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Psycholinguistic Approaches to Meaning and Understanding across Languages

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and Understanding across Languages

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Editors

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Foreword

At the first linguistics conference I attended as a student, one of the keynote speakers held forth on the syntactic analysis of English cleft sentences. During the discussion period, members of the audience questioned the grammaticality of one of the speaker's example sentences. There ensued a polite exchange of introspective judgments, which ended when the speaker declared that, be all as it may, the sentence in question was perfectly well-formed in his idiolect of English. Much to my surprise, this settled the matter straight away, and the discussion turned to more pressing issues.

I would have been surprised in any case, but what made the incident positively surreal, at least to my mind, was the fact that the speaker was Japanese and quite audibly not a native speaker of English.

From the 1960s onwards, the accepted methodology in theoretical linguistics was brazenly autobiographical. Based on edicts emanating from the Massachusetts Institute of Technology, it was taken as writ that it is the linguist's job to probe his or her personal "competence". Even as a timid student during the Reagan era, I had the uncanny feeling that this wasn't so much a methodology as a recipe for nonsense, but it was the received view, and it took a while before its influence started to wane.

Things have definitely changed, and even if the autobio approach remains alive, it's kicking a lot less than it used to. It has become widely accepted that quantitative methods can be useful even to those of us whose core business is designing theories of language, and the chapters of this volume demonstrate, both separately and collectively, how fruitful quantitative methods can be, especially when wielded by researchers who know what they're doing.

The following chapters cover an impressive variety of semantic and pragmatic topics, ranging from reference and aspect to coordination and conversational implicatures, information structure, and speech reports. The experimental methods brought to bear are no less diverse, including as they do various kinds of questionnaire and corpus studies, self-paced reading, and eye tracking.

And there's more. One of the chief dogmas of generative linguistics used to be that all human languages are essentially the same. It was claimed in all earnestness that a Martian scientist visiting our planet would have to conclude that all Earthlings

speak the same language, save for the obvious fact that their lexicons diverge. Nowadays it stretches belief that even in the recent past this view was taken seriously, but it has been extraordinarily influential both within linguistics and without, and perhaps it goes some way to account for the fact that most studies in semantics and pragmatics, theoretical as well as experimental, have been about one and the same language, that is to say, English. (Another part of the explanation, I fear, is that language researchers are as lazy as the next person.) This, too, has begun to change. There is an increasing awareness that the interpretative systems even of closely related languages like English and German are different in many fascinating ways, and every single chapter in this volume attests to the importance of the plurilingual approach.

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Preface

The idea/plan for this book evolved during a 1-year (2010/2011) research project "Meaning and Understanding across Languages", funded by the Centre for Advanced Study (CAS) at the Norwegian Academy of Science and Letters (see http://www.cas.uio.no/research/1011acrosslanguages/index.php) and headed by Cathrine Fabricius-Hansen. The editors and four other contributors (Bergljot Behrens, Oliver Bott, Lyn Frazier, and Torgrim Solstad) participated in the project, which brought together researchers representing different interests and disciplines: theoretical semantics and pragmatics, contrastive linguistics and psycholinguistics. Half of the chapters present collaborative results from that enterprise. We want to thank CAS for the wonderful time we spent there, and for enabling the publication of this book. We are also grateful to anonymous reviewers, whose comments on earlier versions of the individual papers have been extremely useful, and we thank Stig Oppedal for his efficient and conscientious proofreading.

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Introduction: Meaning Across Languages

Barbara Hemforth, Barbara Mertins, and Cathrine Fabricius-Hansen

Abstract In this chapter, we will introduce the basic research questions spanning all chapters in this volume: How do we 'encode' complex thoughts into linguistic signals, how do we interpret such signals in appropriate ways, and to what extent is what we encode constrained at the outset by the particular language we grow up with? We will introduce recent developments of an experimental approach to linguistics and argue for the necessity of cross-linguistic experimental paradigms for linguistic research at the interface of syntax, semantics and pragmatics.

Keywords Experimental linguistics • Cross-linguistic variation • Empirical methods

1   Main Objectives

Our use of language is an everyday affair, but our understanding of how we construe meaning in and through language is still unclear: Despite considerable progress over the last decades (cf. Breheny et al. 2013; Clifton and Frazier 2012; Kaschak and

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Glenberg 2000; Pylkkänen and McElree 2006) we are nonetheless far from having a clear picture of how we 'encode' complex thoughts into linguistic signals and how we interpret such signals in appropriate ways—or to what extent what we encode is constrained at the outset by the particular language we grow up with. These were the basic questions underlying the 1-year (2010/2011) research project "Meaning and Understanding across Languages"[1] at the Centre for Advanced Study in Oslo, out of which the plan for this book and half of its chapters evolved.

One reason why the questions raised above still await their answers is the scarcity of empirical data based on cross-linguistic comparisons suitable for testing different hypotheses or theoretical claims at the interface of syntax, semantics, and pragmatics. The complexity of the interactions at stake here often renders intuitive judgments obsolete, thus asking for controlled and systematic empirical tests of the proposed hypotheses. However, theoretical linguists and experimental (psycho-, neuro-) linguists have tended to work in parallel rather than in direct interaction with each other, in particular with respect to research on semantics and pragmatics. The domain is changing, however, and this volume strives to be part of this change. Experimental semantics and pragmatics and related approaches (e.g., Noveck and Reboul 2008) are quite recent but show increasing impact in current linguistic research (see Sauerland and Yatsushiro 2008 for a highly relevant collection of papers). Topics approached from an experimental perspective cover for example implicatures (e.g., Geurts 2010), presuppositions (e.g., Chemla and Schlenker 2012), and negation (Kaup et al. 2006; Shuval and Hemforth 2008; Giora et al. 2009). The "Questions under Discussion" framework (Ginzburg 1996; Roberts 1996) is contributing to new empirical perspectives (e.g., Clifton and Frazier 2012). What this volume has in common with the more recent literature is the intent to put thoroughly worked out theoretical hypotheses to an empirical test.

Importantly, experimental research on sentence processing has largely focused on (American and British) English. Although research on other European and non-European languages are more and more receiving the attention they deserve (e.g., Hemforth and Konieczny 2000; Bornkessel et al. 2003; Papadopoulou 2006; Yamashita et al. 2011; among many others), most published studies still concern English.[2] Cross-linguistic research in this vein has demonstrated quite clearly that an empirical, cross-linguistic approach is an essential condition for real progress even in theory design. By and large, however, it has concentrated on the role of syntactic properties (word order, case, syntactic complexity, etc.) in the interpretation and generation of utterances, leaving other relevant areas of cross-linguistic variation aside (but see for instance von Stutterheim and Nüse 2003; Schmiedtová and Sahonenko 2008, 2012; Hemforth et al. 2010; Colonna et al. 2012; von Stutterheim et al. 2012). However, phenomena relevant to experimental research in semantics

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[1]http://www.cas.uio.no/research/1011acrosslanguages/index.php

[2]For example, five recent issues of the journal *Language and Cognitive Processes* (Taylor & Francis) contain 13 papers on English and 9 on other languages (Chinese, Dutch, German, Hindi, Japanese, and Spanish).

and pragmatics are obviously in need of cross-linguistic validation as well. They can even become more visible in comparative research as many of the papers in this volume show. Cross-linguistic research demands empirical validation even more than research in a language that most of the community masters easily, since more often than not the subtleties of the languages under investigation are unknown to the interested reader. Most importantly, working on different languages makes it obvious that joining expertise in the relevant linguistic domains as well as in empirical research is becoming ever more necessary in modern linguistics. The research project at the Centre for Advanced Studies in Oslo led by Cathrine Fabricius-Hansen made this possible by bringing together researchers with joint research topics but different theoretical end empirical approaches.

In the spirit of this project, the present volume aims at integrating theoretically well-founded contrastive descriptions with thorough empirical investigations. It addresses the following overarching questions:

(i) What are the constraints that shape the accessibility of form-meaning pairs in the interpretation or generation of utterances?
(ii) What is the interplay between discourse relations and (core) grammatical properties in the interpretation or generation of utterances?
(iii) Which general cognitive principles govern the interpretation and generation of utterances and how do they interact with language specific properties?

A major theoretical issue concerns competition, i.e., the question of if and to what extent the availability of explicit means for expressing a linguistic function affects the interpretation of alternative forms, as entailed by the Gricean maxims (in particular the maxims of manner and quantity, Grice 1975; see also, e.g., Blutner 2000; Levinson 2000; Carston 2002; Zeevat 2014). How do the linguistic means available in a specific language system influence the interpretation of cross-linguistically seemingly parallel constructions? A relevant question for us will be to what extent these linguistic means are obligatory, whether they are grammaticalized, lexicalized, or fixed expressions. Across chapters, we will address the question of whether alternative linguistic means play the same role independently of the linguistic level they operate on.

In line with the general approach taken here, the present book emphasizes direct comparisons of at least two languages (Brazilian Portuguese, Czech, English, French, German, Norwegian, European Portuguese, and Turkish) in the majority of the papers or analyses of one language in comparison with well-established claims in the literature for the others. It focuses on semantic and discourse-related topics, offering semantic and pragmatic explanations of cross-linguistic differences and similarities in the generation and interpretation of utterances. Methodologically, it comprises a variety of online and off-line empirical methods, used in combination. These methods include sensicality judgments, cloze tasks, elicitation, self-paced reading, visual world eye-tracking, and corpus-based research (spoken and written).

The following sections specify in more detail the major topics (Sect. 2) and methodological approaches (Sect. 3) represented in this volume. Section 4 summarizes our main insights.

2 Specific Areas of Interest

2.1 Interpretation of Anaphoric Expressions

A major topic of psycholinguistic research is *anaphor resolution* and, more generally, the interpretation of referential expressions; the present book is no exception in this respect. What makes anaphor resolution particularly interesting in the comparative approach we are taking is that the realization of anaphoric expression differs considerably across languages and even within a language across constructions. The resolution of anaphoric expressions is moreover a central topic in theories of discourse representation, such as DRT (e.g., Kamp and Reyle 2011), SDRT (e.g., Lascarides and Asher 2007), and centering theory (for a recent discussion, see Miltsakaki 2002; Joshi et al. 2005).

A well-known language difference is for example the availability of null subject pronouns. Following Ariel's (2001) proposal that more reduced anaphoric expressions demand more accessible antecedents (see also Givón 1992), a division of labor has been proposed for null subject pronouns and overt pronouns. Carminati (2002) for example provides evidence for Italian that null subject pronouns prefer subject antecedents (prototypical topics), whereas overt pronouns prefer non-topical antecedents. While a variety of factors have been shown to play a role in this division of labor, this pattern has been partly replicated for other languages with null subjects, such as for Spanish (Alonso-Ovalle et al. 2002; Filiaci 2011; de la Fuente and Hemforth 2013), Catalan (Mayol and Clark 2010), and Romanian (Geber 2006). Similar predictions as those proposed by Carminati's Position of Antecedent Hypothesis follow from the application of conversational implicatures (Grice 1975; Levinson 2000). A preference for considering the use of overt pronouns as a cue for choosing less salient antecedents in a null subject language can be explained by Grice's maxim of manner, or by Levinson's I- and M-principles (1), assuming that reduced anaphoric expressions go with the most prominent antecedent.

(1)   I-principle: *Do not say more than is required.*
       M-principle: *Do not use a marked expression without reason.*

Conversational implicatures also predict competition for languages without the null/overt subject pronoun alternation. Syntactic alternatives with unexpressed subjects, such as infinitival constructions, may show a strong preference for one of the antecedents or even unambiguously take only one of the possible antecedents (usually the subject).

An example of this type of syntactic competition can be found in French, where, similar to Portuguese, a syntactic alternative for the subject antecedent of the pronoun *il* in (2a) is the infinitival construction in (2b).

(2a)   Pierre a appelé Marie *avant qu'il rentre à la maison*.
        Pierre has called Marie before he went to the home
        'Pierre called Marie before he went home.'
(2b)   Pierre a appelé Marie *avant de venir à la maison*.
        Pierre has called Marie before to go to the home
        'Pierre called Marie before going home.'

The unexpressed subject of *venir* in (2b) can only be analyzed as the subject of the main clause. The existence of this highly frequent unambiguous way to relate the adverbial clause to the subject of the matrix clause leads to a preference for object antecedents for full pronouns in finite adverbial clauses (Hemforth et al. 2010). This preference strongly contrasts with the preference for subject antecedents established for fully parallel translations of the French materials to German and English. Two chapters in this volume (chapters "Information Structure and Pronoun Resolution in German and French: Evidence from the Visual-World Paradigm" by Colonna, Schimke, and Hemforth and "Conversational Implicatures in Anaphora Resolution: Alternative Constructions and Referring Expressions" by Baumann, Konieczny, and Hemforth) discuss the question of whether a direct syntactic alternative for one of the possible antecedents of an anaphoric expression influences its interpretation, thus directly addressing the question of competition. Colonna et al. show that the object preference for pronouns in finite adverbial clauses with *avant que* ('before') generalize to other conjunctions like *quand* ('when'). Subject pronouns in sentences like (3) show a preference for the object antecedent, though less strongly so than pronouns in *avant que* adverbials.

(3)   Pierre a appelé Marie *quand il était à la maison*.
        Pierre has called Marie when he was at the home
        'Pierre called Marie when was home.'

The chapter by Baumann et al. provides data on Portuguese, a particularly interesting language with respect to competition effects since it allows for null subject pronouns (4a) but also for infinitival constructions with unexpressed subjects (or Pro) (4b).

(4a)   O polícia encontrou o carteiro *antes que (ele) fosse para casa*.
        the policeman met the postman before he went for home
        'The policeman met the postman before he went home.'
(4b)   O polícia encontrou o carteiro *antes de ir para casa*.
        the policeman met the postman before to go for home
        'The policeman met the postman before going home.'

The existence of an alternative construction for subject antecedents (4b) as well as the use of full pronouns (*ele* in (4a)) each enhance the choice of object antecedents in Portuguese. Interestingly, subordinates with *cuando* ('when') do not have an unambiguous infinitival alternative for subject antecedents, though they do allow for null subjects. In a self-paced reading study on interpretational preferences for full pronouns, Baumann et al. find a strong preference for object antecedents for *antes que* subordinates, which—contrary to French—disappears for *quando* subordinates without, however, converting to a subject preference as it has consistently been established for English and German (see chapter "Information Structure and Pronoun Resolution in German and French: Evidence from the Visual-World Paradigm" by Colonna et al.; Hemforth et al. 2010). It may be somewhat surprising that English does not show preference patterns similar to French and Portuguese in *before* subordinates as in (4a), given that a syntactic alternative for subject antecedents exists as well (4b). However, although this alternative exists, it is much less frequent than the French or Portuguese equivalents as evidenced by the corpus study in Baumann et al. (chapter "Conversational Implicatures in Anaphora Resolution: Alternative Constructions and Referring Expressions"). Apparently, it is not the existence of an alternative construction per se that pushes preferences but the existence of a highly frequent alternative.

Language specific preferences, which can be explained by differences in the lexicon or the grammar of the languages involved, help us shed light on the intricate interactions of grammar and processing. Beyond preferences for subjects or objects, information structure on the sentence as well as on the discourse level have been shown to play a role for pronoun resolution preferences (e.g., Cowles et al. 2007; Ellert 2010; Kaiser 2011; Arnold 2013). Pronouns consistently show a preference for topicalized antecedents and slightly less consistently so for focused antecedents. Topicalization (e.g., by left dislocation) or focusing (e.g., by clefting) are often regarded as equivalent in the sense that both serve as salience-enhancing devices. In a comparative study on French and German, Colonna et al. (chapter "Information Structure and Pronoun Resolution in German and French: Evidence from the Visual-World Paradigm") investigate to what extent antecedent preferences triggered by information structure interact with language-specific differences. In two visual world studies, they find highly similar effects for information structure for French and German with a clear preference for free topics (5a) as antecedents but no accessibility-enhancing effects for clefted antecedents. Clefted antecedents (5b) even appear to be dispreferred. This anti-cleft effect can be taken as evidence against a general preference for salient antecedents, since topicalization and clefting can both be argued to enhance salience.

(5a)   Fr.: Quand à Pierre, il a appelé Paul quand il était à la maison.
        Ger.: Was Peter betrifft, er hat Paul angerufen, als er zu Hause war.
        'As for Peter, he called Paul when he was home.'
(5b)   Fr.: C'est Pierre qui a appelé Paul quand il était à la maison.
        Ger.: Es war Peter, der Paul angerufen hat, als er zu Hause war.
        'It was Peter who called Paul when he was home.'

The two chapters by Baumann et al. and Colonna et al. restrict themselves to a single type of coherence relation: *temporal sequence* (Wolf and Gibson 2005). Pronouns do, however, also choose their antecedents, depending on the coherence relation involved. Kehler et al. (2007) for example demonstrate that pronouns show a preference for antecedents in similar functional position only in *similarity* relations (6). In utterances involving *similarity* relations, subject pronouns prefer subject antecedents, whereas object pronouns prefer object antecedents.

(6)   Peter called Paul and similarly Mary called him.

Even more striking is the effect of the semantics of certain verbs on *causal* relations. Garvey and Caramazza (1974) observed that certain verbs such as *frighten* or *confuse* enhance the probability of subject antecedents in sentences like (7a), whereas others such as *like* or *hate* enhance the probability of object antecedents (7b–c).

(7a)   Peter frightened Paul because he ... (*he* = Peter)
(7b)   Peter hated Paul because he ... (*he* = Paul)
(7c)   Peter criticized Paul because he ... (*he* = Paul)

Verbs such as *frighten* are accordingly often called NP1-biasing and verbs like *hate* NP2-biasing. A considerable number of *implicit causality verbs* falls into the class of *stimulus-experiencer* verbs (*frighten*) or *experiencer-stimulus* verbs (*hate*). Brown and Fish (1983) propose that causes are preferentially attributed to agents and stimuli. Au (1986) has proposed a somewhat ad-hoc verb class as *agent-evocator* verbs such as (7c), where the patient of *criticize* is assumed to evoke the event of criticizing by his or her actions. Agent-patient verbs show some variability from highly NP1-biased verbs such as (*apologize*) to strongly NP2-biased verbs (*punish*). Although *implicit causality* verbs have been shown to have highly parallel effects across languages, theoretical accounts of why they show the effects they do are sparse.

The paper by Bott and Solstad in this volume (chapter "From Verbs to Discourse: A Novel Account of Implicit Causality") provides a compelling semantic account of implicit causality. They propose that different types of implicit causality verbs demand specific types of explanations. For *stimulus-experiencer* verbs, they argue that the NP argument each verb is focusing on (e.g., *Peter* in (8a)) is actually a placeholder for a proposition that is semantically not fully specified (e.g., *that Peter is doing x,* (8b)).

(8a)   Peter annoyed Mary (because he made a lot of noise)
(8b)   That Peter made a lot of noise annoyed Mary.

Conversely, some types of *agent-patient* verbs (sometimes classified as *agent-evocator* verbs, see above) presuppose a reason that needs to be either inferred from background knowledge or specified. *Criticize*, for example, presupposes some

reason why the patient should be criticized at least in the eye of the agent (cf. Fabricius-Hansen and Sæbø 2011). Explanations are expected in a *because* clause or an independent sentence filling in the missing content. Bott and Solstad argue that not any kind of explanation can fill this expectation for a specific verb. Stimulus-experiencer verbs (such as *annoyed* in at least one of its possible interpretations) demand *simple causes*, direct non-intentional causes of the event or state at hand. *Agent-patient* verbs, on the other hand, demand *internal* reasons, focusing on internal states of (usually) the agent, or *external* causes, which are independent of the attitude bearer's minds mostly focusing on the patient. A continuation study in Norwegian and German confirms the cross-linguistic validity of the explanation types for the different verb classes for *because* clauses as well as for independent sentences.

Interestingly, and in contrast to the chapters by Colonna et al. and Baumann et al., pronoun resolution preferences following from expectations of specific types of explanations as tested by Bott and Solstad seem to vary very little between within-sentence and between-sentence pronoun-antecedent relations. They are apparently also fairly stable across languages (as long as verb semantics allows close comparisons).

Thus far, experimental research on pronoun interpretation has predominantly been concerned with discourse that does not involve perspective shifts of the kind found in indirect speech (or thought). In (formal) semantics and pragmatics, on the other hand, there is a long-standing discussion concerning indexicals, *de dicto* versus *de se* and *de re* readings of pronouns, and related phenomena in belief contexts/attitude reports; and research on these and various other aspects of reported discourse and quotation has been intensified within the last 10–15 years (see e.g., Recanati 2000; Güldemann and von Roncador 2002; van Rooij 2006; Maier 2009, 2010; Romoli and Sudo 2009; Blakemore 2013; Geurts and Maier 2013; Maier in press). A central question in this context concerns who is "responsible" for the choice of expressions (pronouns, definite descriptions, indefinite descriptions, proper names, etc.) referring to specific entities in reported discourse: Is it the current speaker or the person whose utterances, thoughts or attitudes are reported? Put differently: Is it the reporter's or the reportee's context of utterance that determines the interpretation of such expressions? What are the constraints governing context shifts in interpretation? And how can we explain cross-context identification of the entities in question? In view of the highly sophisticated and partly competing theoretical (semantic and/or pragmatic) accounts presented in the last decades, experimental empirical research that checks the predictions to be drawn from these accounts is comparatively scarce.

The paper by Borthen, Hemforth, Mertins, Behrens, and Fabricius-Hansen (chapter "Referring Expressions in Speech Reports") takes up this challenge, inspired by Sæbø (2012), who observes that a "referential term" (e.g., a proper name or a definite description) in indirect speech may correspond to a (specific) indefinite in direct speech if the original speaker has a specific referent in mind that is not identifiable to the (original) hearer. Using a pen-and-pencil experiments involving native speakers of English, German, Norwegian, and Czech, Borthen et al.

show that, under such conditions, definites are indeed chosen more frequently in indirect than in direct speech reports in English and German but not in Czech and Norwegian, and that in both types of report, indefinites are the preferred choice across languages. The authors conclude that the choice of referring expression not only involves considerations of "audience design" (Clark and Murphy 1982), as argued by Sæbø (2012), but is also sensitive to discourse type and discourse functions (cf. von Heusinger 2002), as well as being affected by general economy constraints, and that these constraints may surface differently in different languages because of the specific morphosyntactic inventory of the individual language.

The paper by Wall (chapter "The Role of Grammaticality Judgments Within an Integral Approach to Brazilian Portuguese Bare Nominals") is particularly concerned with definite and specific uses of bare nouns in Brazilian Portuguese in different linguistic contexts. The data presented here indicate inconsistencies in the theoretical accounts and models found in psycholinguistic literature on the acceptability of definite and specific uses of bare nouns, as opposed to a generic reading of these forms. A central point in Wall's chapter is the theoretical foundation of the interpretation of data in studies using acceptability judgment tasks (for more, see Sect. 3 below).

2.2 Aspect and Aspectual Relations

Aspect and its impact on the temporal interpretation of finite clauses has been a central topic of theoretical semantics for many decades (cf. Vendler 1957; Dowty 1979; for a recent overview, see Filip 2011). Much of the psycholinguistic research concerns coercion (e.g., Brennan and Pylkkänen 2008; Pickering et al. 2006; Townsend 2013). Unfortunately, the theoretical discussion has to a large extent been based on the tense-aspect (TA) system of English rather than full-fledged tense-aspect languages like Czech or Russian. In addition, the discussion has been somewhat hampered by terminological—or notional—confusion, often failing to differentiate between grammatical and lexical aspect (cf. Klein 1994; Schmiedtová 2004; Schmiedtová and Flecken 2008).

Grammatical aspect is a purely grammatical category expressed morphologically on the verb, for example by affixes as in the Slavic languages or verbal particles as in Mandarin Chinese. It encodes abstract (grammatical) concepts like the basic distinction between *perfective* (presentation of situations as completed with the inclusion of a post-state) and *imperfective* aspect (presentation of situations in progression, with defocused left and right boundaries). In languages marking such distinctions, the expression of grammatical aspect is obligatory: Whenever a speaker uses a verb or verbal predicate, (s)he has to decide on its aspectual marking, for example whether it is assigned a perfective or an imperfective meaning. One important consequence is that in aspect-dominant languages there are no aspectually unmarked or "neutral" forms as is the case in English: In terms of grammatical

aspect, the verb *to cook* is neutral, while its Czech equivalent *vařit* is always imperfective. Moreover, grammatical aspect in aspectual languages of the Slavic type (e.g., Czech, Russian, and Polish) is marked already on the infinitival form, and its interaction with other verbal categories such as tense and Aktionsart is limited.

Grammatical aspect is different from but interacts with *lexical aspect*, or *Aktionsar*t,[3] which relates to inherent temporal—or mereological (see Filip 2011)—characteristics of verb (phrase) meanings, or more precisely, dimensions of the event(ualitie)s denoted by verbs or verb phrases. From Vendler's (1957) distinction of states, activities, achievements, accomplishments and onward, a number of more or less refined (re)classifications have been proposed (Filip 2011); none is unproblematic, however, partly because the categorization tends to be based on language-specific criteria like the compatibility with certain temporal adverbials (see chapter "Cross-Linguistic Variation in the Processing of Aspect" by Bott and Hamm), that is, criteria that do not necessarily hold across languages (see for instance Braginsky and Rothstein 2008, for English versus Russian). Often achievement and accomplishment predicates are subsumed under the notion of *telic* predicates expressing an inherent endpoint (culmination point), while state and activity predicates are atelic. The interplay between (a)telicity (lexical aspect) and (im)perfectivity (grammatical aspect) is intricate: While events denoted by telic predicates (e.g., in Czech *na-psat dopis* 'to write a/the letter', *s-níst jablko* 'to eat an/the apple') are conceived as completed under perfective marking, imperfective aspect presents such events as incomplete ("ongoing") (e.g., in Czech *psát dopis* 'to write a/the letter', *jíst jablko* 'to eat an/the apple') relative to a contextually given location time, that is, as failing to reach their inherent culmination (within that time). Conversely, under perfective aspect, activities and states (e.g., in Czech *za-zpívat* 'to sing' or *u-snout* 'to sleep') are viewed as coming to an end—as bounded events—within the location time, that is, followed by a post-state (see above). This means that in Slavic languages telic and atelic predicates require either perfective or imperfective marking; English, on the other hand, has a formally marked (somewhat special) imperfective aspect, the so-called progressive, but no perfective; and in German (and Norwegian) aspect is absent as a grammatical category.

What repercussions do these cross-linguistic differences have on the (temporal) interpretation of finite clauses? What does it mean, in practice, for a form to be aspectually neutral or underspecified? How are such forms processed? One of the first studies addressing such questions is the study in this volume by Bott and Hamm, who investigate the interaction between (simple) past tense and Aktionsart in English and German, testing comprehension processing of sentences like (9a) and (10), which demand an imperfective (ongoingness/incompleteness) reading of a (simple) past accomplishment predicate.

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[3]Other equivalent terms are "situation" (Klein 1994) and "situation type" (Smith 1997).

(9a)   #The architect built the house for two years.
(9b)   The architect was building the house for two years.
(10)   Der Architekt errichtete das Haus zwei Jahre lang.
         the architect build:PAST the house two years long
         The architect #built/was building the house for two years

The experiments show that processing of the English sentences causes difficulties (measured in terms of reading time) that do not arise with their German counterparts. These findings can be explained in terms of an immediate aspectual specification in English versus delayed aspectual specification in German, supporting the hypothesis that the German past tense is genuinely underspecified with respect to perfective versus imperfective aspect, while the English simple past preferably receives a perfective interpretation because of competition with the past progressive (9b) (pragmatic strengthening). The aspectual difference between English simple past and German past tense accomplishment predicates is confirmed in an additional experiment involving iterative/habitual readings of such predicates.

Aspect (in a broad sense) also plays a role for the interpretation of clausal/VP coordination, which is the topic of the contributions by Behrens, Mertins, Hemforth, and Fabricius-Hansen (chapter "Understanding Coordinate Clauses: Cross-Linguistic Experimental Approach") as well as by Behrens, Fabricius-Hansen, and Frazier (chapter "Pairing Form and Meaning in English and Norwegian: Conjoined VPs or Conjoined Clauses?").

One of the main findings in chapter "Pairing Form and Meaning in English and Norwegian: Conjoined VPs or Conjoined Clauses?" is a general preference for temporal simultaneity (overlap) between the first and the second conjunct event(uality) under VP conjunction as well as under clause (S) conjunction. The preference for simultaneity interpretation is independent of the telicity of the first conjunct. In other words, telic predicates (e.g., *to fly to Paris* or *to walk to the park*) tested in this study did not push the interpretation of the clause into a sequential reading. For the aspect discussion, which was not a major topic of this chapter, this finding is very relevant since it shows the difference to perfectivity effects observed in languages encoding perfectivity grammatically: for example, in Czech, if the first conjunct is a perfective, then the temporal interpretation of the entire clause is *per default* a temporal sequence (cf. Schmiedtová 2004). This shows again that perfectivity and telicity are two different notions involving different operations and that simple present/past form in English does not encode perfectivity.

The special status and the effects of a fully grammaticalized aspectual opposition between perfective and imperfective are also evident from the results of the chapter by Behrens, Mertins, Hemforth, and Fabricius-Hansen. First, in the Czech experiment, the verbs used in the first conjunct were simplex imperfectives (no overt grammatical marking but a fixed aspectual meaning). Simplex imperfective verbs cannot be combined with any other Aktionsart but activities (e.g., accomplishments can only be combined with perfectives). This demonstrates that the interaction between Aktionsart and grammatical aspect is limited in aspect languages. Second,

as mentioned above, the availability of grammatically encoded perfective has an impact on the overall temporal interpretation. Data from Behrens et al. (chapter "Understanding Coordinate Clauses: A Cross-Linguistic Experimental Approach") show that in the short condition—that is, when the first conjunct is marked as being of short duration, where an increase of sequential clausal interpretation was predicted across languages—Czech participants show conflicting reactions when confronted with imperfective verbs in the first conjunct. The reason for this behavior is the participants' expectation that under the short condition the verb in the first conjunct has to be a perfective so that the overall interpretation of the clause renders a temporal sequence (see above).

2.3   Interpretation of Coordinate Clauses/VPs

The primary topic of the contributions by Behrens, Mertins et al. (chapter "Understanding Coordinate Clauses: A Cross-Linguistic Experimental Approach") and Behrens, Fabricius-Hansen, and Frazier (chapter "Pairing Form and Meaning in English and Norwegian: Conjoined VPs or Conjoined Clauses?") is clause/VP coordination.

Coordination in general is a much discussed topic in syntax and semantics, and in pragmatics as well (see for instance Haspelmath 2004; Carston and Blakemore 2005; Fabricius-Hansen and Ramm 2008; Zamparelli 2011, with further references). From a theoretical point of view, the main controversies have concerned (i) the syntactic nature of coordination in general, not least the question of whether coordinate structures are "flat" or binary branching (e.g., Johannessen 1998; Cormack and Smith 2005); (ii) the respective roles of semantics and pragmatics in the interpretation of coordinated structures (e.g., Lang 1984; Levinson 2000; Carston 2002); and (iii) discourse-relational/functional aspects of clause conjunction (Txurruka 2003; Zeevat and Jasinskaja 2007). Experimental research on coordination, which is less extensive, has focused mainly on the interpretation of clause/VP conjunction (e.g., Hertwig et al. 2008; Bott et al. 2009; Röhrig et al. 2011), testing why and to what extent 'and' conjunctions, despite the alleged symmetric meaning (logical conjunction) of 'and', receive asymmetric (time-sequential, causal, concessive, etc.) interpretations, as predicted in much of the relevant theoretical literature.

Addressing similar issues, the two chapters in this volume seek to identify and explain interpretational preferences concerning either the temporal order of the first- and second-conjunct events (both papers) or the acceptability of an "adversative" (or "concessive") reading of the second conjunct (chapter "Pairing Form and Meaning in English and Norwegian: Conjoined VPs or Conjoined Clauses?" by Behrens, Fabricius-Hansen, and Frazier). The two papers differ from comparable studies in important ways, however. First, they take a cross-linguistic perspective, conducting parallel (off-line) experiments with native speakers of two and four different languages, respectively. Second, they distinguish explicitly between clause and VP coordination, assuming that the structural contrast has repercussions on

the interpretational preferences: Behrens, Mertins et al. (chapter "Understanding Coordinate Clauses: A Cross-Linguistic Experimental Approach") investigate the temporal interpretation of VP coordination in English, German, Norwegian, and Czech, explicitly leaving clause (or S) conjunction aside, while Behrens, Fabricius-Hansen, and Frazier (chapter "Pairing Form and Meaning in English and Norwegian: Conjoined VPs or Conjoined Clauses?") directly address the question of whether VP and S coordination in English and Norwegian differ (within and/or across languages) with respect to their preferred interpretation (temporal sequence versus overlap or adversative (concessive) versus "neutral"). Third, they take the grammatical/typological differences between their target languages seriously. Thus, Behrens, Mertins et al. argue that the contrast between VO (English, Norwegian) and (underlying) OV (German, Czech) might be responsible for certain cross-linguistic differences in their results while other differences can be ascribed to contrasts in the aspectual systems, Czech being the only language with a grammaticalized distinction between perfective and imperfective aspect (see Sect. 2.2 above); the fundamental structural difference between root clauses in Norwegian, which is a V2 language, and English, an (X)SVO language allowing pre-subject topicalization of for example temporal adverbials, is used by Behrens, Fabricius-Hansen and Frazier to a similar end.

The most important findings of Behrens, Mertins et al. can be summarized as follows: In all four languages there is a clear preference for interpreting conjoined VPs in terms of temporal overlap/simultaneity rather than temporal sequence when event duration is not explicitly marked and pragmatic knowledge does not favor a sequential ("narrative") reading. The simultaneity preference is more marked in Czech than in the other languages because of the inherent imperfectivity of the simplex verb forms used in the Czech items.

The results indicate that the default interpretation of VP coordination is not (con)sequential, contrary to predictions from Grice (1975) and Carston's (2002) extended script theory.[4] To a large degree, however, the results are in accordance with what should be expected on semantic grounds, given the specific combinations of eventuality types in the test items on the one hand and a sufficiently precise (temporal) semantics for VP coordination on the other hand (cf. Lee and Tonhauser 2010; Behrens et al. 2012). Explicitly marking the first conjunct event as being of short duration triggers a reliable decrease of overlap interpretations.

Behrens, Fabricius-Hansen, and Frazier present two experiments on the interpretation of VP versus S coordination in English and Norwegian. Their findings in Experiment 2 confirm the general preference for temporal overlap under VP conjunction (see above) and indicate that the bias towards simultaneity is even stronger under S conjunction, in particular in English. The result shows that the availability of the *-ing* participial construction as a simultaneity-encoding alternative to a second conjunct does not "nudge" conjuncts containing simple verb forms

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[4]In their experimental study on clause conjunction, Bott et al. (2009) come to a similar conclusion; see also Röhrig et al. (2011).