositions with quantifiers are divided into three basic parts: the quantificational determiner or adverb, the restrictor, which restricts the domain of quantification, and the quantificational nucleus. Two examples – one for determiner-based quantification and another for adverbial quantification – are provided in (53). The simplified logical forms that explicate the tripartite quantificational structure of (53) are provided in Figures 10 and 11.

(53) a. Most animals have legs.
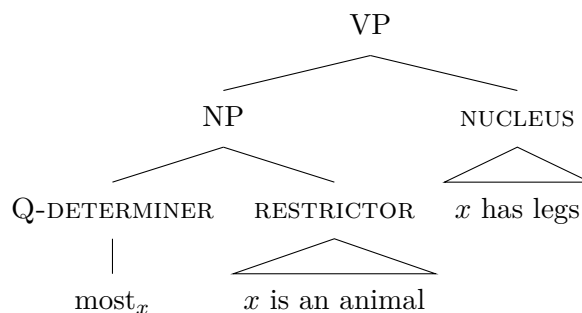   b. Animals usually have legs.

Figure 10: The tripartite quantificational structure of (53a)

How is this tripartite quantificational structure exploited for purposes of information structure? The idea is that the restrictor corresponds to the background (or possibly topic) and the nucleus to the focus (or possibly comment). A classical empirical argument for this position comes from the contrast in (54) (from Halliday 1970). The utterance in (54a) is a natural way of pronouncing a warning – posted nearby an escalator – to a traveler accompanied by a dog. The

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[44]By "modern" I intend to delimit these theories from the 19th century psychological school of information structure. See section 3.
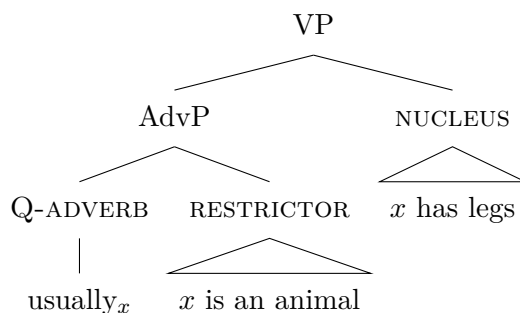
Figure 11: The tripartite quantificational structure of (53b)

utterance conveys that it must be the case that (= quantifier) if you are a traveler with a dog (= restrictor), you carry the dog (= nucleus). Thus, the prosody indicates that the unstressed *dogs* belongs to the restrictor and the stressed *be carried* to the nucleus. Uttering the sentence as in (53b) leads to a comical effect. The utterance conveys that it must be the case that (= quantifier) if you are a traveler (= restrictor), you carry a dog (= nucleus). Stressing *dogs* makes the utterance into a thetic (all-comment/all-focus) statement and the whole statement thus functions as the nucleus.[45]

(54) a. Dogs must be <u>carried</u>.
      b. <u>Dogs</u> must be carried.

This kind of theory of information structure – based in the core notions of structural semantics – was first proposed by Partee (1992). It is also considered in Peregrin (1996). Herburger's (2000) monograph is by far the most worked-out version of this kind of theory, embedded in neo-Davidsonian event semantics. Regarding the syntax–information structure interface, quantification-based theories are sensitive to structural relations and possibly even syntactic categories – at least to the extent that quantificational determiners or adverbs have a dedicated syntactic category.

4 Towards an indexical theory of information structure

The hypothesis defended in this thesis is that information structure interacts with syntax and semantics only in a very loose way. Information structural concepts are defined entirely pragmatically. All that makes them syntactic and semantic is that the concepts are conceived of as properties of syntactic and semantic units. Yet, so far I have assumed a fairly non-technical syntactic/semantic treatment of focus-, givenness-, and topic-marking, relying on pretheoretical subscripts (F, G, T) indicating the information status of constituents. What are these subscripts? Do they have any ontological (syntactic and/or semantic) reality or are they just notational devices? In this short section, I would like to suggest a preliminary answer to this question.

Information structure, being part of discourse pragmatics, has a natural affinity to reference tracking. A prime example of this is the notion of givenness, which is closely related to discourse anaphoricity. A given constituent bears a specific relation to another constituent in previous discourse, and marking the given constituent as such is thus an instrument of discourse coherence and effective communication. Note that it is insufficient to simply equate givenness with discourse anaphoricity, as expressed by canonical grammatical devices such as pronouns or definite descriptions. First, given constituents are hyperonyms (and possibly synonyms) of their antecedents; remember that the word *nuts* is given by virtue of *walnuts* having already

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[45]Restricting the quantification to travelers is a result of a pragmatic, world-knowledge-based process.

been mentioned (see section 2.2). Compare this with pronouns like *they* or *some* (plus ellipsis); these expressions require identity of reference or denotation (i.e., synonymy), hyperonymy is not sufficient. If I say *I had walnuts and Mary also wanted them/some,* the expressions *them/some* can only denote walnuts, not nuts. Another important difference is that while pronouns have anaphoric *uses* – and can generally also be used in other ways, e.g. deictically – givenness is inherently discourse-based. In front of a stand selling walnuts, one can say (out of the blue) *I want those/some,* but one can hardly say *I <u>want</u> walnuts,* deaccenting *walnuts,* and hence marking them as given. The reason is that there is no *discourse* antecedent for *walnuts.*

Despite these differences, suggesting a genuinely discourse-based nature of givenness as opposed to pronouns, there is a clear functional overlap between givenness and pronominal expressions. Therefore, it makes sense to make use of the technical means normally used for pronominal reference. Pronominal reference is standardly modeled by numerical indices, such as the index 1 on *them* in (55a) and a dedicated assignment function, called g, which maps indices to referents (or other kinds of denotations). By analogy, we can take the pretheoretical givenness-marking assumed thus far to be a special kind of indexing, cf. (55b). This dedicated givenness index G1 is then interpreted by a dedicated assignment function, which I refer to as γ (for givenness). The index contributes the presupposition that the indexed (given) constituent is related to an appropriate discourse antecedent, but does not (directly) affect the truth conditions.

(55)   a. $[\![\text{Dave loves them}_1]\!]^g$ presupposes that $g(1)$ is an identifiable plural referent and denotes truth if Dave loves $g(1)$.

        b. $[\![\text{Dave loves nuts}_{\text{G1}}]\!]^{g,\gamma}$ presupposes that $\gamma(\text{G1})$ is a hyponym or synonym of $[\![\text{nuts}]\!]$ mentioned in previous discourse and denotes truth if Dave loves nuts.

The G-index does not only impose a discourse-related condition, but can also affect the formal realization of the indexed constituent. An example of this is the lack of stress; see section 2.2. This theory of givenness-marking is thus compatible with the standard minimalist T-model (or, Y-model) of grammar, in which the syntactic module produces a representation which functions as the input to both the semantic and phonological interpretation.

Finally, the theory is consistent with the hypothesized loose relationship between information structure and syntax/semantics. Givenness accesses syntax and semantics in the form of an unstructured referential index assigned to virtually any syntactic constituent. The interpretation of the index is technically similar to the interpretation of other indexed expressions – particularly pronouns – but it is, at the same time, different in an important respect: the value of the index is crucially resolved based on discourse, which is in line with givenness being inherently discourse-based.

Is this kind of theory applicable to other information structural notions, too? Kratzer (1991) provides an affirmative answer for the notion of focus. Kratzer conceptualizes Jackendoff's (1972) and Rooth's (1985) F-markers as referential indices which are interpreted by a dedicated ("distinguished" or "designated" in Kratzer's terms) assignment function, called by Kratzer h, which generates the set of alternatives with which we became familiar in section 2.1. In this theory, which bears significant resemblance to Rooth's (1992) theory of focus interpretation, expressions have ordinary and focus semantic values. The focus semantic value is derived by varying over the values of the distinguished assignment function h, see (56b-i)/(56b-ii), and it turns out to be (mostly) equivalent with the value predicted by Rooth (1992); cf. (56b-iii).

(56)   a. $[\![\text{Dave}_{\text{F1}} \text{ loves Alice}]\!]^g_o$ is true if Dave loves Alice

        b. $[\![\text{Dave}_{\text{F1}} \text{ loves Alice}]\!]^g_f$

            (i) $= \{[\![\text{Dave}_{\text{F1}} \text{ loves Alice}]\!]^{g,h} : h$ is a distinguished assignment function$\}$

            (ii) $= \{\text{LOVES}(\text{ALICE}, h(\text{F1})) : h$ is a distinguished assignment function$\}$

            (iii) $= \{\text{LOVES}(\text{ALICE}, x) : x$ is an entity$\}$

The case where Kratzer's (1991) theory pays off is illustrated by the so-called Tanglewood example in (57). The variable nature of the F-marker in this example turns out significant, as it remains preserved in the resolution of the VP-ellipsis. The sentence is true if I went to Tanglewood because you went to Tanglewood, and at the same time it does not hold that I went to any other place$_i$ because you went to that place$_i$. This variable-like behavior of focus is captured by Kratzer's (1991) theory, but remains unexplained in Rooth's (1992) theory.

(57) I only went to Tanglewood$_{F1}$ because you did.

Kratzer's (1991) theory has not been widely adopted, perhaps because it is, for the most part, almost equivalent to Rooth (1992). Important and influential uses and/or further developments of this theory include Wold (1996) and Beck (2006). For a recent reconsideration of Kratzer's (1991) original argument, see Erlewine & Kotek (2018) and Bassi & Longenbaugh (2020).

Šimík (2021) contains a chapter, namely chapter 2 [Leffel et al. 2014], which argues for Kratzer's (1991) indexical theory of focus based on morphological evidence. In particular, it shows how focus in the Bantu language Basaá is in some cases accompanied by pronominal morphology. A similar point can be made based on evidence from Czech pronouns. As observed already by Sgall (1967), the strong form of pronouns is reserved for contrastive (focused/contrastively topicalized) uses of pronouns. Consider (58), where (58a), using the clitic form of the pronoun, is compatible with all-focus structure, but (58b), using the strong pronominal form, entails focus on the pronoun.

(58) a. [Pozvala jsem   ho.]$_F$
           invited   AUX.PST.1SG him.CL
           'I invited him.'

      b. Pozvala jsem   jeho$_F$.
           invited   AUX.PST.1SG him.STR
           'I invited him.'

Using Kratzer's (1991) theory, we can interpret the strong pronoun *jeho* compositionally: while *ho* contributes the standard pronominal variable, the prefix *je-* (diachronically a pronominal element, too) contributes the variable dedicated to focus interpretation, as schematized in (59).

(59) je-$_{F3}$ho$_5$

I will leave the technical implementation of (contrastive) topic open. However, I should point out that there is tentative evidence that (contrastive) topics could be conceptualized in terms of indexed expressions, too. One such piece of evidence comes from clitic doubling, well-known from Romance and Balkan languages, whereby topics, esp. left-dislocated topics are obligatorily doubled by a pronominal clitic. This pronominal element could be yet another example of overt morphological expression of information structural properties of constituents.

To summarize, in this section I have sketched a theory of the information structure–syntax/semantics interface which is compatible with my hypothesis that information structure has a very loose relationship with syntax/semantics. The point of contact between the two domains is the referential index. Referential indices are – from the viewpoint of syntax and semantics – extremely versatile devices which constitute or modify the interpretation of various expressions. They can attach to syntactic expressions of any category, a property that is indirectly manifested by the wide range of types of entities that pronouns can refer to (from human and inanimate entities, through places and times, to properties or propositions) and often remain phonologically unrealized, as is the case with empty subjects or objects, movement traces, but also expressions like *mum, home,* and many others, which are arguably endowed with a covert index whose referential value contributes to their overall meaning. Information structural indices assumed here thus represent yet another use of a very general grammatical mechanism

mediating between syntax, semantics, and pragmatics. Finally, let me make clear that the above paragraphs should not be mistaken for a worked-out theory. They are a mere sketch of something that could eventually become a theory – if it were properly technically implemented and supported by empirical evidence. Unfortunately, such an endeavor would make for another book and will have to be left for another occasion. Also the articles/chapters that follow do not constitute an argument in favor of this particular theory of information structure (with the exception of Chapter 2 [Leffel et al. 2014]). Rather, they constitute an argument in favor of the hypothesized loose relationship between information structure and syntax/semantics and, while they are compatible with the overall assumptions introduced in section 2, they remain agnostic with respect to the particular theory of the information structure–syntax/semantics interface.

5 Chapter by chapter overview

This section provides a brief summary of each of the following chapters. The summaries are concluded by a paragraph explicating the relation between the chapter and the core hypothesis. All the chapters have been (or soon will be) published in refereed journals (Chapters 4, 5, 3, 8), refereed collective volumes (Chapters 6, 7, 10), or prestigious conference proceedings with refereed abstract submissions (Chapters 2, 9).[46]

5.1 Chapter 2: Pronominal F-markers in Basaá

In Chapter 2 [Leffel et al. 2014] we analyze a family of cleft-like constructions in the Bantu language Basaá, illustrated in (60). The puzzling property of some of these constructions – particularly of (60a), (60b), and (60c) – is the presence of what we call the left-peripheral pronoun (LP) – *nyɛ́* 'him' in the examples below. This pronoun accompanies a fronted constituent – the object *Hiɔl* below – if and only if the interpretation of the utterance involves reference to alternatives to this constituent. In other words, the pronoun surfaces if the fronted constituent is focused (see section 2.1) or contrastively topicalized (see section 2.3). In addition, some of these constructions involve a resumptive pronoun (RP) (reminiscent of Romance or Balkan clitic doubling) and some involve an affix on the left-peripheral pronoun, whose function corresponds to the one of focus-sensitive particles (see sections 2.1 and 3.2).

(60) a. Hiɔl **nyɛ́ -n** ɓalêt   ɓá- bí- náŋâ
          1.H. 1.him -N 2.teachers 2.SM- PST2- invite
          'It was Hiol that the teachers invited.'   (**-*n*-clefting:** LP-*n*)

      b. Hiɔl **nyɛ́ -k,** ɓalêt   ɓá- bí- náŋá **nyɛ́**
          1.H. 1.him -K 2.teachers 2.SM- PST2- invite 1.him
          'The teachers invited Hiol, too.'   (**-*k*-clefting:** LP-*k*, RP)

      c. Hiɔl **nyɛ́,** ɓalêt   ɓá- bí- náŋá **nyɛ́**
          1.H. 1.him 2.teachers 2.SM- PST2- invite 1.him
          'Hiol, the teachers invited.'   (**CT-fronting:** LP, RP)

      d. Hiɔl**,** ɓalêt   ɓá- bí- náŋá **nyɛ́**
          1.H. 2.teachers 2.SM- PST2- invite 1.him
          'As for Hiol, the teachers invited him.'   (**T-fronting:** RP)

We account for these observation by exploiting an index-based theory of focus (building on Kratzer 1991; also see section 4), analyzing the left-peripheral pronoun as an overt focus index (focus marker) placed on the fronted constituent. The presence of the index thus entails the

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[46]The notational conventions in the chapter summaries follow the conventions used in the individual papers.

presence of alternative denotations, which can either be semantically "free" (subject to pragmatic enrichment) or "bound" by the affix (thereby yielding a semantic – presuppositional effect).

The Basaá left-peripheral pronoun illustrates that syntax/semantics accesses information structure not via specific information structural categories (see section 3), but rather via an independently existing mechanism, namely that of pronouns. Primarily, a pronoun denotes a variable which receives a contextually salient value. In our analysis, Basaá left-peripheral pronouns are variables too, though special kinds of variables, whose values do not contribute to the core meaning of the proposition – the ordinary semantic value, but rather to the focus semantic value.

5.2 Chapter 3: The morphosyntax of exhaustive focus: A view from Awing

In this paper [Fominyam & Šimík 2017] we investigate the role of a focus particle – *lə́* – in the Grassfields Bantu language Awing. Our questions concerned the morphosyntactic and semantic nature of this particle, which at first sight always precedes the focused constituent, as illustrated in (61). Our hypothesis was that the contribution of this particle, despite initial appearances, is *not* primarily information structural.

(61) Ayafor a- yó- yíə **lə́** ndé$_F$ nɨ́ ŋkáp ʒíə.
       Ayafor SM- F1- come LE house with money his
       'It is to the house that Ayafor will come with his money.'

We first show that the particle *lə́* is not required in contexts in which mere prosodic prominence would be used in the languages of Europe. In other words, *lə́* does not encode focus in the sense of Rooth (1992) (see section 2.1). In fact, Awing does not encode this notion of focus formally at all. We then show that, despite the initial appearance, the particle *lə́* is not adjoined to the focused constituent, but rather has a fixed position in the extended verbal projection of Awing – being sandwiched between the category of Agr (hosting the subject agreement marker) and Tense. The way the particle associates with the focused constituent resembles the behavior of 'only' in languages like Czech or German (cf. Büring & Hartmann 2001): the constituents get "reassembled" by standard syntactic operations in such a way that the focus ends up being the closest constituent to the particle. Importantly, the operations themselves are not intrinsically tied to information structure. They are needed in order to give rise to the intended enriched meaning, namely a presupposition of exhaustiveness. In other words, the role of *lə́* is not just to encode focus, but to make a semantically stronger claim about it.

The ostensible existence of "focus morphemes" is sometimes used as evidence for a tight relationship between morphosyntax and information structure (see, e.g., Aboh 2004, 2010). Our analysis of the Awing particle *lə́*, which shares some properties with the purported "focus morphemes" in other African languages, reveals that the appearance can be deceptive. Focus itself is not formally encoded in Awing. The contribution of the particle is not information structural, but rather semantic. The results are thus consistent with the loose syntax–information structure relationship defended in Šimík (2021).

5.3 Chapter 4: The role of givenness, presupposition, and prosody in Czech word order

This chapter [Šimík & Wierzba 2015] asks the questions of (i) what semantic notion of givenness is relevant for prosodic and word order phenomena in Czech and (ii) whether givenness interacts more strongly with prosody or word order. We hypothesized that givenness is defined in terms of a relation to a discourse antecedent (see section 2.2) and that the additional assumption that given nominals must be specific (presupposing the existence of a referent), argued for by Kučerová (2007, 2012), is too strong and should be dropped. This is the null hypothesis, seen from the perspective of what had been argued for English, e.g. by Schwarzschild (1999), and

also from the view of information structure as being only pragmatic. Concerning our second question, we hypothesized that givenness interacts primarily with prosody and only secondarily with word order.

We present two acceptability rating experiments, in which we manipulate prosody, word order, presuppositionality, and givenness. An example of an item from one of the experiments is provided in (62) for illustration (boldface = sentence stress; the items were recorded and presented auditorily). The context ("definite" vs. "indefinite") manipulates the presuppositionality of the target nominal – *potkana* 'rat' – in the target utterance. In the "definite" context, the nominal receives a determinate reading (also: specific, definite, presuppositional; see section 2.6 for discussion), while in the "indefinite" context, the very same nominal receives an indeterminate (also: non-specific, indefinite, existential) interpretation. Despite this semantic difference, affecting Kučerová's (2007) stronger notion of givenness, the nominal counts as given in the weaker sense of being extensionally identical to a contextual antecedent. If having a proper discourse antecedent is what counts for givenness, the marked OV order should be acceptable independently of the context. In addition, if givenness primarily interacts with prosody rather than word order, the canonical VO order with a marked prosody – stress on V (condition (62b)) – should lead to an acceptability increase relative to the case with a canonical, clause-final prosodic prominence (condition (62c)).

(62)   *Definite context:* 'I don't know how long we will tolerate this. We have to get rid of that rat in the cellar.'
Indefinite context: 'I don't know what you are talking about. There have never been rats in our cellar.'

     a.   No, volal mi Jirka, že   prý   právě potkana **objevil**.
            well called me J.   that allegedly just   rat   found
            'Well, Jirka called and said that he has just found the rat.'   **O**V
     b.   No, volal mi Jirka, že prý právě **objevil** potkana.   **V**O
     c.   No, volal mi Jirka, že prý právě objevil **potkana**.   V**O**
     d.   No, volal mi Jirka, že prý právě **potkana** objevil.   **O**V

The results are in line with our hypotheses. First, it is sufficient to define givenness in terms of discourse pragmatics. Givenness in this weaker sense has detectable effects on form. Second, this weaker notion of givenness interacts primarily with prosody; word order alternations are driven by prosodic optimization. Finally, an additional finding is that presuppositionality – independently of givenness – interacts, albeit relatively weakly, with word order.

The chapter constitutes evidence for the proposed loose syntax–information structure relation. It is evident from our results that word orders which violate a given–new partition are acceptable, as long as prosodic constraints are satisfied. A given–new partition – and thereby a configurational syntactic encoding (see section 3) – therefore turns out unnecessary, or in fact too strong in that it rules out acceptable forms. Moreover, the results support a loose relationship between information structure and semantics, showing that presupposition (a semantic notion) is in principle independent of givenness (a discourse pragmatic notion) and that the effects of the two notions are detectable independently of one another.

5.4   Chapter 5: Expression of information structure in West Slavic

In this chapter [Šimík & Wierzba 2017] we ask whether information structure – mainly givenness (section 2.2), but also focus (section 2.1) – is expressed by prosodic or by word order means in three West Slavic languages – Czech, Slovak, and Polish. Our hypothesis is that the prosodic expression of information structure is primary.

In order to test the hypothesis, we devised a series of acceptability rating experiments (in three language mutations) manipulating givenness, focus, prosody, and word order. An exam-

ple of a Czech version of an experimental item from one of the experiments is provided in (63) (boldface = sentence stress; the items were recorded and presented auditorily). In this experiment we manipulated the position of the direct object, which was given, relative to three other constituents – the subject, the verb, and a prepositional phrase, of which all were new, except for the subject, which was either given or new, depending on the context. If given elements are required to precede new ones, as configurational theories of givenness would predict (see section 3), condition (63d) should be more acceptable than any other one if the subject was new, and (63c) or (63d) should be more acceptable than the others if the subject was given. If, on the other hand, givenness is expressed by the lack of sentence stress, all conditions except for (63a) should be acceptable. The results corroborate the latter hypothesis for all three languages, though with interesting differences among them.

(63) [Context 1: 'Do you have an idea why Marta made a phone call?'] (S new)
      [Context 2: 'Do you have an idea why Marta called her aunt?'] (S given)

   a. Protože prý   teta   poveze do nemocnice **Martu**.   (S V PP **O**)
       because allegedly aunt.NOM take   to hospital   Marta.ACC

   b. Protože prý teta poveze Martu do **nemocnice**.   (S V O **PP**)

   c. Protože prý teta Martu poveze do **nemocnice**.   (S O V **PP**)

   d. Protože prý Martu teta poveze do **nemocnice**.   (O S V **PP**)
       'Because allegedly her aunt will take Marta to the hospital.'

Overall, the results of the experiments support our hypothesis that information structure is primarily expressed prosodically in West Slavic languages, despite their free word order. The paper is complemented by a modeling study. Factors assumed to play a role in determining the languages' prosody and word order are framed as violable constraints in a multiple regression model. These constraints are CANONICAL WORD ORDER (violated when a word order other than SVO is used), NUCLEAR STRESS RULE (violated when sentence stress is not placed clause-finally), *STRESS GIVEN (violated when a given element carries sentence stress), and GIVEN ≺ NEW (violated when a new constituent precedes a given constituent). In line with our hypothesis, the modeling study reveals that the ban on stressing given expressions plays a major role in determining the form of sentences in the three West Slavic languages. The tendency for given expressions to precede new ones is comparatively weak and highly inconsistent across different conditions.

The chapter constitutes cross-linguistic evidence for the proposed loose syntax–information structure relationship: givenness (and focus) interact with prosody rather than word order/syntax. The validity of these results is enhanced by the fact that we investigated three languages with very free word order, in which word order has typically been assumed to be the primary mode of expressing information structure.

5.5 Chapter 6: Stress shift, focus, and givenness in Czech

In this chapter [Groeben et al. 2017] we ask how prosodic prominence is distributed in Czech sentences involving focus and givenness manipulations. The main hypothesis is that focus and givenness are independent and that their prosodic effects can be distinguished from each other. Consider example (64), in which *Jiřího* carries sentence stress. This non-canonical (i.e., non-final) stress placement can be motivated in two ways: either *Jiřího* is focused or *k odchodu* 'to leave' is given. In the former case, *Jiřího* is stressed in order to satisfy the requirement for focus to bear stress; in the latter case, *Jiřího* is stressed in order to avoid the violation of the requirement for given elements *not* to bear stress. Notice that in the latter case, *Jiřího* need not be focused; in fact, we have manipulated the context in such a way that the whole sentence is interpreted as focus. The stress shift thus occurs *within* focus, rather than *to* focus.

(64) Marie   přiměla **Jiřího** k odchodu.
      Marie.nom convinced Jiří.acc to leaving
      'Marie convinced Jiří to leave.'

We propose a refinement of the standard stress–focus correspondence, which we call Stress Focus Rightmost.

(65) Stress Focus Rightmost (SFR)
      Sentence stress is realized on the rightmost element of the focus of the sentence.

If this constraint captures the distribution of prosody in Czech clauses, it makes the prediction that stress shifts more easily *to* focus than *within* focus. In consequence, (64) should exhibit a difference in acceptability depending on whether the stress shift is motivated by focus (higher acceptability) or by givenness (lower acceptability).

We present an experiment that tests the hypothesis. The results partly support it and partly remain inconclusive.

This paper does not directly test the main hypothesis of Šimík (2021). Rather, it works with the assumption that information structure primarily interacts with prosody (rather than syntax) and attempts to refine the exact correspondences between information structural categories and their prosodic realizations. It also contributes to the discussion of whether focus and givenness are reducible to a single notion (see section 2.4).

5.6 Chapter 7: Definiteness of bare NPs as a function of clausal position

In this paper [Šimík & Burianová 2020] we ask the question how the position of a bare (determinerless) NP within a clause interacts with its referentiality. Our starting point is the traditional observation that clause-initial bare NPs tend to correspond to definite NPs and clause-final ones to indefinite ones.[47] See the illustration in (66).

(66) a. Na stole je **kniha**.
          on table is book
          'There is **a** book on the table.'

      b. **Kniha** je na stole.
          book   is on table
          '**The** book is on the table.'   [Cz; Krámský 1972: 42]

There are many different ways in which this kind of observation has been built into theories of the word order–referentiality interface. According to one popular theory, the definite-like interpretation of a clause-initial bare NP is due to its topicality (see section 2.3), as topics – or more particularly aboutness topics – are considered to imply a referential status. Thus, while a bare NP can in principle correspond to a definite or an indefinite NP, it is interpreted as definite if it is topical. In a different class of theories, the relevant factor is not topicality (typically conveyed by clause-initiality), but rather presuppositionality (specificity), whereby a presuppositional interpretation amounts to definiteness in the case of bare NPs. What is important is that presuppositionality is conveyed not by the NP's absolute position in the clause (clause-initiality), but rather by its relative position to the verb: preverbal bare NPs are presuppositional, postverbal ones are not (see the discussion of Diesing's 1992b mapping hypothesis in section 3.1).

We tested these and other predictions in a corpus study. We annotated over 300 instances of Czech bare NPs for relevant formal factors (esp. position, but also number, function, etc.)

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[47]In this paper, we understand "definiteness" primarily as a semantic notion – what would probably better be called "determinacy" or "referentiality". See section 2.6 for discussion.

and semantic interpretation (definite vs. indefinite). We found there to be a very strong correlation between definiteness and clause-initiality, but no correlation between definiteness and preverbality. As a result, our study supports the topic-based approach to NP referentiality.

The strong correlation between definiteness and clausal position – possibly a proxy for topicality – is at first sight problematic for the hypothesis of Šimík (2021), namely that the relation between information structure (here: topic) and interpretation (here: definiteness) is very loose. The problem is, I believe, that referentiality has both semantic and pragmatic aspects. In order for bare NPs to be *used* as definite NPs (pragmatics), they do not need to have the *meanings* of definite NPs (semantics). It is possible that the denotation of bare NPs remains unaffected by its information status; it just must be general enough to afford both definite and indefinite uses. This view would in turn be compatible with the envisioned loose relationship between information structure and semantics. Chapter 8 looks more closely at the relationship and concludes that, indeed, a tight relationship between topicality and definiteness is not warranted.

5.7 Chapter 8: Definiteness, uniqueness, and maximality in lgs. with and without articles

In this chapter [Šimík & Demian 2020] we ask the question if bare (= determinerless) NPs in languages without articles can ever convey the same meaning as definite NPs do in languages with articles. The traditional claim is that they can: articleless languages just use different means than articles to convey the meaning, such as word order, prosody, grammatical aspect, case-marking, or grammatical number. These kinds of formal devices are called definiteness correlates in our paper. We contrast this traditional assumption with the idea that the lack of definite articles indicates the lack of definiteness-related meaning (Heim 2011). We test the hypotheses experimentally by manipulating definiteness in German and three kinds of definiteness correlates in Russian: word order, prosody, and grammatical number. An example of a subset of the manipulations is below: the definiteness manipulation in German (67) is correlated with the word order manipulation in Russian (68), where word order is considered a proxy for topicality. The experimental utterances were accompanied by pictures in which the uniqueness (or maximality for plurals) of the reference of the target nominal (*die/eine Lokomotive, vagon*) was manipulated and the participants were asked to judge the utterance–picture correspondence, using the so-called covered box paradigm (e.g. Pearson et al. 2011). We expected a relatively lower utterance–picture correspondence between utterances with definiteness (correlates) and pictures in which uniqueness is violated.

(67) Die Lokomotive musste anhalten.
      the locomotive had.to stop.INF
      'The locomotive had to stop.'

      a. Der Waggon hat sich   abgekoppelt.
          the carriage has REFL disconnected
          'The carriage got disconnected.'
      b. Ein Waggon hat sich   abgekoppelt.
          a   carriage has REFL disconnected
          'A carriage got disconnected.'

(68) Lokomotiv dolžen   byl ostanovit'sja.
      locomotive necessary was stop.INF.REFL
      'The locomotive had to stop.'

      a. Vagon   otcepilsja.
          carriage.NOM disconnected.REFL
          Hypothesis: 'The carriage got disconnected.'

  b. Otcepilsja   vagon.
    disconnected.REFL carriage.NOM
    Hypothesis: 'A carriage got disconnected.'

The results confirm the expectation for German, but not for any of the definiteness correlates in Russian. In other words, while German definite articles convey the uniqueness (or maximality) of reference, we found no evidence that topicality (expressed, e.g., by word order) does so. Our interpretation of the result is that while definiteness in languages with articles and word order (topicality) in languages without articles can be in functional (pragmatic) correspondence, possibly reflected in usage tendencies (cf. Šimík & Burianová 2020 [chapter 7]), there is no semantic match between the two strategies.

  The results of our experiment are in line with the hypothesis that the relation between information structure and semantics is very loose. In particular, the fact that a referential nominal phrase is topical does not yet mean that this pragmatic function has consequences for semantics, particularly uniqueness (or maximality) presuppositions. And indeed, we have found no evidence for such a semantic effect.

5.8 Chapter 9: On pragmatic demonstratives: The case of pragmatic discourse anaphora in Czech

In this paper [Šimík 2016] I propose a syntactic, semantic, and pragmatic analysis of nominal phrases modified by what I call pragmatic demonstratives. A pragmatic demonstrative is defined as a demonstrative which has no impact on the *semantics* of the nominal phrase it modifies (the semantics is constant, irrespective of the presence/absence of the demonstrative); it only has a *pragmatic* effect. Pragmatic demonstratives come in different flavors, including so-called affective demonstratives (a term coined by Liberman 2008), illustrated for Czech in (69a), or by what I call pragmatic discourse anaphoric demonstratives, illustrated in (69b).

(69) a. Ten náš tatínek nějak stárne.   (Mathesius 1926: 40)
    DEM our dad somehow gets.old
    'Our dad is getting old [and we feel affectionate about him].'
  b. Zítra přece jedu do té Prahy.
    tomorrow PRT go.1SG to DEM Praha
    'I'm going to Prague tomorrow [and I recently told you that].'

I argue that there is a systematic way in which pragmatic demonstratives can be related to canonical (semantic) demonstratives and in particular to the analyses of Elbourne (2008) and Schwarz (2009). These analyses work with the assumption that demonstrative descriptions constitute a superset of definite descriptions. That is, they are definites, but with an additional piece of meaning: a relation between the core definite and another – typically contextually or situationally determined referent. In canonical demonstratives, the referent is either present in the context, which gives rise to an anaphoric reading, or in the utterance situation, which gives rise to a deictic reading. The thesis I defend in this paper is that pragmatic demonstratives lack the definiteness core and all they do is relate the baseline denotation of the NP (which may be referential, but also non-specific) to another discourse entity. In the case of pragmatic discourse anaphora, illustrated in (69b), the NP refers to Prague, and the pragmatic demonstrative indicates that this denotation relates to some previous utterance – shared between the speaker and the hearer – where Prague was the topic.

  This paper does not directly address the issue of information structure–syntax/semantics relation. However, it aims to contribute to the understanding of the interface between semantics and discourse pragmatics. In line with the overall hypothesis and loosely also with the indexical theory of information structure (section 4), it defends the idea that semantics accesses pragmatics via unstructured indices which get their value from the context or extra-linguistic situation. In

the case of pragmatic demonstratives, the index is of a relational type and implies a relationship between the core NP denotation and a linguistic or extra-linguistic object.

5.9 Chapter 10: Inherent vs. accidental uniqueness in bare and demonstrative nominals

This paper [Šimík to appear] investigates the competition of bare (determinerless) vs. demonstrative nominal phrases in referential, but non-anaphoric and non-deictic uses. It is commonly assumed that non-deictic reference to situationally unique objects is achieved by the use of bare NPs in languages without articles (Běličová & Uhlířová 1996). An example of that is using *premiér* 'the prime minister' when it is clear from the utterance situation what country is being implied. However, there are some instances where the demonstrative is preferred. Consider the situation in (70). In that situation it is more natural to use the demonstrative to refer to the book (utterance B_2). Interestingly, a bare NP is used to refer to the computer (utterance B_1). This contrast holds despite the fact that both objects are referentially unique.

(70)   *Situation:* Two student assistants A and B are at their shared workdesk, which they share with other student assistants and where there's a computer and a couple of other things, including a book (it doesn't really matter to whom the book belongs). A is looking for a pencil, B says:

B_1 Nějaká tužka je vedle   {počítače   / #toho počítače}.
some   pencil is next.to   computer   DEM computer
'There's a pencil next to the computer.'

B_2 Nějaká tužka je vedle   {té   knížky / #knížky}.
some   pencil is next.to   DEM book   book
'There's a pencil next to the book.'

I argue that the contrast needed to distinguish between the two cases above is one of inherent vs. accidental uniqueness. Intuitively, it is always the case that there is a single computer at the shared workdesk of A and B; that is, the uniqueness of the computer is an inherent property of the workdesk situation. In contrast, it is not always the case that there is a single book at the workdesk; the uniqueness of the book is an accidental property of the particular situation described in (70). The claim is that inherent uniqueness is conveyed by bare NPs and accidental uniqueness by NPs with demonstratives.

This paper does not directly address the issue of the relation between information structure and syntax/semantics. However, it crucially exploits the notion of the topic situation – the situation that an utterance (or even clause) is about (see section 2.6) – and investigates how its properties influence the choice of referring expressions. The topic situation is modeled as a variable whose reference is determined pragmatically. Once again, pragmatics and syntax/semantics are in no intimate relationship. Their relation is mediated by unstructured referential indices.

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