

Verbal Particles in German: Aspect, Structure, and Processing



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Abstract

This thesis investigates German verbal particles through two of their least understood subclasses: aspectual particles and double particles. It combines theoretical analysis with experimental evidence to address three central questions: (i) how aspectual meaning is distributed in particle verb constructions, (ii) to what extent this meaning, and more generally, the polysemy of German verbal particles, is structurally determined, and (iii) how morphologically complex particle verbs are theoretically analysed and empirically processed by German native speakers.

The first part of the thesis develops a structural analysis of aspectual particles in German. It argues that aspectual particles form a distinct subclass of verbal particles, systematically separable from resultative particles and capable of encoding telicity independently of object quantisation. Building on this distinction, it proposes a classification of aspectual particles according to the event boundary they encode, distinguishing inceptive particles, which mark the initial boundary of an event, from egressive particles, which mark its terminal boundary. It then develops a syntactic account on which the polysemy of a particle follows from the distinct syntactic positions in which it is realised rather than from lexical stipulation. Through a detailed case study of the particle *auf*, aspectual readings are located in the head of an inner aspect projection and resultative and idiosyncratic readings in a PP in the complement of the verb. To capture the inceptive-egressive contrast, the thesis proposes a feature-based theory of inner aspect built on the event-structural features [init] and [telic].

The second part of the thesis examines German double particles from syntactic, semantic, and processing perspectives. Although double particles are morphologically complex, the theoretical literature largely treats them as integrated units rather than as combinations of two independent particles. To investigate how such forms are mentally represented, the thesis presents an ERP cross-modal priming experiment comparing single particle verbs, double particle verbs, and prefix verbs. Single and double particle verbs pattern closely during early lexical activation, supporting analyses that treat double particles as unified preverbal constituents, while later processing stages remain sensitive to their internal morphological complexity.

Overall, the thesis shows that the morphological form of a German verbal particle does not transparently reflect its grammatical structure. It contributes a structural account of particle polysemy, a refined theory of inner aspect, and experimental evidence that brings the theoretical literatures on single and double particles into closer relation.

Contents

List of Abbreviations	ix
1 Introduction	1
1.1 Motivation	1
1.2 Thesis objectives	8
1.3 Thesis outline	9
2 Aspectual particles in German	12
2.1 Semantic classifications of verbal particles in German(ic)	15
2.1.1 Telic particles vs. resultative particles	19
2.1.2 Telic particle in German vs. perfective prefixes in Slavic	27
2.1.3 Summary	38
2.2 The semantics of aspectual particles	39
2.2.1 Lexical and grammatical aspect	40
2.2.1.1 Lexical aspect	40
2.2.1.2 Grammatical aspect	45
2.2.2 Classification of German aspectual particles	48
2.2.3 Inceptive and egressive particles in German: the inventory	57
2.2.4 Summary	68
2.3 Particle verb constructions in syntax	69
2.4 Syntactic encoding of lexical aspect	82
2.4.1 Ramchand's (2008) First Phase Syntax	82
2.4.2 Borer's (2005a, 2005b) Exo-skeletal Model	85
2.4.3 Aspectual particles in syntactic theories of aspect	89
2.4.4 Summary	94
2.5 Chapter summary	95

3	Particle verbs with <i>auf</i>	98
3.1	Introduction	99
3.2	An overview of the semantics of <i>auf</i>	101
3.2.1	Resultative <i>auf</i>	101
3.2.2	Idiosyncratic <i>auf</i>	108
3.2.3	Aspectual <i>auf</i>	108
3.3	The framework	113
3.3.1	A projection for inner aspect	115
3.3.2	Analysis of aspectual <i>auf</i>	125
3.3.2.1	Analysis of inceptive <i>auf</i>	133
3.3.2.2	Analysis of egressive <i>auf</i>	142
3.3.2.3	Summary	153
3.3.3	Analysis of resultative <i>auf</i>	155
3.3.4	Aspectual and resultative <i>auf</i> in relation	160
3.3.4.1	Aspectual and resultative <i>auf</i> under degree modification . .	160
3.3.4.2	The semantic relatedness between aspectual and resultative <i>auf</i>	161
3.3.4.3	The encoding of telicity	162
3.3.5	A note on idiosyncratic <i>auf</i>	168
3.3.6	Summary	170
3.4	Discussion	171
3.4.1	Extending the analysis to Distributed Morphology	172
3.4.2	Extending the analysis to other aspectual particles in German	178
3.5	Chapter summary	183
4	Double particle verbs in German	188
4.1	Introduction	188
4.2	Syntax of double particles	192
4.2.1	Zeller (2001a): Double particles as semi-lexical functional heads . .	195
4.2.2	Noonan (2010, 2017): Double particles in cartographical approach . .	205
4.3	Semantics of double particles	211
4.3.1	H-particles are non-deictic in double particles	211
4.3.2	Distinctions between single and double particle verbs	216
4.3.3	H-particles: reinforcement and disambiguation	225
4.3.4	Summary	227
4.4	Double particles in acquisition	228
4.5	Chapter summary	231

5	Morphological processing of German complex verbs	233
5.1	Introduction	235
5.1.1	Particle and prefix verbs in German	237
5.1.2	Previous studies on the morphological processing of German complex verbs	240
5.1.3	The present study	243
5.2	Methods	246
5.2.1	Participants	246
5.2.2	Materials	246
5.2.3	Procedure	249
5.2.4	EEG recording and pre-processing	250
5.3	Data analysis	251
5.3.1	Behavioural data	251
5.3.2	EEG data	252
5.4	Results	253
5.4.1	Behavioural results	253
5.4.2	ERP results	254
5.5	Discussion	256
6	Conclusion	266
6.1	Summary of contributions	267
6.2	Future work	274
6.3	Concluding remarks	275
	Statement of Authorship	277
	Appendices	
A	Stimuli List	280
B	Behavioural Data Model Outputs	283
C	Pairwise Comparisons	285
D	ERP Data Model Outputs	287
	References	293

List of Abbreviations

1/2/3	first/second/third person
1PartV	single particle verb
2PartV	double particle verb
ACC	accusative
BPS	Bare Phrase Structure
DEF	definite
DM	Distributed Morphology
EEG	electroencephalography
ERP	event-related potential
FTN	functional terminal node
FVI	functional vocabulary item
GEN	genitive
ICA	independent component analysis
IMPF	imperfective
INF	infinitive
LCS	Lexical Conceptual Structure
LRG	Landmark Referentiality Generalisation
LTN	lexical terminal node
LVI	lexical vocabulary item
LOC	locative
MP	modal particle
OBJ	object
PF	Phonological Form

PF	perfective
PfxV	prefix verb
PL	plural
PRO	pro-form
PRS	present
PRTV	partitive
PST	past tense
PTCP	participle
REFL	reflexive
REL	relative pronoun
RHR	Righthand Head Rule
RSP	Revised Subset Principle
RT	reaction time
RTN	root terminal node
SG	singular
SPS	Single Particle Verb Specialisation
SRPVs	Spanish reflexive psychological verbs
SUBJ	subject
TM	topic marker
VI	vocabulary item
V2	verb second
XS	exo-skeletal (model)

1

Introduction

Contents

1.1	Motivation	1
1.2	Thesis objectives	8
1.3	Thesis outline	9

1.1 Motivation

This is a thesis about verbal particles in German. The very definition of verbal particles remains disputed in the literature. For example, McIntyre (2015: 436) defines a particle verb as the combination of a verb and an intransitive preposition. However, he notes that not all complementless prepositions can function as particles (e.g., *oben* ‘above’) and acknowledges marginal cases where particles are not prepositional (e.g., *ein*).¹ Lüdeling (2001: 18) classifies particles as part of a broader category of preverbs that are ‘of category X, where X is different

¹But many non-prepositional preverbs have been proposed to be historically or semantically related to prepositions. This is the case, for example, with the particle *ein-* and the preposition *in* ‘in, into’, as well as the particle *ab-* and the preposition *von* ‘from’ (Dewell 2011). With respect to prefixes, Stiebels (1996) traces the Modern German prefix *ent-* back to the preposition *and* in Gothic and *int* in Old High German, and Biskup and Putnam (2012) propose an allomorphy-based analysis of the alternation between the prefix *ent-* and the preposition *aus* ‘out of’.

from N or V', therefore encompassing prepositions, adjectives and adverbs. In this thesis, I mainly focus on verbal particles that are prepositional in nature or are commonly understood to be related to specific prepositions (e.g., *ein-* as the particle counterpart to the preposition *in* 'in' and *ab-* as the particle counterpart to *von* 'from'). Nominal and adjectival/adverbial particles of the kind in (1) and (2) will not be considered.

(1) Nominal particle verbs²

- a. *Rad fahren* (lit. bicycle-drive, 'to ride a bike')
- b. *Klavier spielen* (lit. piano-play, 'to play the piano')
- c. *preis-geben* (lit. price-give, 'to give away/abandon')
- d. *teil-nehmen* (lit. part-take, 'to participate')
- e. *not-landen* (lit. emergency-land, 'to make an emergency landing')

(2) Adjectival/adverbial particle verbs

- a. *fern-sehen* (lit. far-see, 'to watch television')
- b. *weg-laufen* (lit. away-run, 'to run away')
- c. *schwarz-fahren* (lit. black-drive, 'to travel without a ticket')
- d. *krank-feiern* (lit. sick-celebrate, 'to call in sick when not ill')
- e. *fest-legen* (lit. firm-lay, 'to fix/determine')

Particle verbs can be subdivided into two categories based on the number of particles that are attached to the simple verb: while single particle verbs have only one particle preceding the verb (3), some of them can be further prefixed by one of the deictic morphemes

²I adopt the term *nominal particle* from Zeller (2001b), although the nominal element does not behave like an ordinary noun phrase but rather resembles an incorporated nominal. For example, *Rad* in *Rad fahren* and *Klavier* in *Klavier spielen* differ from canonical nominals in that they occur without a determiner, which is impossible for singular count nouns in object position in German. Compare *Ich fahre ein Rad*. 'I am riding a bicycle.', where *Rad* is an ordinary direct object, with *Ich fahre Rad*. 'I cycle.', where *Rad* forms part of the particle verb.

hin- ‘hither’ and *her-* ‘thither’ and form the so-called double particle verbs (cf. McIntyre 2001b), as given in (4).³

(3) Single particle verbs

- a. *an-kommen* (lit. AN-come, ‘to arrive’)
- b. *auf-essen* (lit. AUF-eat, ‘to eat up’)
- c. *vor-stellen* (lit. VOR-place, ‘to introduce/imagine’)
- d. *um-ziehen* (lit. UM-pull, ‘to move house/change clothes (reflexive)’)
- e. *ein-schlafen* (lit. EIN-sleep, ‘to fall asleep’)

(4) Double particle verbs

- a. *hin-ein-gehen* (lit. HIN-EIN-go, ‘to go in/enter’)
- b. *her-aus-kommen* (lit. HER-AUS-come, ‘to come out’)
- c. *hin-auf-steigen* (lit. HIN-AUF-climb, ‘to climb up’)
- d. *her-unter-fallen* (lit. HER-UNTER-fall, ‘to fall down’)

German also has morphologically complex particles that do not begin with *hin* or *her*. These forms usually combine a preposition with a pronominal element such as *da* ‘there’, *hier* ‘here’, and *einander* ‘each other’, as shown in (5). Some authors have analysed such forms as double particles (e.g., Behrens 2009). The present study, however, adopts the definition of double particles proposed by McIntyre (2001b), which restricts the term to forms beginning with *hin-* or *her-*.

- (5) *d(a)runter* ‘under it’, *drin(ne(n))* ‘inside’, *hierzu* ‘regarding this’, *vorbei* ‘past’, *hinterher* ‘afterwards’, *umhin* ‘around’, *auseinander* ‘apart’

Chapters 2 and 3 focus exclusively on single particle verbs, with particular emphasis on their aspectual uses and the syntactic configurations underlying them. In these two chapters,

³As the polysemy of German verbal particles cannot be adequately captured by any fixed English translation, throughout this thesis, verbal particles are given in small capitals and left without an English equivalent in the glosses. The meaning of the predicate as a whole can be inferred from the free translation provided for each example.

the terms *particle* and *particle verb* refer throughout to single particles and single particle verbs, unless otherwise specified. From the introduction of double particle verbs in Chapter 4 onwards, the two subtypes of particle verbs are always referred to by their specific names, *single particle verb* and *double particle verb*; the unmarked terms *particle* and *particle verb* serve as general labels covering both subtypes.

German verbal particles constitute one of the largest and most productive classes of elements in the German verbal system. They combine with verbal stems to produce a substantial portion of the German verbal lexicon, span a wide range of semantic functions including directional, resultative, aspectual, and idiomatic, and continue to serve as a productive source of new lexical items (Lüdelling 2001; Müller 2002; Olsen 1997; Stiebels 1996; Zeller 2001b). Accordingly, verbal particles have received sustained attention in the descriptive and theoretical literature, with extensive work devoted to their morphological status, syntactic behaviour, and semantic contribution (see Dewell 2011; Lüdelling 2001; McIntyre 2001b; Müller 2002; Stiebels 1996; Wurmbrand 2000; Zeller 2001b, among many others). Yet within this extensive body of work, two subclasses of verbal particles are often mentioned only in passing and remain largely peripheral to the broader theoretical discussion: aspectual particles and double particles, which constitute the two primary objects of investigation in this thesis.

The label *aspectual particle* refers to verbal particles whose primary contribution is to mark the temporal structure of the event denoted by the predicate, by, for example, signalling its terminal boundary, as in the German particle *auf* in *aufessen* ‘to eat up’ or the English particle *up* in *drink up*. Despite the descriptive consensus on examples such as these, the existence of a distinct class of aspectual particles has been a recurring matter of contention.

Two sources of difficulty are responsible for this contested status. The first is the long-standing tendency in the literature to conflate aspectual particles with resultative particles, since both can give rise to bounded or endpoint-oriented interpretations. On many accounts (e.g., Ramchand 2008; Travis 2010), particles in particle verb constructions are taken to introduce a result state as a secondary predicate of the object, and the aspectual contribution

of the particle is then derived from this result state. On such accounts, there is no principled need to recognise aspectual particles as a category distinct from resultative ones. The second source of difficulty is the well-known scepticism, going back to Verkuyl (1972, 1993) and developed in detail by Krifka (1989, 1992, 1998) and Borer (2005b), regarding whether verbal morphology in Germanic languages can be a genuine source of telicity at all. On the standard view, telicity in Germanic depends on the quantisation of the internal argument rather than on any morphological marker, and aspectual particles are accordingly relegated to a peripheral or epiphenomenal status in the calculation of telicity.

Even within the literature that recognises aspectual particles as a distinct class, almost all work has concentrated on egressive or culminating particles, which mark the terminal boundary of an event and yield telic predicates. Particles that mark the initial boundary of an event have received markedly less attention, despite the fact that such particles are attested in German, including *auf*, *an*, and *ein*, each of which can attach to an activity verb to derive a predicate denoting the onset of the corresponding event. A systematic treatment of inceptive particles, and their classification alongside egressive ones within a unified theory of aspectual particles, remains an open question.

Double particles have received even less theoretical attention than aspectual particles. As Behrens (2009) observes, despite their high frequency in spoken German, they are scarcely treated in the standard reference grammars, and the descriptive linguistic literature is correspondingly thin. The most extensive work on double particles to date is McIntyre (2001b), who provides a detailed survey of the morphological and semantic properties of the class. Beyond this, sustained discussion of double particles is largely confined to scattered remarks within studies of particle verbs more broadly, or to comparative observations made in passing in the literature on directional prepositions and adverbs.

The syntactic literature on double particles is similarly limited. On the two most developed accounts (Noonan 2010, 2017; Zeller 2001a), double particles are treated not as a transparent combination of two lexical heads but as functional elements situated within the extended

projection of PP. Beyond these proposals, no systematic syntactic treatment of double particles has been developed, and the relation between their surface form and their syntactic representation remains largely unexamined.

Their peripheral status in the literature notwithstanding, both aspectual particles and double particles raise theoretical questions of considerable significance, and neither can be treated as peripheral curiosities within the literature on the German particle system. Aspectual particles form a well-attested class in German, with systematic morphological, syntactic, and semantic properties that demand a principled theoretical account. Double particles, in turn, occupy a central position in the German locative and directional inventory, and their overt morphological transparency makes them an informative testing ground for any theory of how word-internal structure relates to grammatical composition. Each of the two subclasses therefore raises questions that the wider literature on particle verbs cannot easily set aside. A more comprehensive understanding of German verbal particles requires that these two subclasses be brought into the center of the discussion.

More importantly, the two subclasses are not unrelated. Despite differing markedly in their semantics, each exhibits a mismatch between morphological form and its representation at phonological, syntactic, and semantic levels. In the case of aspectual particles, the aspectual interpretation typically represents one of multiple meanings of the same particle, with the single morphological form supporting a range of distinct semantic interpretations. For example, the particle *auf* can contribute spatial, resultative, aspectual, and idiosyncratic meaning to the predicate in which it occurs. Previous syntactic analyses have largely chosen to treat these different uses as instances of a single structural configuration, typically as the merger of the particle as a secondary predicate of the verb (Borer 2005b; Ramchand 2008; Zeller 2001b). The semantic diversity of the particle is thereby recognised at the level of interpretation but flattened at the level of syntactic representation. In contrast, I argue in Chapters 2 and 3 that the different uses of a single particle in fact follow from different syntactic positions in which the particle is realised. On the resulting analysis, the mismatch

is no longer confined to morphological form and semantic interpretation but extends to syntactic structure as well: a single morphological form is associated with multiple syntactic structures and their corresponding semantic interpretations. At the same time, a direct, transparent mapping is established between the latter two: each syntactic structure corresponds to a distinct semantic interpretation.

Double particles instantiate a different type of mismatch: they are morphologically complex and apparently compositional, transparently decomposing into a deictic h-particle and a base particle, yet phonologically they form a single foot, with stress assigned to the second constituent. On the syntactic and semantic analyses that the literature has developed, this phonological unity finds its counterpart in a similarly unified syntactic and semantic treatment: double particles are analysed as single, functional units, with their two morphemes not projecting independently as lexical heads in the way that simple directional particles do (Noonan 2010, 2017; Zeller 2001a). The morphological transparency of the surface form thus stands alone in suggesting a compositional structure, while phonology, syntax, and semantics converge on single constituency. If morphological transparency is, in this case, an unreliable guide to representation at other linguistic levels, then the question of how speakers actually represent and process these forms is one that cannot be settled by inspection of their surface morphology alone. Whether double particles are decomposed into their component parts during real-time processing or are treated as single units, as the unitary analyses proposed in the theoretical literature would suggest, remains an open question that bears directly on how the German particle verb system is mentally organised and, accordingly on how it should be theorised. An ERP priming experiment presented in Chapter 5 reveals that double particle verbs are processed much like single particle verbs during early lexical access, suggesting that double particles are represented in a manner comparable to single particles in the mental lexicon and thereby supporting the unitary representations proposed in the theoretical literature. At the same time, the greater morphological complexity of double particles gives rise to additional reanalysis costs at later stages of processing.

1.2 Thesis objectives

The overarching objective of the thesis is to investigate the relationship between morphological form and syntactic-semantic representation of German verbal particles, and in particular to examine how morphological form aligns with or diverges from representation at other linguistic levels. The thesis pursues this question through two subclasses of verbal particles that exemplify the form-representation mismatch in distinct ways: aspectual particles, in which a single morphological form supports variation at both syntactic and semantic levels, and double particles, in which a morphologically complex surface form corresponds to a single grammatical unit at phonological, syntactic and semantic levels.

For each of these two subclasses, there are a number of specific points that the thesis addresses. With respect to aspectual particles, the discussion centers on the following two questions:

(i) What is the status of aspectual particles within the broader system of German verbal particles, both in terms of their distinctness from other particle types and their internal classification (Chapter 2)?

(ii) How can the polysemy of German verbal particles be encoded syntactically, such that the interpretive variation follows from structural variation rather than from lexical stipulation (Chapter 3)?

Turning to double particles, two further questions are examined:

(i) What does the existing syntactic, semantic, and acquisition literature establish about the grammatical status of double particles, and what empirical questions does it leave open (Chapter 4)?

(ii) How do German double particle verbs pattern relative to single particle verbs in real-time processing, and in what ways do these patterns inform the theoretical analysis of these morphologically complex particles (Chapter 5)?

The two types of particle verbs structure the thesis into two parts: a first part, in which I focus on the aspectual meaning of single particles and its relation to other uses of the same particles (Chapters 2 and 3), and a second part, in which I turn to (the apparently morphologically complex) double particles, and to the question of how they are theoretically analysed and empirically processed by native speakers of German (Chapters 4 and 5). As a transition between the two parts, Chapter 4 reviews the literature on double particles and points out that the syntactic and semantic accounts developed for double particles in the existing literature do not build on those developed for single particles. This not only raises the question of how double particles are processed by native speakers, which is taken up experimentally in Chapter 5, but also draws attention to the need for a dialogue between the research on single and double particles. Chapter 5 extends the empirical scope further beyond particle verbs by including prefix verbs in its experimental design, thereby offering a more comprehensive picture of the morphological processing of complex verbs in German.

1.3 Thesis outline

Chapter 2 examines the semantics of German verbal particles, with particular attention to their aspectual uses. The chapter proposes a tripartite classification of verbal particles into resultative, aspectual, and idiosyncratic types, and develops a new internal classification of the aspectual subclass based on the event boundary targeted by the particle, distinguishing inceptive from egressive particles. It closes with a critical assessment of existing syntactic analyses, which uniformly assign particles to a single structural position across their different uses. The central argument of this chapter is that this undifferentiated treatment cannot capture the semantic polysemy of particles, and instead calls for a syntactic account in which different particle meanings follow from different structural positions.

Chapter 3 substantiates the structural account proposed at the end of Chapter 2 through a detailed case study of the German verbal particle *auf*. The chapter proposes that *auf* can occupy two structural positions across its different uses: its aspectual meanings arise when

the particle is merged in the head of an inner aspect projection iAspP, while its resultative and idiosyncratic uses arise when it is merged as the head of a PP in the complement of V. A feature-based treatment of the inceptive-egressive contrast is developed within the aspectual uses, and the consequences of the analysis are explored. The account is then extended to the other aspectual particles in German, and its compatibility with broader theoretical frameworks such as Distributed Morphology is discussed.

Chapter 4 introduces double particles into the discussion and examines them from three complementary perspectives: syntax, semantics, and first language acquisition. The syntactic and semantic literature converges on treating double particles as integrated wholes despite their morphological compositionality, while acquisition data provide evidence on both sides of the representational question. The question of how double particles are represented in the mental lexicon of adult native speakers thus remains empirically open, motivating the experimental investigation pursued in Chapter 5.

Chapter 5 presents an EEG priming experiment on the morphological processing of German complex verbs, comparing single particle verbs, double particle verbs, and prefix verbs. The experiment reveals clear processing differences between particle verbs, including both single and double particle verbs, and prefix verbs in both response time and ERP (event-related potential) data, contrary to previous findings of no reliable difference between single particle verbs and prefix verbs. While no significant difference emerges between single and double particle verbs in terms of early lexical activation, the additional deictic morpheme in double particle verbs appears to introduce greater reanalysis costs at later stages of processing. The results suggest that the processing of morphologically complex verbs is shaped not by morphological structure alone, but also by constituency at phonological and morphosyntactic levels.

Chapter 6 summarises the key findings and contributions of the preceding chapters. On the basis of the two underinvestigated particle types examined in the thesis, the central conclusion is that German verbal particles systematically exhibit a non-transparent correspondence

between morphological form and representation at other linguistic levels, and that a thorough analysis of these vocabulary items must therefore engage with all the grammatical levels at which they are realised. The chapter then considers the broader implications of this claim and identifies directions for future research.

This is an integrated thesis that contains one chapter, namely Chapter 5, that is based on a manuscript prepared for submission to a peer-reviewed journal:

Yiwei Si, Isabella Fritz. (in preparation). Morphological decomposition: The role of phonology and morphosyntax.

I am the first author of this manuscript, and a detailed statement of authorship is provided as an appendix. The remaining chapters are presented as standard thesis chapters.

2

Aspectual particles in German

Contents

2.1	Semantic classifications of verbal particles in German(ic)	15
2.1.1	Telic particles vs. resultative particles	19
2.1.2	Telic particle in German vs. perfective prefixes in Slavic	27
2.1.3	Summary	38
2.2	The semantics of aspectual particles	39
2.2.1	Lexical and grammatical aspect	40
2.2.2	Classification of German aspectual particles	48
2.2.3	Inceptive and egressive particles in German: the inventory	57
2.2.4	Summary	68
2.3	Particle verb constructions in syntax	69
2.4	Syntactic encoding of lexical aspect	82
2.4.1	Ramchand's (2008) First Phase Syntax	82
2.4.2	Borer's (2005a, 2005b) Exo-skeletal Model	85
2.4.3	Aspectual particles in syntactic theories of aspect	89
2.4.4	Summary	94
2.5	Chapter summary	95

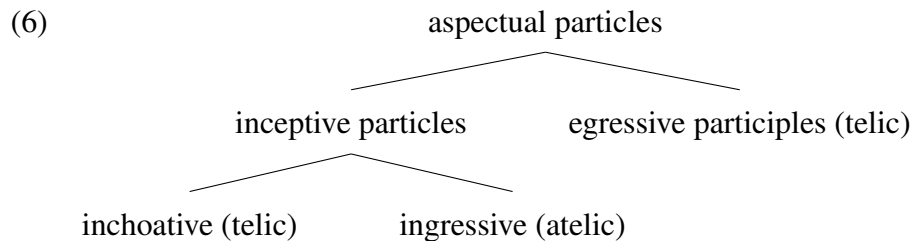
German verbal particles have long been recognised as exhibiting a wide range of semantic properties, ranging from spatial and resultative meanings to more abstract aspectual interpretations. Despite the considerable attention that particle verb constructions have received in the linguistic literature, no consensus has emerged regarding their semantic classification or

syntactic structure (Lüdeling 2001). Among these uses, aspectual particles are of particular theoretical interest, as they interact with the internal temporal structure of events in ways that are not straightforwardly reducible to either lexical semantics or purely compositional syntax. This chapter therefore investigates the syntax and semantics of German verbal particles with a particular focus on their aspectual uses.

The chapter is structured as follows. Section 2.1 first reviews previous work on the semantic classification of verbal particles, on the basis of which I propose a tripartite division into *resultative*, *aspectual*, and *idiosyncratic* subtypes. The status of aspectual particles, and of telic particles in particular, has been contested in the literature, as their comparison with resultative particles and with prefixes in Slavic languages has often led to questions about the necessity of treating them, and aspectual particles more generally, as a distinct subtype. I argue, however, that telic particles do in fact constitute a well-defined subtype of verbal particles by demonstrating, first, that they can be distinguished from resultative particles (cf. Section 2.1.1), and second, that they function as genuine morphological markers of telicity, a conclusion that is supported by a comparison with perfective prefixes in Slavic languages (cf. Section 2.1.2).

Having established aspectual particles as a distinct subtype, Section 2.2 turns to a more fine-grained analysis of their semantic contribution. Aspectual particles in German encode exclusively lexical aspect rather than grammatical aspect; the two notions are introduced in Section 2.2.1.1 and Section 2.2.1.2 respectively, with the discussion focusing primarily on the former. As with the broader literature on lexical aspect, which has been preoccupied with telic phenomena, previous work on aspectual particles is likewise heavily biased towards telic particles, as I show in Section 2.2.2. However, I argue that telic particles do not form a homogeneous category, and I propose a novel classification of German aspectual particles, illustrated in (6), based on whether the particle targets the initial or the terminal boundary of an event. I refer to the former as *inceptive* particles and to the latter as *egressive* particles. Inceptive particles further subdivide into *inchoative* particles, which signal the onset of a new state and yield telic predicates, and *ingressive* particles, which signal entry into an activity or

process and yield atelic predicates. Egressive particles, by contrast, are uniformly telic. The concrete particles instantiating each subtype are identified in Section 2.2.3. This classification constitutes the central contribution of the chapter, as it expands the empirical and theoretical scope of aspectual particles beyond the traditional focus on telicity and highlights the need to incorporate inceptivity into the classification of event types. It also motivates a feature-based account of aspectual interpretation, which will be developed in Chapter 3.



Following the semantic discussion, Section 2.3 reviews existing syntactic analyses of particle verb constructions. In contrast to the rich semantic taxonomies that have been proposed, syntactic approaches typically assume a single, undifferentiated structural position for particles across their different uses. To my knowledge, no previous account has attempted to map distinct semantic uses of verbal particles onto distinct syntactic positions, let alone to differentiate the syntactic representation of inceptive and egressive aspectual particles. I argue that such an undifferentiated approach is empirically and theoretically inadequate, and that a more satisfactory account requires distinguishing the syntactic representation of particles in accordance with their semantic contribution.

Section 2.4 situates this proposal within the broader context of syntactic theories of inner aspect. I introduce two influential frameworks that encode lexical aspect in the syntax, namely those of Ramchand (2008) and Borer (2005a, 2005b), which differ in how they derive telicity. I show that, despite their differences, both frameworks face systematic difficulties when extended to the analysis of aspectual particles. In particular, their analyses are largely restricted to telicity and do not address particles that encode the initial boundary of an event.

This gap is especially significant in light of the classification proposed in this chapter, which distinguishes between inceptive and egressive particles. The limitations of existing frameworks therefore motivate the feature-based account of aspectual interpretation developed in Chapter 3, in which aspectual particles are analysed in terms of the event boundary they target and are associated with distinct positions in the syntactic structure.

2.1 Semantic classifications of verbal particles in German(ic)

Particles do not make a uniform semantic contribution to verbal meaning: while some particles contribute a locational or directional reading derived from their use as prepositions, as shown by *auf* in (7), others may provide aspectual meanings, such as telic (8a) or inchoative semantics (8b).

(7) *Peter rollte die Ärmel auf.*

Peter rolled the sleeves AUF

‘Peter rolled up his sleeves.’

(8) a. *Peter trank das Bier aus.*

Peter drank the beer AUS

‘Peter drank up the beer.’

b. *Peter kochte den Spargel an.*

Peter boiled the asparagus AN

‘Peter parboiled the asparagus.’

The literature offers a variety of proposals concerning the number and types of particle subclasses. For example, Toivonen (2020) suggests that there are three semantic classes of preverbs/particles in Germanic, viz. *locative*, *aspectual*, and *idiomatic particles*, illustrated by the examples in (9)-(11).

- (9) *Peter setzte die Brille auf.*
 Peter put the glasses AUF
 ‘Peter put on glasses.’
- (10) *Peter stöhnte auf.*
 Peter groaned AUF
 ‘Peter gave a groan.’
- (11) *Peter hörte mit dem Rauchen auf.*
 Peter heard with the smoking AUF
 ‘Peter stopped smoking.’

In their locative use, particles are interpreted as a marker of spatial location or directionality, e.g., the particle *auf* in (9) above describes an upward movement when placing one’s glasses. Aspectual particles add information concerning the temporal constitution of the event described, e.g., the addition of *auf* in (10) turns an activity predicate (*stöhnen* ‘to groan’) into a punctual achievement.⁴ Other than punctualising, aspectual particles, according to Lüdeling (2001), also ingressive or egressive the base verb: the former zooms in on the beginning of an event, resulting in an inchoative/ingressive meaning (e.g., *schlafen* ‘to sleep’ vs. *einschlafen* ‘to fall asleep’), whereas the latter zooms in on the end of an event, leading to a telic interpretation. (e.g., *essen* ‘to eat’ vs. *aufessen* ‘to eat up’). Finally, idiomatic particles ‘change the lexical semantics of their base verbs in unpredictable ways’ (Lüdeling 2001: 25), as seen in (11), where *auf* combined with *hören* ‘to hear’ results in an expression with the non-compositional meaning *aufhören* ‘to stop’. The occurrence of *auf* in all three of the examples above shows that a particle can be semantically ambiguous, surfacing in more than one class.

⁴In the literature, the term *aspect* has been used to cover (at least) two distinct phenomena, commonly referred to as *lexical aspect* and *grammatical aspect* (see Section 2.2.1 for a detailed introduction). To avoid confusion, I refrain from using the term *aspect* in this broad sense and instead adopt the more specific terminology when referring to these two types. As aspectual particles in German(ic) only provide information about the lexical aspect of the verbal event (Dehé et al. 2002: 14), the term *aspectual* as used in *aspectual particles* throughout this paper is to be understood as referring to lexical aspect rather than to grammatical aspect.

McIntyre (2015) subsumes locative particles under the class of resultative particles, which may, but do not necessarily need to, have purely spatial meanings. An example of a resultative particle with non-spatial meaning is *aus* in *ausmachen* ‘to turn off’, where the particle does not inherit its prepositional meaning ‘out of/from inside’, but instead reflects the adverbial use of *aus* meaning ‘off’. Beyond resultative particles, McIntyre proposes three additional types of particles, which are aspectual particles (10), non-resultative non-aspectual particles that function as locative or temporal modifiers (12), and particles with idiomatic interpretations (11), arriving at a fourfold classification.

- (12) a. *den Ofen vorheizen* (McIntyre 2015: 438)
 the oven VOR.heat
 ‘to preheat the oven’
- b. *ein Bier mittrinken* (ibid.)
 a beer MIT.drink
 ‘to drink a beer with (other people)’

As noted by Dehé et al. (2002), despite variations in details, the types of semantic effects of verbal particles are largely uniform across the Germanic languages. Setting aside idiomatic uses of particles, there is broad agreement in the literature that resultativity and aspectual meaning constitute two major semantic interpretations that are commonly associated with verbal particles.

Building on the existing literature, I propose a classification of German verbal particles into three semantic types: particles with *resultative uses*, *aspectual uses*, and *idiosyncratic uses*. *Resultative* uses of particles pertain mainly to their spatial or directional meanings, which can typically be identified with the meanings of their prepositional counterparts. In such cases, the particle specifies the resulting state of the theme argument as brought about by the directional movement denoted by the base verb (e.g., *aufsetzen* ‘to put on’). *Resultative* uses may also involve adjectival or adverbial meanings associated with the particle itself, as in

die Tür aufmachen ‘to open the door’ and *die Tür ist auf* ‘the door is open’. In *aspectual* uses, which constitute the main focus of this chapter, particles contribute meanings concerning inner aspect (cf. Section 2.2.1). As will be discussed in Section 2.2.2, I argue that German verbal particles encode two types of aspectual meaning: inceptive and egressive, following Lüdeling’s notions of ingressivisation and egressivisation. The former marks the initiation of an event or state, while the latter signals its termination. Finally, particles may also have *idiosyncratic* uses. In these cases, the meaning of the particle is neither resultative nor aspectual, and the interpretation of the particle verb cannot be compositionally derived from the meanings of the particle and the base verb (e.g., *aufhören* ‘to stop’).

While aspectual particles have long been identified in the literature on German verbal particles, there is no consensus on which members belong to this class or on whether particles can genuinely be considered telic markers in the morphological sense. Much of this uncertainty centers on telic particles, i.e., particles that mark the boundedness or endpoint of an event. On the one hand, telic particles are often conflated with resultative particles, as both may give rise to bounded or endpoint-oriented interpretations. On the other hand, their contribution to telicity has been questioned, since telicity in Germanic languages has been argued to be ultimately dependent on the quantification of the internal argument rather than on verbal morphology (among others, Borer 2005b; Krifka 1989, 1992, 1998; Verkuyl 1972, 1993). In this respect, telic particles in German contrast sharply with perfective prefixes in Slavic languages, which are widely analysed in the literature as genuine telicity markers (cf. Borer 2005b; Czardybon and Fleischhauer 2014; Fleischhauer and Czardybon 2016; Kratzer 2004; Krifka 1992; Zucchi 1999). These two sources of confusion have led to scepticism as to whether telic particles should be posited as a category independent of resultative particles and, given the heavy bias of work on aspectual particles towards telic ones, whether the category of aspectual particles is theoretically warranted at all.

In the following, however, I address each issue in turn and argue that the scepticism is unwarranted: in Section 2.1.1, I demonstrate that telic particles can be systematically

distinguished from resultative particles, and in Section 2.1.2, I argue that telic particles do function as morphological aspectual markers, encoding telicity in a way that is independent of the quantificational properties of the object. Together with inceptive particles, which will be introduced in Section 2.2.2, I argue that aspectual particles should be recognised as a well-defined subtype of verbal particles in German.

2.1.1 Telic particles vs. resultative particles

The confusion surrounding telic and resultative particles stems from the fact that, as is commonly assumed (cf. Hoekstra 1988), the addition of a resultative predicate can turn an atelic activity into a telic accomplishment. For example, in the particle verb *zuschieben* ‘to push closed’, the particle *zu* conveys a resultative meaning, indicating that the affected object is *zu* ‘closed’ as a result of the pushing action denoted by *schieben* ‘to push’ (7a). At the same time, the addition of the particle turns *schieben*, an atelic verb, into a telic particle verb. The differing aspectual properties of the simple verb *schieben* and the particle verb *zuschieben* are reflected in their compatibility with time-span adverbials such as *in* ‘in’ and *innerhalb (von)* ‘within’, which can only modify telic predicates (13).⁵

- (13) a. *Peter schob die Schublade (*in / *innerhalb von einer Sekunde).*
 Peter pushed the drawer in within of a second
 ‘Peter pushed the drawer (*within one second).’

⁵In German, the *in*-adverbial is ambiguous between (i) a durative reading, which measures the run time of an event (the reading at issue here), and (ii) a distance reading, on which the adverbial does not measure the event itself but rather the interval between the utterance time and the onset of an event, i.e., *from now on x time in the future*. For example, on the latter reading, the example below asserts that at the end of the measured time interval, namely three hours, Peter will go home. As only the durative reading serves as a diagnostic for telicity, *in*-adverbials will be interpreted in this sense throughout the thesis; the end-of-interval reading will be indicated explicitly where relevant.

- (i) *In drei Stunden geht Peter nach Hause.*
 in three hours goes Peter toward home
 ‘After three hours counting from now on, Peter will go back home.’

- b. *Peter schob die Schublade (in / innerhalb von einer Sekunde) zu.*

Peter pushed the drawer in within of a second ZU

‘Peter pushed the drawer completely shut (within one second).’

The differing aspectual properties can also be diagnosed using the *stop*-test (cf. Dowty 1979): for atelic predicates, *stop V-ing* entails that the event denoted by the verb has taken place, whereas for telic predicates, *stop V-ing* does not entail that the event has reached its endpoint. Applying this test, the base verb in (14a) still entails that Peter has pushed the drawer, while the particle verb in (14b) does not entail that Peter has pushed the drawer closed.

- (14) a. *Peter hörte auf, die Schublade zu schieben.*

Peter stopped AUF the drawer to push.INF

‘Peter stopped pushing the drawer.’

- b. *Peter hörte auf, die Schublade zu-zu-schieben.*

Peter stopped AUF the drawer ZU-to-push.INF

‘Peter stopped pushing the drawer closed.’

Like adjectival resultative predicates (15a), the particle *zu* can also be used predicatively in copular constructions (15b), which further validates its status as a resultative predicate in these cases.

- (15) a. *Peter strich die Schublade rot.*

Peter painted the drawer red

‘Peter painted the drawer red.’

- b. *Die Schublade ist rot / zu.*

the drawer is red closed

‘The drawer is red/closed.’

In some cases, a particle can exhibit both a resultative and an aspectual reading. For example, the particle *auf* contributes a telic interpretation in (16a) and a resultative inter-

pretation in (16b). The latter reading is further illustrated by the use of the particle in the copular construction in (16c).

- (16) a. *Peter hat (innerhalb von einer Stunde) ein Stück Kuchen aufgegessen.*
 Peter ate within of an hour a piece.of cake AUF.eaten
 ‘Peter ate up a piece of cake (within an hour)’
- b. *Peter trat die Tür (innerhalb von einer Sekunde) auf.*
 Peter kicked the door within of a second AUF
 ‘Peter kicked the door open (within a second)’
- c. *Die Tür ist auf.*
 the door is AUF
 ‘The door is open.’

The fuzzy relationship between resultative and telic particles has led to the label telic particle often being used to refer to a subset of resultative particles that appear to express only the completion of the event denoted by the verb and its arguments (Blom 2005: 148). This practice further undermines the validity of the category of aspectual particles, or leads to definitions that unexpectedly exclude particles contributing to telicity. In the following, I argue that telic particles cannot be subsumed under resultative particles by identifying a crucial respect in which they differ. Before turning to this difference, however, I reassess a commonly used diagnostic for identifying the resultative use of particles and for distinguishing it from their aspectual (telic) use, whose validity, however, has been frequently challenged by exceptional data.

As shown in (16), the resultative use of particles is often taken to be reflected in their ability to appear predicatively in copular constructions, whereas telic particles are generally excluded from such contexts. Copular predication has been proposed by many authors as a sufficient diagnostic for identifying the resultative use of particles (cf. McIntyre 2007). Applying this

diagnostic to the uses of *auf* in (17), with the results shown in (18), leads to the conclusion that *auf* contributes a resultative meaning in (17a), but a telic meaning in (17b).

- (17) a. *Peter schloss die Tür auf.*
 Peter locked the door AUF
 ‘Peter unlocked the door.’
- b. *Peter aß den Apfel auf.*
 Peter ate the apple AUF
 ‘Peter ate up the apple.’
- (18) a. *Die Tür ist auf.*
 the door is AUF
 ‘The door is open.’
- b. **Der Apfel ist auf.*
 the apple is AUF
 Intended: ‘The apple is eaten up.’

The same applies to the particle *aus*, which, like *auf*, can exhibit either a resultative or a telic meaning. The use of *aus* in (19a) is diagnosed as resultative on the basis of (20a), whereas its use in (19b) is diagnosed as telic on the basis of (20b).⁶

- (19) a. *Das Kind blies die Kerze aus.*
 the child blew the candle AUS
 ‘The child blew out the candle.’
- b. *Das Kind trank den Saft aus.*
 the child drank the juice AUF
 ‘The child drank up the juice.’

⁶The use of *aus* as in (18b) is ungrammatical in standard German, but is acceptable in certain dialects. See the discussion below.

- (20) a. *Die Kerze ist aus.*
 the candle is AUS
 ‘The candle is out.’
- b. **Der Saft ist aus.*
 the juice is AUS
 Intended: ‘The juice is drank up.’

However, this diagnostic faces two problems. First, while the use of a particle as a copula predicate qualifies it as a resultative particle, the inability of a particle to occur in this context does not warrant the conclusion that the particle does not contribute a resultative interpretation. An example is the particle verb *ausspucken* (lit. out-spit) ‘to spit out’ in (21a), where the particle *aus* is used directionally, which, following McIntyre’s classification, belongs to a subtype of resultative particles. In (21a), it denotes the resultant state of the spit being outside the mouth as a result of the spitting action. Nevertheless, the same particle cannot occur as a predicate in a copular construction, as shown in (21b).

- (21) a. *Das Kind spuckte den Kern (innerhalb von einer Sekunde) aus.*
 the child spit the pit within of a second AUS
 ‘The child spat the pit (within one second) out.’
- b. **Der Kern ist aus.*
 the pit is AUS
 ‘The pit is out.’

In English too, there are resultative particles that are acceptable in verbal constructions but cannot appear as predicates in copular clauses (McIntyre 2002).⁷

⁷Unlike German and English, where only a subset of resultative particles rejects the copula construction, Blom (2005) observes that resultative particles in Dutch resist copular predication in general (i-iii). Blom attributes the inability of Dutch resultative particles to appear in copular constructions to their non-projecting nature. Given that this appears to be a language-specific property of Dutch particles, the Dutch data is not directly comparable to the situation in German and English.

(22) a. to carry the ball away/out

b. *The ball is away/out.⁸

This challenge to the use of copular predication as a diagnostic for distinguishing resultative from telic particles may admit a possible resolution. It can be noted that the particles in question do not encode a simple locative meaning but rather a directional one, which typically requires the presence of a ground argument specifying either the source or the goal of the movement. Therefore, it can be argued that the inability of particles like *aus* to appear in copular constructions is not due to their status as non-resultative particles, but rather to their directional semantics in combination with the absence of an overt ground argument. The ungrammaticality of (21b) can be remedied by adding the prefix *hin-* or *her-* (23),⁹ which has a deictic function (indicating movement towards or away from the speaker) and, crucially, permits the ground argument associated with the directional relation expressed by these prefixes to remain implicit.

(i) *de boeken doorverkopen* ‘to resell the books (to a third party)’:

**De boeken zijn door.*

‘The books are through.’

(ii) *klok voorzetten* ‘to put the clock ahead’:

**De klok is voor.*

‘The clock is ahead.’

(iii) *het zilver oppoetsen* ‘to polish up the silver’:

**Het zilver is op.*

‘The silver is polished up.’

(Blom 2005:200)

⁸As McIntyre (2002) notes, in English copular constructions such as *she is out* and *she is away* often involve specialised meanings (e.g., ‘not at home’), which occur only in a restricted set of particle verb constructions (e.g., *go out/away*, *take (someone) out*). These uses are argued by McIntyre to reflect cases of lexical stipulation, resulting in idiosyncratic interpretations. It is important to emphasise that the use of copular predication as a diagnostic in this chapter is limited to assessing whether the particle in a copular construction expresses the same meaning as in the corresponding particle verb. Accordingly, in examples (22-25), particle meanings in copular constructions are evaluated solely with respect to their counterparts in particle-verb constructions. Idiosyncratic or purely extensional meanings are not taken into consideration.

⁹In colloquial German, the particles *hin-* and *her-* are often reduced to *r-* (e.g., *raus*), a form that neutralises the deictic distinction between *hin* and *her* that is preserved in more formal registers.

- (23) *Der Kern ist hin-/heraus.*
 the pit is HIN/HER.out

Since English lacks equivalents of German *hin-* and *her-*, the ungrammatical example in (22b) can be repaired only by overtly expressing the ground argument, as in (24)

- (24) a. The ball is out of the room.
 b. The ball is away from the house.

The second problem associated with the copular predication diagnostic, which is much harder to explain away, is that telic particles may in fact appear as copular predicates. This issue arises particularly with the particle *aus*, as illustrated by the Facebook post in (25).

- (25) *Das Mehl ist aus, die Milch auch. Schnell mal eben besorgen geht*
 the flour is AUS the milk also quickly MP just get goes
in vielen kleinen Gemeinden nicht, denn die meisten haben keinen
 in many small communities not because the most have no
*Lebensmittelladen mehr.*¹¹
 grocery.store anymore

‘The flour is out, and so is the milk. Quickly going to get some isn’t possible in many small communities, because most of them no longer have a grocery store.’

Furthermore, according to the *Atlas zur deutschen Alltagssprache* (AdA) (Elspaß & Möller 2003ff.),¹² expressions like *Die Milch ist aus* (‘there is no more milk left’) are widely attested in regions such as Swabia, Bavaria, and eastern Austria.¹³ Therefore, both resultative and telic particles can occur in copular constructions, which significantly undermines the validity of this diagnostic as a reliable test for distinguishing between resultative and telic uses of particles.

¹¹<https://www.facebook.com/treffpunktsittensen/posts/das-mehl-ist-aus-die-milch-auch-schnell-mal-eben-besorgen-geht-in-vielen-kleinen/1134116182055531/>

¹²<https://www.atlas-alltagssprache.de/>

¹³<https://www.atlas-alltagssprache.de/runde-5/f07a-c/>

Although this diagnostic fails as a reliable test, resultative and telic particles are not indistinguishable. There is indeed an important difference between them: while resultative particles permit quantificational modification, egressive uses do not. This contrast holds in both copular constructions (26) and particle verb constructions (27).

- (26) a. *Die Lichter sind teilweise / völlig / ganz aus.*
 the lights are partly completely completely AUS
 ‘The lights are partly / completely out.’
- b. **Die Milch ist teilweise / völlig / ganz aus.*
 the milk is partly completely completely AUS
 Intended meaning: ‘The milk is partly(?) / completely used up.’
- (27) a. *Peter machte das Fenster halb / völlig / ganz auf.*
 Peter made the window half completely entirely AUF
 ‘Peter opened the window half / completely / entirely.’
- b. **Peter aß den Apfel teilweise / völlig / ganz auf.*
 Peter ate the apple partly completely entirely AUF
 Intended: ‘Peter ate the apple partly / completely / entirely up.’

A similar contrast is observed by Jackendoff (1997) for the English particle *away*: when used aspectually, *away* does not permit quantificational modification (28a), whereas such modification is possible in its non-aspectual uses, such as in time-*away* constructions (28b).

- (28) a. **Sally waltzed entirely / partly / half away.*
- b. Sally waltzed the afternoon entirely / partly / half away.

To summarise, while the copular predication test ultimately proves insufficient as a reliable diagnostic for distinguishing resultative from telic uses of particles, the distinction between the two can be identified through quantificational modification: while resultative particles permit such modification, telic particles do not.

Having established that telic particles can be distinguished from resultative particles, I now turn to the second source of scepticism surrounding telic particles, namely the question of whether they genuinely function as morphosyntactic aspectual markers. The following subsection examines the contrast between aspectual marking in German and Slavic languages. The discussion is not intended to be comprehensive; rather, its purpose is to highlight the fundamental differences that have motivated the widespread view that Slavic prefixes, but not German particles, constitute genuine aspectual markers. I will argue, however, that this contrast merits reconsideration and that the received conclusion that German particles do not serve as morphosyntactic aspectual markers deserves re-examination.

2.1.2 Telic particle in German vs. perfective prefixes in Slavic

It is well-observed that in Germanic languages, the telicity of a predicate, particularly predicates headed by so-called incremental theme verbs (a term introduced by Dowty (1991) based on Krifka (1987, 1989)) such as *essen* ‘to eat’ and *trinken* ‘to drink’, is determined not only by the event structure properties of the verb but also by the quantisation properties of the theme argument. Specifically, if the theme is quantised, which is commonly marked morphosyntactically by number expressions (e.g., *drei Äpfel* ‘three apples’), demonstratives (e.g., *diese Äpfel* ‘these apples’) or (in-)definite articles (e.g., *ein/der Apfel* ‘a/the apple’), the resulting predicate is telic: for example, it is compatible only with *in*-adverbials (29a) but not with durative *for*-adverbials (29b). By contrast, if the incremental theme argument is not quantised, as with bare plurals (e.g., *Äpfel* ‘apples’) and mass nouns (e.g., *Reis* ‘rice’), the predicate is atelic (29b). This is reflected in its compatibility with *for*-adverbials (30a) but not with *in*-adverbials (30b). Therefore, for morphological simplex incremental theme verbs such as *essen*, telicity is determined by the quantisation of the theme argument. The influence of the referential property of the direct object on the telicity of the whole predication has been approached from various perspectives in the literature (see Filip 2008; Kennedy and Levin 2008; Krifka 1992, 1998; Rappaport Hovav 2008; Rothstein 2004, 2008, among others).

- (29) a. *Peter hat einen / den Apfel in zehn Minuten gegessen.*
 Peter has an the apple in ten minutes eat.PTCP
 ‘Peter ate the apple in ten minutes.’
- b. **Peter hat einen / den Apfel zehn Minuten lang gegessen.*
 Peter has an the apple ten minutes long eat.PTCP
- (30) a. *Peter hat zehn Minuten lang Äpfel / Reis gegessen.*
 Peter has ten minutes long apples rice eat.PTCP
 ‘Peter ate apples / rice for ten minutes.’
- b. **Peter hat Äpfel / Reis in zehn Minuten gegessen.*
 Peter has apples rice in ten minutes eat.PTCP

When *essen* combines with the particle *auf*, however, the resulting particle verb *aufessen* ‘to eat up’ becomes invariably telic, and it now can only take quantised theme arguments as its direct object (31).¹⁴

- (31) a. *Peter hat die Äpfel in zehn Minuten auf-gegessen.*
 Peter has the apples in ten minutes AUF-eat.PTCP
 ‘Peter ate up the apples in ten minutes.’
- b. **Peter hat Äpfel in zehn Minuten auf-gegessen.*
 Peter has apples in ten minutes AUF-eat.PTCP

Unlike Germanic languages, where telicity is typically expressed through the quantisation of the object (an *object-marking strategy*), Slavic languages employ a *verb-marking strategy* for telicity marking, whereby telicity is triggered by the grammatical aspect of the verb. Consider, for example, the Russian examples in (32).

¹⁴It should be noted that sentences containing telic particle verbs with bare plural objects, as in (31b), may be subject to variations in native speakers’ judgments. However, for speakers who do accept sentences of this type, the object is nevertheless interpreted as bounded, even in the absence of a definite article.

(32) Russian (Czardybon and Fleischhauer 2014: 375)

- a. *On pil_{IMPF} vod-u (*za čas).*
 he drank.PST water-ACC in hour
 ‘He drank/was drinking water.’
- b. *On vy-pil_{PF} vod-u za čas.*
 he VY-drink.PST water-ACC in hour
 ‘He drank (all) the water in an hour.’

Both sentences contain the verb *pít* ‘to drink’ and the mass noun *vodá* ‘water’ as the object, differing only in the aspectual marking on the verb: the verb is imperfective in (32a) but is perfectivised in (32b) through prefixation with *vy-*. This difference in aspectual marking results in a significant difference in the interpretation of the object. In the imperfective sentence, the object is interpreted as an unspecified, unbounded quantity of water, which leads to an atelic predication that does not allow time-span adverbials such as *za čas* ‘in an hour’. By contrast, in the perfective sentence, the mass noun receives an obligatorily quantised reading and the predicate is telic, hence licencing the presence of the time-span adverbial and yielding a reading the agent finishes drinking all the water.

Crucially, the difference in interpretation of the object is not marked by definiteness determiners, as in the case in Germanic languages. In fact, most Slavic languages such as Russian, Polish, and Czech, lack a grammatical system of definiteness marking with definite or indefinite articles. The referential properties of the otherwise cumulative object are instead determined by the aspectual marking on the verb: perfective verbs obligatorily induce a quantised interpretation of the object and yield a telic predicate, whereas imperfective verbs do not.

The effect of verbal perfectivity on the realisation of telicity in incremental theme verbs also extends to cases where the object is a count noun, regardless of whether it is singular or plural. As shown by the examples in (33)–(34), the noun *jabloko* ‘apple’ receives a quantised reading (compatible with either a definite or an indefinite reading in the singular) when it

co-occurs with a verb marked for perfective aspect ((33b) and (34b)), but a non-quantised reading in the imperfective case ((33a) and (34a)). The former results in a telic predication, while the latter gives rise to an atelic one.

(33) Russian (Czardybon and Fleischhauer 2014: 374)

- a. *On el_{IMPF} jabloko (*za čas).*
 he eat.PST apple.ACC in hour
 ‘He ate/was eating an/the apple.’
- b. *On s''-el_{PF} jabloko za čas.*
 he s-eat.PST apple.ACC in hour
 ‘He ate a/the (whole) apple in an hour.’

(34) Russian

- a. *On el_{IMPF} jabloki (*za čas).*
 he eat.PST apples.ACC in hour
 ‘He ate/was eating apples.’
- b. *On s''-el_{PF} jabloki za čas.*
 he s-eat.PST apple.ACC in hour
 ‘He ate apples in an hour.’

The Russian examples in (32)–(34) find direct equivalents in Polish (35)–(37). As in Russian, in Polish, a telic reading in incremental theme constructions arises only with perfective verbs, whereas combinations with imperfective verbs always yield an atelic predication.

(35) Polish (Fleischhauer and Czardybon 2016: 177)

- a. *Jan pił_{IMPF} wod-ę (*w godzinę).*
 Jan drink.PST water-ACC in hour
 ‘Jan drank/was drinking water.’

- b. *Jan wy-pił_{PF} wod-e w godzinę.*
 Jan WY-drink.PST water-ACC in hour
 ‘Jan drank (all) the water in an hour.’

(36) Polish (Fleischhauer and Czardybon 2016: 191)

- a. *Jadłem_{IMPF} gruszkę (*w minutę).*
 z-eat.PST pear.ACC in minute
 ‘I ate/was eating a/the pear.’
- b. *Z-jadłem_{PF} gruszkę w minutę.*
 z-eat.PST pear.ACC in minute
 ‘I ate a/the pear in a minute.’

(37) Polish (Fleischhauer and Czardybon 2016: 191)

- a. *Jadłem_{IMPF} truskawki (*w minutę).*
 z-eat.PST strawberries.ACC in minute
 ‘I ate/was eating strawberries.’
- b. *Z-jadłem_{PF} truskawki w minutę.*
 z-eat.PST strawberries.ACC in minute
 ‘I ate strawberries in a minute.’

Furthermore, Czardybon and Fleischhauer (2014) observe that in Upper Silesian, a south-west dialect of Polish that does have grammatical definite articles, imperfective sentences nevertheless always give rise to an atelic interpretation even in the presence of a definite article (38b). As in standard Polish, telicity always entails perfective marking on the verb (39).

(38) Upper Silesian (Czardybon and Fleischhauer 2014: 388)

- a. *Łon jod_{IMPF} jabk-o (*za godziną).*
 he eat.PST apple-ACC in hour
 ‘He ate/was eating (of) an apple’

- b. *Łon jod_{IMPF} te jabk-o (*za godzina).*
 he eat.PST DEF apple-ACC in hour
 ‘He ate/was eating (of) an apple’

(39) Upper Silesian (Czardybon and Fleischhauer 2014: 389)

- a. *Łon z-jod_{PF} jabk-o za godzina.*
 he eat.PST apple-ACC in hour
 ‘He ate an apple in an hour.’
- b. *Łon z-jod_{PF} te jabk-o za godzina.*
 he eat.PST DEF apple-ACC in hour
 ‘He ate the apple in an hour.’

The Slavic data presented above lead to the generalisation that in these languages, the telicity of verbs is correlated with their perfective marking.¹⁵¹⁶ Since most perfective verb forms in Slavic are formed through prefixation, these prefixes are commonly analysed as telicity markers. This idea is syntactically implemented by analysing these prefixes as spelling out a telic feature in a functional projection above VP (see Borer 2005a; Kratzer 2004;

¹⁵It should be noted that Slavic languages vary with respect to the relationship between perfectivity and telicity. In Russian, for example, perfective verbs do not always yield telic predicates, as illustrated by the example in (i). In Polish, by contrast, telicity is a semantic entailment of perfective verbs (Kwapiszewski 2022).

(i) *Petja pro-sidel_{PF} v tjur'me (*za) pjat' let.*
 Peter PRO-sit in prison.LOC in five years
 ‘Peter was in prison for/*in five years.’
 (Borik 2002: 55)

¹⁶In some Slavic languages (e.g., Polish, Russian) as well as Uralic languages (e.g., Hungarian, Finish, Estonian), partial and total affectedness of the object, accordingly the telicity of the predicate, is differentiated in terms of case marking of the nominal object. For example, in Hungarian (i) and Russian (ii), totally affected object is coded in the accusative case, whereas partially affected object in the genitive/partitive case.

(i) Hungarian (Song 2018: 185)
 a. *Olvasta a könyvet.*
 read.s/he.it the book.ACC
 ‘S/He read the book.’
 b. *Olvasott a könyvből.*
 read.s/he the book.PRTV
 ‘S/He read some of the book.’

Travis 2010, for example).

As an interim summary, while telicity in Slavic languages is exclusively associated with perfective marking on the verb, telicity in Germanic languages is argued to be a semantic and pragmatic property of the verb phrase rather than of the verb alone (Filip 2008), as it depends on both the lexical semantics of the verb and the referential properties of the theme object. Furthermore, while German particles actively participate in the derivational processes of forming complex verbs, none of them seems to be systematically linked to telicity (Kratzer 2003, 2004). These typological differences between Slavic and Germanic languages have led to the widely accepted view in the literature that Germanic particles do not function as morphosyntactic telicity markers, even though they may contribute semantic telic meanings in certain contexts.

While cross-linguistic differences in the expression of telicity in Slavic and Germanic languages have long been observed (Filip 2005; Svenonius 2012), comparisons with Slavic verbs have typically focused on simple verbs or verbs with resultative particles in Germanic, whereas aspectual particles have largely been overlooked.¹⁷ To the best of my knowledge, Fleischhauer and Czardybon (2016) are among the few studies that explicitly compare Slavic prefixes with aspectual uses of particles in German. Based on a comparison between Slavic prefixes and the completive use of the German particle *auf*, Fleischhauer and Czardybon (2016) argue that unlike Slavic perfective prefixes, which are mandatory in expressing telic incremental theme predications, German particles such as *auf* are only ‘optional’, and that

(ii) Russian (Song 2018: 185)

- a. *Peredajte mne xleb.*
pass me bread.ACC
‘Pass me the (whole) bread.’
- b. *Peredajte mne xleba.*
pass me bread.GEN
‘Pass me some (of the) bread.’

¹⁷This tendency appears to be rooted in a widely held assumption that the aspectual meaning of particles can be reduced to resultativity — an assumption that is often taken for granted and not systematically questioned. As I have argued in Section 2.1.1, aspectual particles should be recognised as a distinct category independent of resultative particles. They convey meanings that go beyond simple resultativity, and, at least in German, telic particles can be systematically distinguished from resultative ones.

telicity in Germanic ultimately depends on the referential properties of the incremental theme argument rather than on the presence of the particle. They propose that in *auf*-particle verbs where *auf* has a completive meaning, the semantic function of the particle is to contribute a condition of total affectedness on the theme. Since total affectedness presupposes a bounded and specific quantity, predicates involving a verbal particle are incompatible with non-quantised themes, which explains why verbs such as *aufessen* ‘to eat up’ can only take quantised objects, as shown in (31). Therefore, while the authors acknowledge the telic meaning contributed by the particle, they treat this meaning as derivative of the semantics of the object rather than as a consequence of the particle functioning as a grammatical marker of telicity.

Against this analysis, I defend a stronger position. I argue that the requirement imposed by the particle on the quantity of the direct object does not follow merely from its semantics, but from the fact that these particles function as morphosyntactic telicity markers in these constructions. On this view, the particle itself encodes telicity, yielding a telic predicate independently of the quantisation properties of the direct object. The restriction to quantised objects is therefore not the source of telicity, but a consequence of the morphosyntactic requirements imposed by the particle.

The most direct evidence for my argument comes from the fact that particle verbs like *austrinken* ‘to drink up’ and *aufessen* ‘to eat up’ can be used intransitively without an overt object, yet still yield a telic interpretation. For instance, in (40), the sentence is interpreted as meaning that the man finished drinking a specific amount of wine, even though the exact amount is unknown. Similarly, in (40b) the verb *aufessen* denotes the completion of an eating event despite the absence of an overt object.

- (40) a. *Nachdem er bereits vor einigen Stunden aus-getrunken und mittlerweile*
 after he already before some hours AUF-drink.PTCP and by.now
auch geschlafen hatte, nahm er an, wieder fahrtüchtig zu sein. In dieser
 also slept had took he AN again fit.to.drive to be in this
Annahme ging er jedoch fehl.
 assumption went he however wrong
 ‘After he had already finished drinking some hours earlier and had also slept by then,
 he assumed he was fit to drive again. In this assumption, however, he was mistaken.’
 (<https://www.bgland24.de/bgland/polizeimeldungen/landkreis-fahrer-viel-promille-steuer-erwischt-ch24-2479029.html>)
- b. *Ich musste so lange am Tisch sitzen, bis ich auf-gegessen hatte.*
 I had.to so long bei.the table sit until I AUF-eat.PTCP had
 ‘I had to sit at the table until I finished (my meal).’
 (<https://www.threads.com/@capeniona/post/DINvHIHNmvN/ich-musste-so-lange-am-tisch-sitzen-bis-ich-aufgegessen-hatte-als-ich-beschloss->)

These data are unexpected under an account according to which, despite the presence of telic particles in German, the telicity of predicates containing particle verbs still depends on the quantisation of the direct object, just as in the case of the corresponding base verbs. Based on the data, I propose that telic particles such as *auf* and *aus* in German behave much like perfective prefixes in Slavic in that they necessarily render the predicate telic regardless of the quantity of the direct object. Given that both encode telicity, and given that events of eating or drinking can be telic only with respect to some specified quantity of food or liquid, the object is necessarily interpreted as definite.

However, German telic particles differ from Slavic prefixes in two crucial aspects. First, while Slavic prefixes influence the computation of telicity at the level of perfectivity, German particles operate inside the verbal domain. Therefore, the difference ultimately reduces to

the distinct roles of German particles and Slavic prefixes in the encoding of inner and outer aspect, respectively, notions that will be introduced in Section 2.2.1. Second, while encoding telicity, German telic particles also constrain the morphosyntactic realisation of the object, given that German, unlike Slavic languages, does have a grammaticalised system of marking quantisation through definite or indefinite articles. As a result, if an object is present, it must be morphosyntactically realised as quantised; otherwise, a mismatch arises between the interpretation imposed by the particle and the morphosyntactic marking of the object. This crucially captures the fact that particle verbs with telic particles in German in fact disprefer non-quantised objects: the result is not an atelic interpretation, as one might otherwise expect, but degradation or outright ungrammaticality, as illustrated in (41). This contrasts with the behaviour of morphologically simplex verbs, where a non-quantised object yields a fully grammatical atelic predicate, as shown in (42).

- (41) a. *Peter hat die Äpfel auf-geessen.*

Peter has the apples AUF-eat.PTCP

‘Peter ate up the apples.’

- b. **/?Peter hat Äpfel auf-geessen.*

Peter has apples AUF-eat.PTCP

- (42) a. *Peter hat die Äpfel (in zehn Minuten / zehn Minuten lang) gegessen.*

Peter has the apples in ten minutes ten minutes long eat.PTCP

‘Peter ate the apples in/for ten minutes.’

- b. *Peter hat Äpfel (*in zehn Minuten / zehn Minuten lang) gegessen.*

Peter has apples in ten minutes ten minutes long eat.PTCP

‘Peter ate apples *in/for ten minutes.’

When the object is absent, however, no such mismatch arises, since the quantised interpretation introduced by the particle is not in conflict with any overt nominal marking. This accounts for the contrast in (43), where *aufessen* combines naturally with *in*-adverbials either

without an overt object or with a quantised object, but becomes ungrammatical when the object appears in a non-quantised form.¹⁸

- (43) a. *Peter hat in zehn Minuten auf-gegessen.*
 Peter has in ten minutes AUF-eat.PTCP
 ‘Peter ate up in ten minutes.’
- b. *Peter hat die Äpfel in zehn Minuten auf-gegessen.*
 Peter has the apples in ten minutes AUF-eat.PTCP
 ‘Peter ate up the apples in ten minutes.’
- c. **Peter hat Äpfel in zehn Minuten auf-gegessen.*
 Peter has apples in ten minutes AUF-eat.PTCP

The requirement imposed by telic particles on the quantisation of the object will be given a syntactic explanation in Section 3.3.2.2. For now, it suffices to point out that I depart from Fleischhauer and Czardybon (2016) in that, while they treat the restriction that particle verbs with telic *auf* and *aus* only combine with quantised objects as a semantic requirement imposed by the particle, I argue that it follows from their role as morphosyntactic telicity markers,

¹⁸ Travis (2010) notes that while the combination of *austrinken* with a non-quantised object is ungrammatical with the *in*-adverbial, it is degraded but nevertheless more acceptable with the *for*-adverbial.

- (i) *Ich habe *in zwei Stunden/ ?zwei Stunden lang Weinflaschen aus-getrunken.*
 I have in two hours ?two hours long wine.bottles AUS-drink.PTCP
 ‘I drank up wine bottles *in two hours/?for two hours.’

The acceptable combination of the telic predicate *austrinken* with a durative *for*-adverbial is unexpected here. But it should be noted that although durative *for*-adverbials have been widely used as a standard diagnostic for atelicity, this assumption has been challenged, as durative phrases have been shown to be compatible with telic predicates under an iterative interpretation (Alsina 1999; Jackendoff 1996; Schmitt 1996; Wyngaerd 2001). This is precisely the case in (i): the sentence with the *for*-adverbial is interpreted as involving a repetition of telic events of drinking a bottle empty, one after another, over a period of two hours, giving rise to what MacDonald (2008a) refers to as a *sequence-of-similar-events* (SSE) reading. This reading is obviously triggered by the *for*-adverbial, which introduces an iterative operator that embeds a sequence of telic drinking events and thereby improves the acceptability of the sentence compared to the corresponding construction with an *in*-adverbial. However, since the SSE reading represents a case of grammatical aspect (Ramchand 2008), it falls outside the current discussion of Aktionsart. For further discussion of the distinction between telicity and temporal boundedness denoted by *in*- and *for*-adverbials, see Depraetere (1995), Smith (1999), and Wyngaerd (2001). For a detailed discussion of the SSE reading and the conditions under which it arises, see MacDonald (2008a) and van Geenhoven (2004).

which require a match between the quantised semantic interpretation of the object and its morphosyntactic realisation. But it should be emphasised that I do not claim German particles function as aspectual markers in all contexts. Rather, I propose that they act as aspectual markers only in particle verb constructions in which they contribute aspectual meanings such as inceptivity and egressivity (to be introduced in Section 2.2.2). In Chapter 3, I argue that the resultative, aspectual, and idiosyncratic uses of particles can be derived from the different structural positions they occupy. In this respect, the present analysis challenges a widely assumed, though often unexamined, premise underlying much of the syntactic literature on German particle verbs: namely, that particles occupy a single, uniform structural position regardless of their varied meanings, to which I turn in Section 2.3.

2.1.3 Summary

To summarise, this section has reviewed semantic classifications of verbal particles in the literature and proposed a tripartite categorisation of German particles into resultative, aspectual, and idiosyncratic types.

Among these, aspectual particles raise two central questions: first, whether they can be subsumed under resultative particles, and second, whether they encode telicity morphosyntactically. With respect to the first question, it has been shown that, while the commonly used copular predication test fails to diagnose the difference between telic and resultative particles, the crucial distinction between them is more clearly reflected in their behaviour under quantificational modification: resultative particles permit such modification, whereas telic particles do not. This contrast provides a more reliable diagnostic for distinguishing the two categories and supports the need to separate telic particles from resultative ones in the analysis of German verbal particles.

With respect to the second question, the data in Section 2.1.2 suggest that telic particles do function as morphological markers of telicity. Crucially, particle verbs with telic particles can be used intransitively without an overt object and still yield a telic interpretation,

demonstrating that telicity in these cases is not determined by the quantificational properties of the internal argument (as it would be for the base verb alone), but is instead contributed by the particle itself. This provides grounds for treating telic particles as genuine aspectual markers. Moreover, as will be argued in Section 2.2, the class of aspectual particles extends beyond telic particles to include inceptive particles, which mark the initiation of an event rather than its culmination. Taken together, I argue that aspectual particles constitute a well-defined subtype of particles in German.

The next section zooms in on aspectual particles in German and provides a detailed discussion of their aspectual marking function, which lays the empirical groundwork for the syntactic account developed later in Chapter 3. Section 2.2.1 first introduces the distinction between lexical (inner) and grammatical (outer) aspect. Section 2.2.2 then proposes a classification of aspectual particles in German into two types: inceptive particles, which encode initiation, and egressive particles, which encode culmination. Finally, Section 2.2.3 presents a systematic overview of the particles in German that realise the inceptive and egressive meanings.

2.2 The semantics of aspectual particles

The notion of aspect has been used in different and sometimes inconsistent ways in the linguistic literature. According to Comrie (1976), aspect can be broadly defined as ‘the different ways of viewing the internal temporal constituency of a situation’, and in linguistic research it has been used to encompass (at least) two distinct subcategories: *lexical aspect* and *grammatical aspect* (or *inner* vs. *outer aspect* in Travis (1991), *situation* vs. *viewpoint aspect* in Smith (1991)). Aspectual particles in German contribute only to the encoding of lexical aspect.

2.2.1 Lexical and grammatical aspect

2.2.1.1 Lexical aspect

Lexical aspect, or Aktionsart, is generally defined as indicating the intrinsic temporal qualities of a situation (Brinton 1988: 3).¹⁹ The most influential characterisation of different Aktionsarten goes back to Vendler (1957), who distinguishes four event types: states, activities, accomplishments, and achievements. Vendler's quadripartition is based on three temporal features: dynamicity, telicity and duration. Dynamicity distinguishes states from the other three categories in that only states involve a period of undifferentiated time: as long as a state holds, it remains the same throughout, at every moment of its duration. Dynamic states, by contrast, necessarily involve change affecting an entity. Telicity (from the Greek *telos* 'goal') has been characterised in terms of 'culmination' or 'boundedness', that is, whether a situation is presented as having a natural endpoint. Among Vendler's four event types, only accomplishments and achievements are telic. Finally, durativity concerns whether a situation extends over a temporal interval. Durative situations have a measurable runtime, whereas punctual situations lack temporal extension. In this respect, achievements are punctual, while states, activities, and accomplishments are durative. Vendler's four event types and their associated aspectual features are summarised in Table 2.1, together with illustrative examples from German.

As can be seen from the examples in the table, Aktionsart in German is determined at the level of the predicate rather than by the base verb alone (Verkuyl 1972). Consequently, other elements of the predicate, including objects and preverbal elements (e.g., particles and prefixes), can also influence the aspectual interpretation of the predicate as a whole. For example, the addition of an object can turn an activity verb into an accomplishment, as shown by pairs such as *rennen* 'to run' vs. *einen Kilometer rennen* 'to run a kilometer', and *malen*

¹⁹But when the term was originally coined by Karl Brugmann in 1885, it was intended to be used as a cover term encompassing what is now distinguished as grammatical aspect and Aktionsart.

	Dynamic	Telic	Durative	Examples
State	–	–	+	<i>wissen</i> ‘to know’, <i>lieben</i> ‘to love’, <i>haben</i> ‘to have’, <i>glauben</i> ‘to believe’, <i>kennen</i> ‘to know’
Activity	+	–	+	<i>rennen</i> ‘to run’, <i>arbeiten</i> ‘to work’, <i>essen</i> ‘to eat’, <i>schwimmen</i> ‘to swim’, <i>denken</i> ‘to think’, <i>malen</i> ‘to draw’
Accomplishment	+	+	+	<i>einen Kilometer rennen</i> ‘to run a kilo- meter’ <i>ein Bild malen</i> ‘to paint a picture’ <i>aufessen</i> ‘to eat up’
Achievement	+	+	–	<i>Gold finden</i> ‘to find gold’ <i>bemerken</i> ‘to notice’ <i>erreichen</i> ‘to reach/arrive’ <i>erkennen</i> ‘to recognise’

Table 2.1: Classification of Aktionsarten

‘to draw’ vs. *ein Bild malen* ‘to draw a picture’. The event class of a base verb can also be modified through the addition of a verbal particle or a prefix (cf. Section 2.1). For example, the activity verb *essen* ‘to eat’ becomes telic when combined with the particle *auf* (*aufessen* ‘to eat up’). Likewise, the stative verb *kennen* ‘to know’ is converted into an achievement through prefixation with *er-* (*erkennen* ‘to recognise’).

Vendler’s classification, despite its widespread use, has been subject to subsequent revision and expansion. Dowty (1979), for example, reanalyses Vendler’s event types in terms of the temporal criterion of change. On Dowty’s account, activities, accomplishments, and achievements all involve change, whereas states are characterised by the absence of change. Among the former three types, activities specify indefinite change, accomplishments specify definite complex change, and achievements are associated with a definite singular change. Verkuyl (1993) collapses Vendler’s accomplishments and achievements into a single class of events, alongside states and processes (the latter corresponding to Vendler’s activities), yielding a three-way classification of event types. He abandons the durativity parameter used by Vendler

and argues that ‘the length of the event does not seem to be a linguistic matter’ (Verkuyl 1993: 49). Building on Vendler’s framework, Smith (1991) introduces an additional category, semelfactives, which denote situations that are dynamic, punctual and atelic. Examples of semelfactive predicates include *husten* ‘to cough’, *niesen* ‘to sneeze’, *klopfen* ‘to knock’ etc. Although the Vendlerian classes were proposed primarily based on English data, they are still taken by many scholars as a starting point for the classification of aspectual situations in languages other than English. Van Valin (2006) claims that Vendler’s four categories, with the addition of semelfactives, are universal. For broader discussion of cross-linguistic variation in the encoding of aspectual classes, see Bache et al. (1994), Bar-el (2015), and Tatevosov (2003).

Vendler’s four aspectual classes have also been subsequently challenged as not being atomic notions, but as requiring further decomposition. On this view, labels such as activity, accomplishment, or achievement reflect complex event structures rather than primitive categories, giving rise to the now widely held assumption that events are composed of more fine-grained primitives, even though there remains considerable disagreement regarding where and how this decomposition should be represented.

One influential line of work locates the decomposition of Aktionsart in the lexical semantics of verbs (among others, Dowty 1979; Jackendoff 1990; Levin & Rappaport Hovav 2005; Parsons 1990; Wunderlich 1997). Within this lexicalist tradition, event-structural properties are taken to be inherent to lexical items and encoded in their semantic representations. This tradition goes back to Dowty (1979), but the most important contribution to this line of research is provided by Levin and Rappaport Hovav (1995, 2005) and Rappaport Hovav and Levin (1998), who, drawing on earlier work by Jackendoff (1983, 1990), develop a template-based approach to lexical decomposition. On this approach, the event structure of a verb is represented as a structured template composed of two types of elements: *primitive predicates*, which are universal and grammatically relevant, and *predicate constants*, which encode the idiosyncratic lexical content of individual verbs and function as modifiers or arguments within the templates. Primitive predicates include ACT, CAUSE, and BECOME, whereas predicate

constants are contributed by roots. Roots may be stative or eventive, and among eventive roots, Rappaport Hovav and Levin (2010) propose that they fall into two broad ontological classes that are in complementary distribution: *manner roots*, which specify the manner in which an action is carried out, and *result roots*, which specify a result state that comes about as a consequence of the event. The ontological type of the root determines which template it can be associated with, and thereby determines the Aktionsart class of the derived predicate.

The templates proposed for the four Aktionsart classes are given in (44) (Rappaport Hovav & Levin 1998: 108), where primitive predicates appear in small caps, whereas predicate constants are italicised and represented in angle brackets.

- (44)
- a. State [x <STATE>]
 - b. Activity [x ACT<MANNER>(y)]
 - c. Achievement [BECOME [x <Result>]]
 - d. Accomplishment
 - i. [x CAUSE [BECOME [y <RESULT>]]]
 - ii. [x ACT<MANNER>] CAUSE [BECOME [y <RESULT>]]

States, activities, and achievements are argued to have simple event structures, each consisting of a single event. Stative predicates are represented by a stative root (45a), while activities are instantiated by a manner root modifying an action event, represented by ACT (45b). Achievements are built on states but differ from them in including the operator BECOME, which encodes a change of state (45c).

- (45)
- a. State: *The box is empty.*
[box <EMPTY>]
 - b. Activity: *Peter ran.*
[Peter ACT<RUN>(y)]
 - c. Achievement: *The train arrived.*
[BECOME [train <ARRIVED>]]

Different from the three mono-eventive types discussed above, accomplishments are proposed to have complex event structure, consisting of two subevents linked by the CAUSE operator. The presence of CAUSE is what crucially distinguishes accomplishments from simpler event types, as it encodes a causal relation between an initiating subevent and a resulting change of state. Rappaport Hovav and Levin distinguish two subtypes of accomplishments depending on the ontological type of the root involved. When a result root is present, the causing subevent is left unspecified as to manner, yielding the template in (44i), which is exemplified in (46). The template encodes only that an agent *x* brings about a change of state in *y*, with no specification of how this is achieved.

(46) a. Accomplishment: *Peter broke the vase.*

[Peter CAUSE [BECOME [vase *⟨BROKEN⟩*]]]

When a manner root is present, the causing subevent is elaborated as an activity, yielding a template of the form in (44ii). In this case, an agent *x* performs an action in a particular manner, and that action brings about a change of state in *y*, as in *Peter hammered the metal flat*, where the manner of hammering causes the metal to become flat.

(47) a. Accomplishment: *Peter hammered the metal flat.*

[Peter ACT_(HAMMER) CAUSE [BECOME [metal *⟨FLAT⟩*]]]

Although different approaches to the lexical decomposition of verb meaning may vary in their formal implementation, they share the core assumption that event structure is derived from a small set of primitives including causation, change of state, and agentivity. Crucially, it is treated as a property of lexical meaning, encoded in the semantic representations of individual verbs rather than represented in syntax.

At the same time, a move away from strictly lexicalist accounts can be observed in approaches that introduce event-structural meaning into the syntax, while still maintaining a close connection between verbs and their semantic properties. Hale and Keyser (2002), for example, argue that the aspectual properties of verbs are derived compositionally and

are subject to syntactic principles and restrictions. However, they distinguish that this occurs within *l(exical)-syntax*, i.e., syntax that applies at the lexical level, as opposed to *s(entential)-syntax*, which applies exclusively to phrases and sentences. Therefore, while this approach employs syntactic mechanisms to derive Aktionsart, the relevant operations are constrained in a lexical dimension.

There are also proposals that execute the decomposition of Aktionsart entirely within the syntax. Early syntactic approaches to event decompositions can be found in Pesetsky (1995) and Kempchinsky (2000), but this line of research is most prominently developed within so-called neo-constructionist approaches, as represented by Ramchand (2008), Borer (2005a, 2005b, 2014), and a large body of work within Distributed Morphology (among others, Embick 2004; Halle & Marantz 1993; Harley 2014; Marantz 1997). These frameworks, however, differ substantially in how inner aspectual information is derived and encoded. In particular, Ramchand (2008) and Borer (2005a, 2005b, 2014) represent two contrasting approaches to the syntactic encoding of aspect. The former assumes that inner aspectual information is encoded as part of the lexical semantics of the verb, whereas the latter treats roots as grammatically inert, with aspectual properties determined entirely by a dedicated functional structure. For present purposes, I defer a detailed discussion of these two frameworks to a later stage, in Section 2.4, where they will be directly related to syntactic analyses of particle verb constructions.

2.2.1.2 Grammatical aspect

Aktionsart is frequently differentiated in the literature from *grammatical aspect*, which concerns how events are located relative to the speaker's perspective on a situation (hence the term *viewpoint aspect*, introduced first by Smith (1991)). A speaker may choose, for example, to present an event either as a completed 'single whole' (Comrie 1976), or with 'explicit reference to the internal temporal structure of a situation, viewing a situation from within' (ibid:24), which gives rise to perfective and imperfective aspect respectively. The imperfective is further divisible into the progressive, which presents an action as ongoing

at a particular time, and the habitual, which refers to events that are ‘characteristic of an extended period of time’ (ibid: 27-28).

The encoding of grammatical aspect varies considerably across languages (Comrie 1976): ranging from direct aspectual morphology on the verb to more indirect ways such as particles, periphrastic constructions, aspectual adverbials, or even zero-expression. German occupies the weaker end of this continuum: it is traditionally classified as a non-aspect language, insofar as it lacks a grammaticalised system for marking grammatical aspect on the verb. Morphologically, German verbs distinguish only between non-past and past tense, as illustrated in (48).

- (48) a. *Peter arbeitet.* (Non-past)
 Peter work.PRS
 ‘Peter works.’
- b. *Peter arbeitete.* (Past)
 Peter work.PST
 ‘Peter worked.’

Perfective aspect in German is expressed by periphrastic constructions consisting of an auxiliary (*haben* or in some cases *sein*) and a past participle (49).²⁰

- (49) a. *Peter hat gearbeitet.* (Present perfect)
 Peter has-PRS worked-PTCP
 ‘Peter worked.’
- b. *Peter hatte gearbeitet.* (Past perfect)
 Peter had-PST worked-PTCP
 ‘Peter had worked.’

²⁰In German, the simple past form is aspectually the same as the present perfect, with the choice between them a matter of register, style, dialect, and personal preference (Klein 2018). Maslov (1985) points out that the forms of the perfect in German have lost to a very great degree their former aspectual meaning, so that *Peter hat gearbeitet* semantically coincides with *Peter arbeitete* in a paradigm of prescribed standard German. More generally, this loss of aspectual content in the perfect reflects the broader tendency in German to develop a tense-based system rather than grammatical categories for aspect expression (Goedsche 1934: 519).

For imperfective aspect, German uses prepositional phrases for marking progressivity, as illustrated by the example in (50).

(50) *Peter ist (gerade) beim / am Arbeiten.*

Peter is just.now at.the on.the work

‘Peter is working (just now).’

The other imperfective aspect, the habitual, can be expressed with the periphrastic construction *pflügen* + infinitive (51a),²¹ or with adverbials such as *regelmäßig* ‘regularly’ or *jeden Tag* ‘every day’ that express the habitual recurrence, normally with verbs in the present tense (51b–c).

(51) a. *Peter pflegte bis spät in die Nacht zu arbeiten.*

Peter used until late into the night to work.INF

‘Peter used to work until late into the night.’

b. *Peter arbeitet regelmäßig bis spät in die Nacht.*

Peter works regularly until late in the night

‘Peter works regularly until late into the night.’

c. *Peter arbeitet jeden Tag bis spät in die Nacht.*

Peter works every day until late in the night

‘Peter works until late into the night every day.’

Therefore, German differs from aspectual languages (e.g., English, Russian, Spanish) not in the aspectual meanings it can express, but in the relative ease with which these meanings are encoded. In the absence of imperfective and progressive verb forms, the relevant aspectual meanings are expressed through periphrastic constructions or lexical means rather than through

²¹In Austrian German, the habitual can be encoded by the periphrastic *tun* ‘to do’ + infinitive (i) (Saller 2023).

(i) *Wir tun immer montags Kaffee trinken.*
we do always on.Mondays coffee drink.INF
‘We do have coffee every Monday.’

direct morphological marking on the verb. Crucially, while verbal particles contribute to lexical aspect, they play no role in the encoding of grammatical aspect.

In the following sections, I survey the aspectual meanings contributed by German verbal particles (Section 2.2.2) and specify, for each meaning, which particles can give rise to it (Section 2.2.3).

2.2.2 Classification of German aspectual particles

The classification of aspectual particles exhibits considerable variation and terminological inconsistency. Furthermore, although widely invoked, the category is often taken for granted rather than clearly defined. In this section, I review the subclasses of aspectual particles proposed in the literature and assess whether these distinctions can be applied to particles in German. Ultimately, I propose a classification of aspectual particles in German into inceptive and egressive particles, with the former marking the initial boundary and the latter the final boundary of events.

A large body of work characterises aspectual particles primarily in terms of their contribution to telicity. Emonds (1985), for example, refers to aspectual particles as *completive verb-particle combinations*, a label that directly suggests their role in encoding completion. The telicity-marking function of particles is famously pointed out by Brinton (1985) in her analysis of English particle verbs. Contrary to earlier accounts that treated particles as markers of perfectivity (e.g., Bolinger 1971; Smith 1991), Brinton argues that English particles primarily function to introduce telic semantics to verbal predicates. A classic example of this effect is provided by the particle *up* in the English particle verb *eat up*, where the addition of the particle converts an atelic activity predicate into a telic accomplishment. In support of her analysis, Brinton observes that verbal particles systematically fail to combine with stative verbs such as *know*, *hope*, or *resemble*, a restriction noted earlier by Fraser (1976: 11).²² She

²²Bolinger (1971) notes that particles can combine with verbs such as *be* and *have* only when these verbs are interpreted as non-stative. As shown in (i), the combination *be up* receives an activity-like interpretation, which is corroborated by the use of *do* in the following clause. By contrast, in (ii) the predicate remains stative, and its

accounts for this distribution by arguing that stative predicates are inherently incompatible with the goal-oriented semantics contributed by particles: although states may extend over time, they lack internal progression toward a culmination point and therefore do not support the introduction of telicity. Overall, Brinton (1985) argues that verb particles in English primarily function as markers of telic Aktionsart. She observes that ‘particles may add the concept of a goal or an endpoint to durative situations which otherwise have no necessary terminus. That is, the particles may affect the intrinsic temporal nature of a situation and hence alter its Aktionsart from atelic to telic.’ Following Brinton’s (1985) seminal work, the role of verbal particles as markers of telicity has come to be widely recognised as one of their core functions (see, among others, Bikicki and Jerković 2011; Jeschull 2003; Keyser and Roeper 1992; Tenny 1992; van Hout 1998), with such particles being categorised under various labels, including *perfective* (Bolinger 1971; Dehé et al. 2002; Kennedy 1920), *terminative* (Live 1965; Poutsma 1926; Traugott 1978), *completive* (Fraser 1976), *conclusive* (Dietrich 1960), and *telic* (Comrie 1976). The telicity-marking function of particles has also received empirical support from large-scale corpus-based studies, which provide quantitative evidence for the telicity-marking function of particles (e.g., Giddings 2001; Glodović 2013).

Beyond marking the endpoint of an event, aspectual particles may also highlight the internal development of an event, which thereby naturally gives rise to atelic, continuative interpretations. Jackendoff (1997, 2002) provides a detailed discussion of such particles in English, which include *on* (52) and *away* (53), both of which can be roughly paraphrased as ‘keep on V-ing’. Dutch also possesses a small set of continuative particles, the most productive of which is *door* ‘through’, as in *doorlopen* ‘to continue walking’ (Blom 2005).²³

repetition requires the stative auxiliary *are*.

(i) I will be right up. – See that you *do*.

(ii) I will be ready in a minute. – See that you *are*.

In general, Bolinger proposes that in order to qualify as a verbal particle in English, an element must satisfy two semantic conditions: it must encode both a processual component (‘motion through location’) and a resultative component (‘terminus or result’).

²³The other continuative particles identified for Dutch are *rond* ‘around’ and *aan* ‘on’. However, Blom (2005) notes that the continuative use of *aan* is relatively unproductive.

In general, aspectual particles are broadly divided in much of the literature into telic and continuative/non-telic classes (Dehé et al. 2002; Walková 2015).

(52) run/sing/talk/write on

(53) a. Lois and Clark danced away for/*in two blissful hours.

b. Bill slept/drank/talked/read/sneezed away.

However, such a distinction between telic and non-telic aspectual particles is not directly applicable to German for three independent reasons. First, unlike English and Dutch, German does not possess verb particles that systematically mark continuative aspect. Neither the German cognate of English *on* (i.e., *an*) nor that of Dutch *door* (i.e., *durch*) functions as a continuative particle. As will be discussed in the following section, *an* mainly functions as an inceptive marker in the domain of aspectual marking. *Durch*, when used as a verbal particle in German, typically denotes the traversal of a path relative to an object, as illustrated in (54), rather than the continuation of an event over time, as in Dutch *doorlopen* ‘to continue walking’ (Blom 2005: 365).

(54) a. *den Wald durch-wandern*
the forest DURCH-walk.INF
‘to walk through the forest’

b. *das Buch durch-lesen*
the book DURCH-read.INF
‘to read through the book’

c. *die Sonate durch-spielen*
the sonata DURCH-play.INF
‘to play through the sonata’

- d. *Alternativen durch-sprechen*
 alternatives DURCH-talk.INF
 ‘to talk over alternatives’

To mark continuativity, German typically employs adverbs such as *weiter* ‘further’ and *fort* ‘further/on’, as illustrated in subsequent examples.

(55) Continuative *weiter*-

- a. *arbeiten* ‘to work’ → *weiterarbeiten* ‘to continue working’
 b. *lesen* ‘to read’ → *weiterlesen* ‘to keep reading’
 c. *laufen* ‘to run’ → *weiterlaufen* ‘to keep running’

(56) Continuative *fort*-

- a. *setzen* ‘to set’ → *fortsetzen* ‘to continue’
 b. *gehen* ‘to go’ → *fortgehen* ‘to go on’

Second, the notion of ‘telic particles’ itself lacks conceptual precision. To date, there is no widely accepted definition of telic particles beyond a small set of classical examples, most prominently English *up* in *eat up* and its German counterpart *auf* in *aufessen* ‘to eat up’. Nor has there been a systematic effort to establish reliable diagnostics that clearly distinguish telic particles from resultative particles (but see Section 2.1.1). As Blom (2005) observes, the label ‘telic particle’ is often applied to a subset of resultative particles that only seem to express the completion of the event denoted by the verb and its arguments.

The conceptual vagueness of category telic particles is probably related to the last problem with the telic vs. non-telic distinction of aspectual particles, namely that telicity is not a homogeneous category. Within the Vendlerian system, telic events can be either durative or punctual, corresponding to accomplishments and achievements, respectively. Tschirner (1991), on the basis of an extensive analysis of German verbs, further subdivides accomplishments,

which are characterised as terminative and telic, into ingressive and egressive types.²⁴ The former describe the beginning of an activity or process (e.g., *erblühen* ‘to bloom’), whereas the latter describe its endpoint (e.g., *aufessen* ‘to eat up’). The ingressive-egressive distinction is later adopted by Lüdeling (2001) in her classification of German aspectual particles, where she distinguishes between ingressive and egressive verbal particles. Specifically, ingressive particles zoom in on the beginning of an event, resulting in an ingressive meaning, as in *schlafen* ‘to sleep’ vs. *einschlafen* ‘to fall asleep’, and *fahren* ‘to drive’ vs. *abfahren* ‘to leave’. Egressive particles, by contrast, zoom in on the endpoint of an event and lead to a telic interpretation, as in *essen* ‘to eat’ vs. *aufessen* ‘to eat up’, and *klingen* ‘to sound’ vs. *ausklingen* ‘to fade away’. Importantly, both ingressive and egressive particles can yield telic predicates (e.g., *einschlafen* ‘to fall asleep’ and *aufessen* ‘to eat up’), although ingressive particles do not necessarily do so. Telicity therefore does not correspond to a unified semantic category of particles but rather spans both ingressive and egressive uses of particles.

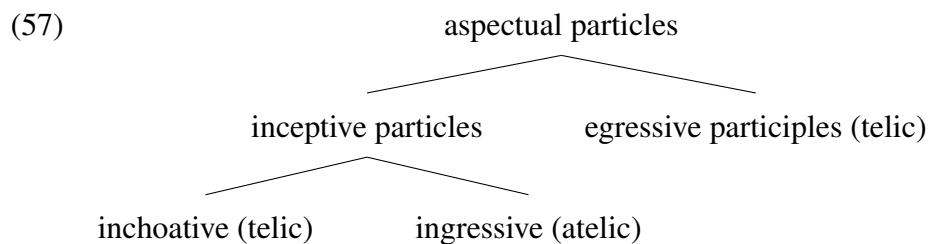
Given the absence of continuative particles in German and the conceptual vagueness and non-homogeneity of the category ‘telic particles’, I depart from the traditional dichotomy between telic and non-telic particles, and instead adopt Lüdeling’s (2001) classification, distinguishing primarily between particles that highlight the initiation of events or states and those that mark the endpoint. I argue that a distinction along these lines is conceptually clearer and empirically more robust, as it allows for a principled separation of particles according to the temporal boundary they foreground, initial or terminal, without conflating telicity with resultativity. Moreover, this approach makes it possible to capture systematic differences among particles that would otherwise be obscured under a broad telic/non-telic classification.

A note on terminology is necessary here. While Tschirner’s ingressive verbs are necessarily telic, Lüdeling (2001) uses the term *ingressive* in a relatively broad sense, treating it largely as synonymous with *inchoative* and applying it to the onset of both actions and states. In a stricter

²⁴In contrast to accomplishments, achievements are characterised by Tschirner (1991) as terminative but punctual.

sense, however, *ingressive* (or its equivalent *inceptive*) can be distinguished from *inchoative*.²⁵ Where a distinction is drawn, *ingressive* refers to the initiation of an activity, while *inchoative* is reserved for the coming into existence of a state. Importantly, from the perspective of telicity, ingressive predicates are not inherently telic, since they merely highlight the starting point of an event without necessarily implying a culmination, whereas inchoative predicates are telic insofar as they encode a change of state. If this distinction is taken seriously, Tschirner's so-called ingressive verbs would more accurately be characterised as inchoative.

In the present study, I maintain a strict distinction between ingressive and inchoative meanings and do not use the terms interchangeably. To avoid the terminological ambiguity, I refer to particles that mark the initiation of eventualities as *inceptive particles*, rather than adopting Lüdeling's use of *ingressive*. For those marking the endpoint, I retain Lüdeling's terminology, referring to them as *egressive particles*. With respect to telicity, while the addition of an egressive particle necessarily yields a telic predicate, inceptive particles may produce either a telic (inchoative) or a non-telic (ingressive) predicate (to be introduced in Section 2.2.3). The proposed classification of aspectual particles in German is graphically shown in (57).



By proposing a distinction between inceptive and egressive particles, I argue more generally for the importance of inceptivity as a fundamental notion in the classification of eventualities. Dominant approaches to ‘eventology’ have largely focused on the right boundary of events, as reflected in the extensive and diverse literature on the telic and atelic distinction. By contrast, the left boundary of events, namely their initiation or inception, has received comparatively

²⁵The distinction is generally maintained in the literature on Slavic linguistics, where it is often more clearly reflected in the use of different verbal prefixes. For a comprehensive overview of the terminological variation and ambiguity surrounding inchoative, ingressive, and inceptive in Slavic studies, see Pátrovics (2025).

less attention (cf. Bar-el 2005; Rozwadowska 2003, 2012, 2020). As Bar-el (2005: 137) puts it, ‘initial points are rarely, if ever, addressed in discussions of aspectual predicate classes. Although initial points may be implicitly assumed, the focus in the literature on the classification of predicates according to their aspectual status has been on their final points’. Nevertheless, several scholars have convincingly argued for the independent grammatical relevance of event inception and for the necessity of distinguishing not only between telic and atelic predicates, but also between predicates that encode event initiation and those that do not. This has led to the proposal that initial events should be recognised as basic event types in their own right (Rozwadowska 2020).

An influential proposal in this direction is that of Piñón (1997), who argues that the traditional Vendlerian classification of ‘achievements’ as monolithic, punctual points is insufficient. Piñón proposes a more articulated ontology of event semantics, distinguishing between *happenings* and *boundary happenings*. Happenings correspond roughly to durative, or to use Piñón’s terminology, ‘thick’ eventualities including events, states and processes, whereas boundary happenings are ‘thin’ eventualities that mark the boundaries of happenings. Boundary happenings can be divided further into *beginnings* (left boundaries) and *endings* (right boundaries). Crucially, beginnings and endings are not simply mirror images of one another, but impose distinct structural requirements on the eventualities they bound. A beginning requires that no eventuality of the same type immediately precedes it, and that an eventuality of that type extends temporally to the right, i.e., it marks the onset of something that was not already underway. An ending, conversely, requires that the relevant eventuality extends to the left and is not immediately followed by one of the same type, marking the termination of something that has run its course. These two conditions are logically independent and cannot be collapsed into a single undifferentiated boundary notion. Verbs such as *recognise* are accordingly analysed as denoting the left boundary, i.e., the inception of a state, while verbs such as *stop* denote right boundaries, and verbs such as *reach* denote both simultaneously, marking the termination of a motion event and the initiation of a resulting

state. This classification demonstrates that event initiation and event culmination are distinct grammatical primitives, each encoding a different relationship between an instantaneous boundary happening and the extended eventuality it bounds. Treating event inception as an independent and irreducible category is therefore not merely a theoretical refinement, but a necessary condition for a compositionally adequate and empirically faithful semantic analysis of event semantics.

Based on Spanish reflexive psychological verbs (SRPVs), Marín and McNally (2019) argue extensively for treating event inception as a primitive and independent category within aspectual typologies, separate from both telicity and change of state. Using a range of diagnostics, the authors conclude that SPRVs are consistently inchoative yet systematically atelic, which, as they observe, ‘underscores the perhaps obvious but underappreciated fact that we can allude to changes by talking explicitly about the onset of the states produced by those changes’ (Marín & McNally 2011: 500). Furthermore, they show that SPRVs encode the onset of a state without referring to the change from a prior state, thereby demonstrating that inchoativity and change of state are also logically and empirically distinct notions. To formalise the semantics of these verbs, they adopt Piñón’s (1997) ontology and define a *Beg(inning)* relation to characterise inception predicates as those whose denotation necessarily includes the left boundary of a happening without any specification of a right boundary. More generally, they argue that event inception must be recognised as an independent grammatical primitive that is neither reducible to telicity nor to change of state, and which therefore warrants its own place in aspectual typologies.

In a similar vein, Rozwadowska (2020) argues that the traditional Vendlerian classification fails to capture the aspectual properties of perfective psychological verbs in Polish and that inceptive events should be recognised as a separate class alongside the commonly acknowledged aspectual classes. Cross-linguistically, psych verbs have been analysed either as unbounded stative predicates or as change-of-state verbs, typically described as achievements or accomplishments, both of which are telic. Rozwadowska (2020), however, shows that

the perfective forms of three types of psych verbs in Polish denote dynamic eventualities, with perfectivity overtly marking the left boundary of the state. She therefore proposes that these predicates denote what she terms inceptive states, that is, boundary events which introduce a state without encoding a culmination, and joins many others in arguing for the importance of recognising inceptive or initial events as a basic event type on a par with endpoint events. Inchoative states have been identified in a range of other languages including Japanese (Kiyota 2008), Spanish (Fábregas & Marín 2020), Korean (Fritz-Huechante et al. 2020) and Sənčáθən (Kiyota 2008).

Yet another language for which the presence of an intrinsic initial point has been proposed is Skwxwú7mesh, a Central Coast Salish language of the Northwest Coast of North America. Bar-el (2005) argues that activities and states in this language contain an inherent initial boundary in their aspectual structure, which is represented as an initial BECOME subevent in the event representation. Furthermore, observing that English activity verbs pattern with those in Skwxwú7mesh with respect to diagnostics targeting initial points, she proposes that English activity verbs likewise contain an initial point in their semantics. Kiyota (2008) similarly argues that activity verbs in Japanese are ‘complex events’ that include an initial transition event, represented as BECOME, as one of their subevents.

The discussion above has shown that a growing body of work argues for the independent grammatical relevance of event initiation: predicates may encode the onset of a state or activity independently of whether they encode a culmination. If endpoint-related notions such as telicity have long been assumed to correspond to formal features in the grammar, there is no principled reason to deny the same status to inceptivity. Crucially, I argue that whatever formal representation is assumed for telicity in the grammar, inceptivity should be represented in an analogous manner. This point will be relevant for the syntactic analysis of inceptive *auf* in Chapter 3.

The next section provides a detailed overview of the specific inceptive and egressive particles in German.

2.2.3 Inceptive and egressive particles in German: the inventory

I start with inceptive particles in German, which include *an-*, *auf-* and *ein-*. Examples of particle verbs containing the inceptive *an-* are given in (58).

(58) Inceptive *an-*

- | | |
|------------------------------------|--|
| a. <i>singen</i> ‘to sing’ | → <i>ansingen</i> ‘to start singing’ |
| b. <i>lesen</i> ‘to read’ | → <i>anlesen</i> ‘to start reading’ |
| c. <i>diskutieren</i> ‘to discuss’ | → <i>andiskutieren</i> ‘to start discussing’ |
| d. <i>knabbern</i> ‘to nibble’ | → <i>anknabbern</i> ‘to start nibbling / to nibble partly’ |
| e. <i>braten</i> ‘to roast’ | → <i>anbraten</i> ‘to start roasting / to roast partly’ |
| f. <i>trocknen</i> ‘to dry’ | → <i>antrocknen</i> ‘to start drying / to dry partly’ |
| g. <i>wärmen</i> ‘to warm’ | → <i>anwärmen</i> ‘to start warming / to warm slightly’ |
| h. <i>brennen</i> ‘to burn’ | → <i>anbrennen</i> ‘to start burning / to burn partly’ |

Generally, inceptive *an-* combines with activity verbs (58a-c) or scalar change verbs (58d-h; cf. Rappaport Hovav 2008), with the resulting particle verbs being predominantly atelic. The atelicity of the particle verbs listed in (58) is evidenced by their compatibility with durative (*for-*)adverbials.²⁶ This is demonstrated in (59), where the base verb is an activity, and in (60), where the base verb denotes a scalar change. In both cases, the particle introduces the initial boundary of the event without specifying an inherent endpoint, thereby

²⁶When the particle *an-* combines with change-of-state verbs such as *braten* ‘to roast’, *brennen* ‘to burn’, *frieren* ‘to freeze’, and *wärmen* ‘to warm’, some German speakers judge the resulting particle verbs to be compatible with *in-*adverbials (although native speaker judgments vary considerably in this respect), as illustrated below. For those speakers who accept such examples, however, the particle *an-* no longer receives an inceptive interpretation. Instead, it appears to contribute a resultative meaning, entailing that the affected object reaches a specific result state, as demonstrated by the entailment tests in (ii) and (iv). Crucially, this entailment does not arise when the same verbs co-occur with *for-*adverbials. Compare (ii) with (iii), and (iv) with (v). I therefore argue that the inceptive use of *an-* is compatible only with *for-*adverbials. When an *in-*adverbial is accepted, it triggers a different interpretation in which *an-* contributes a resultative meaning rather than an aspectual, inceptive one.

- (i) *Ich habe die Zwiebeln in einer Minute an-gebraten / an-gebrannt.*
 I have the onions in one minute AN-roast.PTCP AN-burn.PTCP
 ‘I roasted the onions (until brown) / set the onions on fire in one minute.’

preserving the atelic character of the predicate.

- (59) a. *Jeder Jazzsänger musste das Lied nur ein paar Takte lang an-singen,*
 every jazz.singer must the song only a few bars long AN-sing.INF
um seine Qualitäten zu zeigen.
 in.order his qualities to show.INF
 ‘Every jazz singer had to sing the song just for a few bars to show his qualities.’
- b. *Alex las das Buch zehn Minuten lang an.*
 Alex read the book ten minutes long AN
 ‘Alex was reading into the book for ten minutes.’

-
- (ii) *Ich habe das Zimmer in zehn Minuten an-gewärmt. (* Aber es ist immer noch ziemlich kalt.)*
 I have the room in ten minutes AN-warm.PTCP. but it is always still quite cold
 I warmed up the room in ten minutes. (*But it is still quite cold).
- (iii) *Ich habe das Zimmer zehn Minuten lang an-gewärmt. (Aber es ist immer noch ziemlich kalt.)*
 I have the room ten minutes long AN-warm.PTCP. but it is always still quite cold
 I warmed up the room for ten minutes. (But it is still quite cold).
- (iv) *Ich habe die Trauben in zehn Minuten an-gefroren. (* Aber sie sind immer noch ziemlich weich.)*
 I have the grapes in ten minutes AN-freeze.PTCP. but they are always still quite soft
 I froze the grapes in ten minutes. (*But they are still quite soft).
- (v) *Ich habe die Trauben zehn Minuten lang an-gefroren. (Aber sie sind immer noch ziemlich weich.)*
 I have the grapes ten minutes long AN-freeze.PTCP. but they are always still quite soft
 I froze the grapes for ten minutes. (But they are still quite soft).

- c. *Wir haben das Thema gestern nur kurz an-diskutiert, aber*
 we have the theme yesterday only shortly AN-discuss.PTCP but
nicht zu Ende geführt.
 not to end lead.PTCP
 ‘We only briefly touched upon/discussed the topic yesterday, but didn’t finish it.’

- d. *Wir haben diese Lösungsmöglichkeit gestern stundenlang an-gedacht,*
 we have this solution.possibility yesterday hours.lang AN-think.PTCP
aber dann doch verworfen.
 but then after.all discard.PTCP
 ‘We spent hours considering this potential solution yesterday, but then discarded it after all.’

- e. *Für 35 Euro kann man sich von den kleinen Fischen 30 Minuten*
 for 35 euros can one oneself by the small fishes 30 minutes
lang an-knabbern lassen.
 long AN-nibble.INF let
 ‘For 35 Euros, you can let yourself be nibbled on by the small fish for 30 minutes.’

- (60) a. *das Fleisch in einer Pfanne im heißen Olivenöl sechs Minuten*
 the meat in a pan in.the hot olive.oil six minutes
lang an-braten
 long AN-fry.INF
 ‘to fry the meat in a pan in hot olive oil for six minutes’

- b. *Die Schnittstelle sollte anschließend mehrere Tage lang an-trocknen.*
 the cut.surface should subsequently several days long AN-dry.INF
 ‘The cut surface should subsequently allow to dry for several days.’

- c. *Lasse den Teig 30 Minuten lang an-wärmen, bevor du ihn dehnt.*
 let the dough 30 minutes long AN-warm.INF before you it stretch
 ‘Let the dough warm up for 30 minutes before you stretch it.’
- d. *Anschließend den Fisch mit trockenem Stroh bedecken und etwa 15*
 subsequently the fish with dry straw cover.INF and about 15
Minuten lang an-brennen lassen.
 minutes long AN-burn.INF let.INF
 ‘Subsequently cover the fish with dry straw and let it burn for about 15 minutes.’

The ingressive use of the particle *an-* is in fact highly productive. As McIntyre (2002) notes, *an-* can combine even with ad hoc verbs created by the speaker, such as *knuspern* (backformed from the adjective *knusprig* ‘crunchy’), which is used to describe food that has just been placed in the oven and is beginning to become slightly crunchy. As illustrated by *anknuspern*, the ingressive meaning of *an-* is often associated with an additional implication of partial affectedness of the object. This implication generally applies to verbs where ingressive *an-* combines with base verbs denoting scalar change, as illustrated by the examples in (58d–h).

With respect to the ingressive use of *auf-*, the particle frequently combines with perception verbs as well as verbs of sound emission or emotional expression (cf. Section 3.2.3). In such cases, it not only marks the onset of the event but also introduces a punctualising effect, thereby yielding particle verbs that denote achievements and often convey an intensified interpretation.

(61) Inceptive *auf-*

- | | | | |
|----|--------------------------------------|---|--|
| a. | <i>horchen</i> ‘to listen carefully’ | → | <i>aufhorchen</i> ‘to become alert’ |
| b. | <i>lachen</i> ‘to laugh’ | → | <i>auf-lachen</i> ‘to start laughing’ |
| c. | <i>schreien</i> ‘to scream’ | → | <i>aufschreien</i> ‘to scream out’ |
| d. | <i>weinen</i> ‘to cry’ | → | <i>aufweinen</i> ‘to burst into tears’ |

The final particle that encodes an inceptive meaning is *ein-* (62). This ingressive interpretation plausibly derives from the spatial semantics of the preposition *in* ‘in, into’, as the

particle and the preposition are generally assumed to be historically related (Olsen 1997; Rehbein and Van Genabith 2006).²⁷ The development can be understood as a metaphorical extension from movement into a spatial interior to entry into an event domain. The resulting particle verbs denote telic eventualities (63), although the onset of the event may be either abrupt or gradual (64).

(62) Inceptive *ein-*

- a. *setzen* ‘to put’ → *einsetzen* ‘to set in / begin’
- b. *treten* ‘to kick / step’ → *eintreten* ‘to begin / to enter (an event)’
- c. *brechen* ‘to break’ → *einbrechen* ‘to begin’
- d. *regnen* ‘to rain’ → *(sich) einregnen* ‘to go into a period of steady rain’
- e. *arbeiten* ‘to work’ → *(sich) einarbeiten* ‘to get settled into the job’
- f. *leben* ‘to live’ → *(sich) einleben* ‘to settle in’

- (63) a. *Die volle Wirkung ist in zwei Tagen ein-getreten.*
 the full effect is in two days EIN-set.PTCP
 ‘The full effect set in within two days.’
- b. *Er hat sich in zwei Wochen ein-gearbeitet.*
 he has himself in two weeks EIN-work.PTCP
 ‘He got settled into the job in two weeks.’
- c. *Es hat sich innerhalb einer Stunde ein-gereget.*
 it has itself within an hour EIN-rain.PTCP
 ‘It set in for a steady rain within an hour.’
- d. *Sie hat sich in wenigen Monaten ein-gelebt.*
 she has herself in few months EIN-live.PTCP
 ‘She settled in (felt at home) in a few months.’

²⁷Meinunger (2006) notes that *in* can be used as a particle in many German dialects.

- (64) a. *Langsam brach die Nacht ein.*
 slowly break the night EIN
 ‘Slowly, night fell.’
- b. *Die Dunkelheit brach um 17 Uhr ein.*
 the darkness broke at 17 o’clock EIN
 ‘Darkness fell at 5pm.’
- c. *Der Regen setzte plötzlich ein.*
 the rain set suddenly EIN
 ‘The rain started suddenly.’

I now turn to egressive particles in German, which, due to their focus on the terminal boundary of the eventuality, necessarily yield telic predicates. For this reason, the particles defined as egressive in the present study are commonly referred to in previous literature as telic particles. However, as established in Section 2.2.2, telicity is a feature that spans both inceptive and egressive categories. While egressive particles invariably render the complex verb telic, inceptive particles may also do so, for example, when they exert a punctualising effect, thereby resulting in a telic achievement.

Egressive particles in German include *auf-* (70) and *aus-* (71). It should be emphasised, however, that I do not claim that these particles are consistently used to mark egressivity. More precisely, they can assume an egressive function in certain contexts. Before turning to the data, I first specify the criteria by which egressive uses of these two particles are identified. Egressive particles, by definition, mark the endpoint of the eventuality denoted by the base verb. Accordingly, particle verbs with fully idiosyncratic meaning, i.e., where the meaning of the base verb is no longer transparently recoverable in the complex verb, are excluded from this category.²⁸ Representative examples of such excluded cases are given in (65)–(66).

²⁸While such verbs are treated as idiosyncratic for the purposes of the present classification, this is not a claim that they are genuinely non-compositional. Lechler and Roßdeutscher (2009), for instance, argue that even seemingly idiosyncratic particle verbs are compositional and rule-governed, analysing *auf-* in *aufpassen* ‘to pay attention’ as an abstract meaning of planning or anticipation that is also detectable in verbs such as *aufsparen* ‘to

(65) Idiosyncratic *auf*-

- a. *hören* ‘to hear’ → *aufhören* ‘to stop’
- b. *passen* ‘to fit’ → *aufpassen* ‘to keep an eye on’
- c. *führen* ‘to lead’ → *aufführen* ‘to perform (a play)’
- d. *fallen* ‘to fall’ → *auffallen* ‘to stand out’

(66) Idiosyncratic *aus*-

- a. *kommen* ‘to come’ → *auskommen* ‘to get along’
- b. *fallen* ‘to fall’ → *ausfallen* ‘to be cancelled’
- c. *üben* ‘to practice’ → *ausüben* ‘to exert’

Furthermore, the egressive use of a particle serves solely to mark the abstract notion of completion, without contributing additional lexical meaning. In this respect, the particle functions, in McIntyre’s (2002) terms, as a ‘bleached’ element, stripped of the more concrete semantic content more or less associated with its corresponding prepositional meaning. Consequently, egressive uses of a particle exclude cases in which the meaning of the base verb remains identifiable but the particle still contributes additional semantic content related, however loosely, to its prepositional origin. For example, *auf* in *aufpolieren* ‘to polish up’ contributes a meaning of improvement, which is arguably an extension of the upward spatial meaning of *auf* in its prepositional. Further similar examples are given in (67).

(67) Non-egressive *auf*-

- a. *polieren* ‘to polish’ → *aufpolieren* ‘to polish up’
- b. *wachsen* ‘to grow’ → *aufwachsen* ‘to grow up’
- c. *heizen* ‘to heat’ → *aufheizen* ‘to heat up’

In general, egressive uses of particles concern cases where the particle simply denotes the completion of the event denoted by the base verb without any other semantic content inherited

save up’ and *aufheben* ‘to preserve’.

in it.²⁹ Examples of egressive uses of *auf*- and *aus*- are given in (68-69).

(68) Egressive *auf*-

- a. *essen* 'to eat' → *aufessen* 'to eat up'
- b. *brauchen* 'to require' → *aufbrauchen* 'to use up'
- c. *arbeiten* 'to work' → *aufarbeiten* 'to fully process'

(69) Egressive *aus*-

- a. *trinken* 'to drink' → *austrinken* 'to drink up'
- b. *laufen* 'to run' → *auslaufen* 'to run out'
- c. *rechnen* 'to calculate' → *ausrechnen* 'to solve'

Particle verbs with egressive particle are all telic, as they are compatible with temporal *in*-adverbials but incompatible with durative *for*-adverbials.

(70) Egressive *auf*-

- a. *Peter aß (in zehn Minuten) / (*zehn Minuten lang) auf.*

Peter ate in ten minutes ten minutes long AUF

'Peter ate up in ten minutes / *for ten minutes.'

²⁹There may be borderline cases. For example, for the particle verb *ausreichen* 'to suffice', one might argue that *aus* contributes an egressive meaning. The particle denotes an activity of reaching out to the limit, with the meaning of the base verb still transparently recoverable. Yet, *ausreichen* is incompatible with *in*-adverbials, as shown in (i), which might suggest that egressive particles do not always trigger telicity. It should be made clear that *aus* in *ausreichen* is not considered here as an egressive use of the particle, as the particle verb denotes a state rather than a dynamic eventuality and lacks an internal process or gradual change. A person cannot 'be in the process of sufficing' in the same way he is 'in the process of drinking up (*austrinken*).' This stative nature further explains the incompatibility of *ausreichen* with dynamic pace adverbials such as *schnell* 'quickly', as shown in (ii).

(i) *Zehn euro reichen (*in einem Tag) aus.*
 ten euro suffice in one day AUS
 'Ten euros is enough (*in one day)'

(ii) *Zehn euro reichen (*schnell) aus.*
 ten euro suffice quickly AUS

- b. *Peter brauchte das Mehl (in zwei Monaten) / (*zwei Monate lang) auf.*
 Peter used the flour in two months two months long AUF
 ‘Peter used up the flour in two months / *for two months.’
- c. *Er arbeitete die Akten (in zwei Stunden) / (*zwei Stunden lang) auf.*
 he worked the files in two hours two hours long AUF
 ‘He finished processing the files in two hours.’

(71) Egressive *aus-*

- a. *Peter trank (in zehn Minuten) / (*zehn Minuten lang) aus.*
 Peter drank in ten minutes ten minutes long AUS
 ‘Peter drank up in ten minutes / *for ten minutes.’
- b. *Das Wasser lief (in zwei Stunden) / (*zwei Stunden lang) aus.*
 the water ran in two hours two hours long AUS
 ‘The water ran out in two hours / *for two hours.’
- c. *Die Glocke klang (in zehn Sekunden) / (*zehn Sekunden lang) aus.*
 the bell rang in ten seconds ten seconds long AUS
 ‘The bell faded out in ten seconds / *for ten seconds.’

The telic interpretation in these examples is clearly contributed by the particles. This becomes evident when the corresponding simplex verbs are considered, as shown in (72)–(73): without the particle, the predicates uniformly yield atelic interpretations and freely combine with *for*-adverbials, while *in*-adverbials are infelicitous. In constructing these minimal pairs, all factors were held constant as far as possible. The only exception is (72c), which necessarily involves argument-structure alternation, since the relevant base verb cannot appear in transitive constructions in the absence of the particle.

(72) Minimal pairs without egressive *auf* (cf. (70))

- a. *Peter aß (*in zehn Minuten) / (zehn Minuten lang).*³⁰
 Peter ate in ten minutes ten minutes long
 ‘Peter ate (*in ten minutes / for ten minutes).’
- b. *Peter brauchte das Mehl (*in zwei Monaten) / (zwei Monate lang).*
 Peter used the flour in two months two months long
 ‘Peter used the flour (*in two months / for two months).’
- c. *Er arbeitete (*in zwei Stunden) / (zwei Stunden lang) an den Akten.*
 he worked in two hours two hours long on the files
 ‘He worked on the files (*in two months / for two hours).’

(73) Minimal pairs without egressive *aus* (cf. (71))

- a. *Peter trank (*in zehn Minuten) / (zehn Minuten lang).*
 Peter drank in ten minutes ten minutes long
 ‘Peter drank (*in ten minutes / for ten minutes).’
- b. *Das Wasser lief (*in zwei Stunden) / (zwei Stunden lang).*
 the water ran in two hours two hours long
 ‘The water ran (*in two hours / for two hours).’
- c. *Die Glocke klang (*in zehn Sekunden) / (zehn Sekunden lang).*
 the bell rang in ten seconds ten seconds long
 ‘The bell rang (*in ten seconds / for ten seconds).’

Egressive particles have a somewhat fuzzy relationship with resultative particles, since, as noted earlier in Section 2.1.1, resultative particles, like egressive ones, can also render a

³⁰Some speakers judge the *in*-adverbial to be acceptable in this context, yielding a reading in which Peter finishes whatever he is eating (e.g., his meal) within ten minutes. I argue that this interpretation results from coercion triggered by the presence of the *in*-adverbial and consequently the retrieval of an conventionalised or contextually salient object as an implicit object. The latter acts as a measuring scale for the event, transforming an otherwise durative activity into a bounded accomplishment. Without the *in*-adverbial, *Peter aß* ‘Peter ate’ unambiguously denotes an eating activity.

predicate telic. Indeed, both *auf*- and *aus*- may occur in resultative constructions, where they denote the result state brought about by the event expressed by the base verb.

(74) Resultative *auf*-

- a. *Peter schloss die Tür (in zwei Sekunden) / (*zwei Sekunden lang) auf.*
 Peter locked the door in two seconds two seconds long AUF
 ‘Peter unlocked the door (in two seconds / *for two seconds).’
- b. *Peter klappte den Deckel (in zwei Sekunden) / (*zwei Sekunden lang) auf.*
 Peter flipped the lid in two seconds two seconds long AUF
 ‘Peter flipped the lid open (in two seconds / *for two seconds).’

(75) Resultative *aus*-

- a. *Peter schaltete das Licht (in zwei Sekunden) / (*zwei Sekunden lang) aus.*
 Peter switched the light in two seconds two seconds long AUS
 ‘Peter switched off the light (in two seconds / *for two seconds).’
- b. *Das Kind blies die Kerze (in zwei Sekunden) / (*zwei Sekunden lang) aus.*
 the child blew the candle in two seconds two seconds long AUS
 ‘The child blew out the candle (in two seconds / *for two seconds).’

But as discussed in Section 2.1.1, telic particles crucially differ from resultative ones in that they do not permit modification by quantificational adverbs such as *ganz* ‘completely’, as shown in (76)–(77).

- (76) a. *Die Tür ist teilweise / völlig / ganz auf.*
 the door is partly completely completely AUF
 ‘The door is partly / completely open.’
- b. **Der Apfel ist teilweise / völlig / ganz auf.*
 the apple is partly completely completely AUF
 Intended meaning: ‘The apple is partly(?) / completely eaten up.’

- (77) a. *Die Lichter sind teilweise / völlig / ganz aus.*
 the lights are partly completely completely AUS
 ‘The lights are partly / completely out.’
- b. **Die Milch ist teilweise / völlig / ganz aus.*
 the milk is partly completely completely AUS
 Intended meaning: ‘The milk is partly(?) / completely used up.’

2.2.4 Summary

This section examined aspectual particles as a distinct subtype of verbal particles in German. It first introduced the distinction between lexical and grammatical aspect and showed that verbal particles in German contribute only to lexical aspect, not to grammatical aspect.

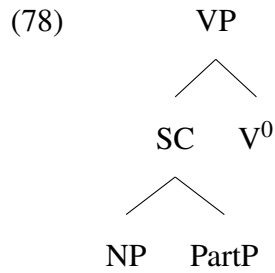
A review of the literature has shown that aspectual particles are frequently classified in terms of telicity. However, the traditional telic vs. non-telic dichotomy has proven insufficiently precise, as telic particles are often conflated with resultative particles, and clear diagnostics for distinguishing the two remain underdeveloped. Moreover, telicity itself is not a homogeneous category. Drawing on previous work, especially Lüdeling (2001), I have argued for a more structurally transparent classification based on whether a particle highlights the initial or terminal phase of an event. Accordingly, I adopt a distinction between *inceptive* and *egressive* particles. Inceptive particles mark the initiation of an eventuality and may yield either telic (inchoative) or non-telic (ingressive) readings, whereas egressive particles consistently mark the endpoint of an event and therefore yield telic predicates. With this distinction, I further advocate the importance of the left boundary of events, that is, their inceptivity, alongside the more widely recognised notion of culmination, and argue that it should be treated on a par with egressivity in the classification of event types. This point will be crucial for the analysis of the aspectual uses of *auf* in the next section. Towards the end of this section, I provided a detailed discussion of the specific particles in German that realise these aspectual meanings.

The discussion so far has focused on the semantics of verbal particles, for which I have proposed a three-way classification into resultative, aspectual, and idiosyncratic uses, with aspectual uses further subdivided into inceptive and egressive types. The next section turns to the syntactic analysis of particle verb constructions. In contrast to the diversity of semantic classifications, syntactic accounts have generally assigned particles to one and the same structural position across their different uses. I argue that this undifferentiated treatment is problematic, as it fails to provide a principled account of the semantic polysemy of particles. Instead, I propose that the different uses of a particle should be located in distinct positions within the syntactic structure, such that their interpretive variation follows directly from structural configuration rather than being stipulated in the lexicon.

2.3 Particle verb constructions in syntax

While particles are categorised into different groups based on their semantic interpretation, syntactic analyses of particle verbs generally assume that their syntactic structure remains the same across all semantic readings, despite variations depending on the specific framework adopted and the language-specific syntax.³¹ One widely adopted approach to the syntactic structure of particle verbs is the so-called small-clause approach where the particle, rather than forming a syntactic constituent with the base verb, instead forms one with the direct object (Haider 1997; Hoekstra 1988; Neeleman and Weerman 1993; Svenonius 1996, among others). The particle is argued to predicate over the object NP in a small clause, with the two standing in a subject-predicate relation (78).

³¹This section only reviews syntactic approaches to particle verbs. Other than these, there are also lexicalist approaches that propose particle verbs are not generated in syntax but are formed in the lexicon and subsequently fed into the syntax as fully composed words (cf. Koster 1975; McIntyre 2001a; Neeleman 1994; Neeleman and Weerman 1993; Olsen 1997; Stiebels 1996; Stiebels and Wunderlich 1994 etc.). However, the lexicalist approach faces challenges from data demonstrating the morphological and syntactic independence of the particle, for instance, the discontinuous realisation of particle verbs in main clauses (9b) and the ability of particles to undergo topicalisation. To account for these data, additional mechanisms must be introduced to explain the excorporation (as opposed to incorporation) of the particle from the complex head, a move that has drawn considerable criticism on this view. For a critical assessment of literature on lexicalist approaches to particle verb constructions in Germanic, see Dehé et al. (2002), Lüdeling (2001), and Zeller (2001b).



The small-clause approach is primarily motivated by the interpretative parallels between particles, particularly resultative particles, and other resultative predicates such as resultative adjectives, as shown in (79). Both the particle in (79a) and the resultative adjective in (79b) express the result state of the event denoted by the verb and both sentences can be roughly paraphrased as ‘Peter’s slamming/painting of the door caused it to become zu/rot’. Additionally, both can function as predicates in copular constructions, as shown in (79c).

- (79) a. *Peter schlug die Tür zu.*
 Peter slammed the door ZU
 ‘Peter slammed the door shut.’
- b. *Peter strich die Tür rot.*
 Peter painted the door red
 ‘Peter painted the door red.’
- c. *Die Tür ist rot / zu.*
 the door is red closed
 ‘The door is red/closed.’

While the small-clause analysis works fine for resultative particles, its applicability to aspectual particles is more limited, as the subject-predicate relation between the particle and the direct object becomes blurred. An example of this kind is given by *aufessen* ‘to eat up’ in (80), where the particle *auf* denotes telic reading and cannot appear as a copular predicate (80b)

- (80) a. *Peter aß die Suppe auf.*
 Peter ate the soup AUF
 ‘Peter ate up the soup.’
- b. **Die Suppe ist auf.*
 the soup is AUF

Furthermore, while resultative particles can be topicalised (81a), aspectual particles reject topicalisation (81b), which cannot be naturally accounted for under the small-clause analysis.³²

- (81) a. *Auf hat Peter die Tür gemacht.*
 AUF has Peter the door make.PTCP
 ‘Peter opened the door.’ (infinitive: *aufmachen* ‘to open’)
- b. **Auf hat Peter die Suppe gegessen.*
 AUF has Peter the soup eat.PTCP

Realising the deficiencies of the small-clause analysis, Wurmbrand (2000) proposes two syntactic structures of particle verbs in German: a small-clause structure and a complex head structure. In the latter, particle verbs are argued to be complex predicates with the particle

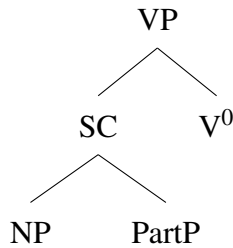
³²While data like (81b) have frequently been used as evidence for the constituenthood of the particle and the base verb, Wurmbrand (2000) points out that the inability of some particles to undergo topicalisation does not bear much on the status of the particle as part of a complex predicate or as an independent head or phrase. Interestingly, changing the sentence in (81b) from present perfect into simple past tense, fronting of the aspectual particle becomes significantly more acceptable, as illustrated by the (b)-examples in (i-ii) (Wurmbrand 2000: 7).

- (i) a. **Auf hat Peter die Suppe gegessen.*
 AUF has Peter the soup eat.PTCP
- b. *?Auf aß Peter die Suppe.*
 AUF ate Peter the soup
 ‘Peter ate up the soup.’
- (ii) a. **Ab ist Nixon 1974 getreten.*
 AB is Nixon 1974 step.PTCP
- b. *?Ab trat Nixon 1974.*
 AB stepped Nixon 1974
 ‘Nixon resigned in 1974.’

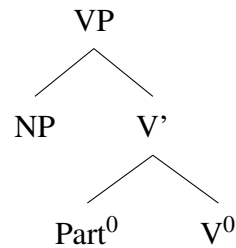
But it should be noted that native speakers’ judgements about the acceptability of these sentences vary. Some tend to reject (iia) and (iib) entirely with no difference in acceptability between perfect and past tense.

being head-adjoined to the verbal head. The proposed structures are shown in (82).

(82) a. Small-clause structure



b. Complex head structure



The two structures are proposed to represent two types of particle verbs in German differing in idiomaticity: the small-clause structure corresponds to semantically transparent particle verbs (e.g., *aufmachen* ‘to open’), and the complex head structure to semantically opaque or idiomatic particle verbs (e.g., *aufessen* ‘to eat up’). In particular, the particle and the verbal head in the complex head structure are in a syntactic relation that is local enough to enable a negotiation of meaning and the emergence of idiomatic interpretations in the sense of Marantz (2013). This option, however, is not available in the small clause structure.

Wurmbrand’s (2000) analysis, which posits distinct syntactic structures for semantically transparent and opaque particle verbs, is problematic in the sense that the property of semantic transparency seems to be more of a matter of scale rather than a binary property, and there are borderline cases where the word cannot be determined as completely idiomatic or compositional. For example, according to Wurmbrand, an important property for a particle to be semantically transparent is that it can contrast with other particles that express the opposite meaning. Given this diagnostic, *aufmachen* ‘to open’ is semantically transparent since *auf* has a contrastive counterpart *zu*, and switching the particles changes the meaning of the particle word to the opposite, i.e., *zumachen* ‘to close’. In contrast, *aufessen* ‘to eat up’ is idiomatic because the particle *auf* in this context does not have an available contrastive particle. But as pointed out by McIntyre (2002), the absence of the antonym of *aufessen* is probably not due to the idiomatic use of the particle but purely represents a lexical gap in the language. In the case of *fressen* which also means ‘to eat’ but applies to non-human entities

such as poultry, *auffressen* ‘to eat up’ can unproblematically contrast with *anfressen* ‘to eat a small part’, with *auf* and *an* being semantically antonymous, indicating the maximal and minimal effect of the eating event on an entity respectively (83).³³

- (83) *Der Fisch wurde auf-gefressen, nicht nur an-gefressen.* (McIntyre 2002: 103)
 the fish was AUF-eat.PTCP not just AN-eat.PTCP
 ‘The fish was completely eaten up, not just nibbled on.’

Furthermore, as a classic representative of aspectual particles in German, the completive meaning of *auf* is productive in particle verb constructions, as shown in (84), which suggests that the meaning of *auffessen* can also be derived compositionally to some extent, questioning the meaning of *auf* being semantically opaque.

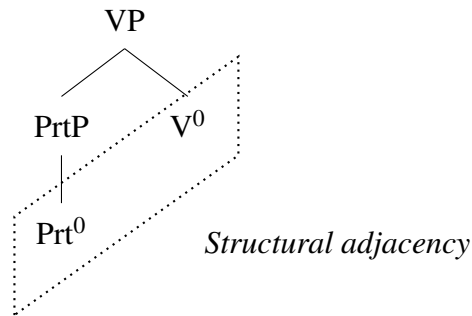
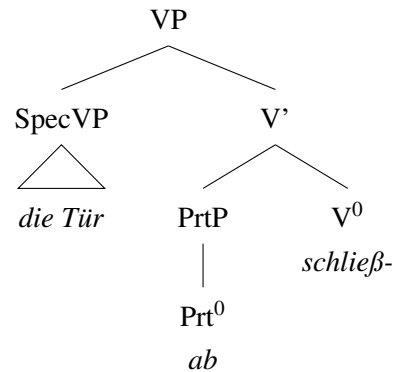
- (84) *auffressen* to gobble up
aufkaufen to buy up
aufknabbern to nibble up
aufflutschen to suck up
aufrauchen to smoke up
aufschlucken to swallow up
aufzehren to use up

Therefore, Wurmbrand’s analysis requires additionally careful and cautious criteria for classifying particle verbs as semantically transparent or opaque.

The most detailed and comprehensive analysis of particle verbs in German is provided by Zeller (2001b), who proposes the structure in (85a) for particle verbs, exemplified with a concrete example in (85b)

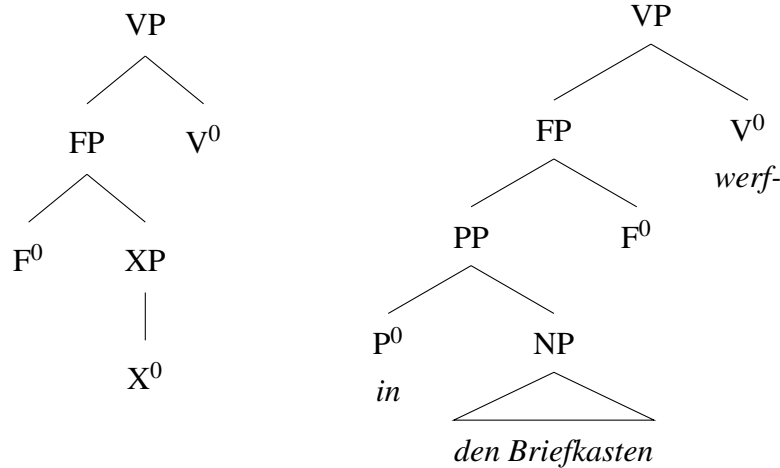
³³As the reader may have noticed, the antonymous relationship between *auf* and *zu* (in the sense of ‘open’ vs. ‘closed’) differs from that between *auf* and *an* (in the sense of ‘complete’ vs. ‘partial’). A door that is not *auf* ‘open’ is necessarily *zu* ‘closed’, and vice versa. The pair *auf* and *an* is not complementary in this way. A fish that is not *aufgefressen* ‘eaten up’ need not be *angefressen* ‘partially eaten’: two thirds of the fish may have been consumed, yet such a situation would not normally be described as *angefressen*, which typically suggests only slight nibbling of the food.

(85) a. Particle verb (Zeller 2001b: 36)

b. *die Tür abschließen* ‘to close the door’

Zeller proposes that in particle verbs, the particle and the verb stand in a particularly local structural relation, which Zeller refers to as *structural adjacency*. This syntactic relation is characterised by the absence of any functional projection that intervenes between the particle and the verb; in other words, particles are proposed to be heads of non-functional complements of the verb. Particles crucially differ from regular verbal complements, which, by contrast, are always embedded under one or more functional projections that form part of the extended projection of the lexical head (Grimshaw 1991), as illustrated in (86a) and is exemplified by the VP *in den Briefkasten werfen* ‘to throw into the letterbox’ in (86b). The FP in (86a) may be realised in various forms, for example a DP that hosts determiners for nouns, an Agr(eement)P that hosts agreement morphemes for adjectives, or an FP_{Prep} that encodes locative or directional specifications for prepositions. Regardless of its specific realisation, the presence of a functional projection in the complement of V disrupts the structural adjacency between the lexical item and the verbal head; as a result, the lexical item is not analysed as a particle.

- (86) a. Phrasal complement b.
- in den Briefkasten werfen*
- ‘to throw into the letter box’



Therefore, according to Zeller, whether a lexical item functions as a particle or as part of a phrasal verbal complement depends on its syntactic environment: if it is structurally adjacent to the verbal head, it functions as a particle; otherwise, it heads a phrasal complement.

The structural adjacency relation between the particle and the base verb, as proposed by Zeller, is considered crucial in explaining many unique morphological and syntactic properties of particle verbs. Most relevant to the present discussion is its role in accounting for the polysemy of verbal particles. Zeller adopts the idea proposed in Jackendoff (1983, 1990) that each root is associated with a Lexical Conceptual Structure (LCS) where its different meanings are listed. Some of these meanings may also include specifications of the syntactic environments in which they occur. For example, the LCS for the particle *an* with the meaning ‘the event is directed-towards some person/object’, as seen in particle verbs *anschreien* ‘to shout at (somebody)’ and *anspucken* ‘to spit at (somebody)’, can be formulated as in (87) (adapted from Zeller 2001b: 173).

- (87)
- an*

$[\text{Event} \text{DIRECTED TOWARDS} ([\text{Event}]_A, [\text{Thing}]_A)]^{34}$

If P^0 is structurally adjacent to V^0

³⁴Following Jackendoff (1983, 1990), Zeller formulates LCS using a number of basic conceptual categories such as EVENT, STATE, THING, PLACE, PATH, which can be combined compositionally to denote the

According to (87), this particular meaning of *an* becomes available only when the structure created by syntax meets the structural adjacency condition for particle verbs, namely, when *an* is the head of a non-functional complement of V. Furthermore, Zeller observes that the ‘directed-towards’ meaning of the particle *an* is sensitive to the semantic class of the base verb. Specifically, this meaning is available only in combinations with agentive intransitive base verbs (88a-e), but not with verbs such as *lieben* ‘to love’ (88f), which is non-agentive and transitive, or *träumen* ‘to dream’ (88g), which is non-agentive.

(88) (Zeller 2001b: 173-174)

- a. *jemanden an-schreien*
 somebody AN-shout.INF
 ‘to shout at somebody’
- b. *jemanden an-betteln*
 somebody AN-beg.INF
 ‘to ask somebody for money’
- c. *jemanden an-sprechen*
 somebody AN-speak.INF
 ‘to address somebody’
- d. *jemanden an-singen*³⁵
 somebody AN-sing.INF
 ‘to sing towards/to somebody’

semantic and pragmatic information associated with the lexical representation of roots. The subscript A marks the argument status of a conceptual constituent.

³⁵While *singen* ‘to sing’ can also be used transitively, it cannot link its incremental theme argument when used with the ‘directed-towards’ *an*.

- (i) *Ich singe dich (*Lieder) an*
 I sing you.ACC songs.ACC AN
 ‘I am singing at you.’

- e. *jemanden an-spucken*
 somebody AN-spit.INF
 ‘to spit at somebody’
- f. **jemanden an-lieben*
 somebody AN-love.INF
 intended: ‘to direct the loving towards somebody’
- g. **jemanden an-träumen*
 somebody AN-dream.INF
 intended: ‘to direct the dreaming towards somebody’

The particle *an* has another use in which it conveys an inchoative meaning or the meaning that the event expressed by the base verb is only carried out ‘partially’ or ‘lightly’. This use typically arises when the particle combines with a transitive verb that takes an incremental theme (88a-c). Intransitive verbs such as *arbeiten* ‘to work’ and *lachen* ‘to laugh’ do not combine with the particle *an* with the intended meaning ‘start working/laughing’ or ‘to work partially/to laugh a little’ (88d-e).³⁶

(88) (Zeller 2001b: 174)

- | | | | |
|----|----------------------|---------------|--|
| a. | <i>an-lesen</i> | lit. AN-read | ‘to start reading a book/reading a book partially’ |
| b. | <i>an-spielen</i> | lit. AN-play | ‘to start playing a song/play a song partially’ |
| c. | <i>an-schneiden</i> | lit. AN-cut | ‘to start cutting the bread, cut into the bread’ |
| d. | * <i>an-arbeiten</i> | lit. AN-work | intended: ‘to start working/work partially’ |
| e. | * <i>an-lachen</i> | lit. AN-laugh | intended: ‘to start laughing/laughing a little’ |

Zeller proposes that selectional restrictions, whereby a specific particle meaning depends on the semantic properties of the base verb, should be specified in the LCS of the vocabulary

³⁶The particle verbs with *an* in (88) are judged only with respect to the intended ingressive reading. Some verbs may additionally have unrelated idiosyncratic meanings, as in *anspielen* (*auf etwas anspielen*, ‘to allude to something’); some verb forms judged ungrammatical in the intended reading may be grammatical under an unrelated meaning, as in *anlachen* (*sich jemanden anlachen*, ‘to get a significant other’).

item. The LCS of *an*, then, would be represented as shown in (89). The LCS in (89a) specifies that the direct-towards meaning of *an* is licensed if and only if the word is structurally adjacent to an agentive intransitive verb, name it Class 1. The aspectual meaning of *an*, in turn, is licensed if and only if it is structurally adjacent to a transitive verb that takes an incremental theme, name it Class 2 (89b). If *an* has further meanings and if these meanings likewise impose selectional restrictions on the verbs which it can combine, they should also be specified in the corresponding LCSs.

(89) LCS of *an* (Zeller 2001b: 176)

- a. $[\text{Event} \text{DIRECTED TOWARDS} ([\text{Event}]_A, [\text{Thing}]_A)]$
 If P^0 is structurally adjacent to a class-1 verb
 Class 1: agentive intransitive verbs
- b. $[\text{Event} \text{PART}^{37} ([\text{Event}]_A)]$
 If P^0 is structurally adjacent to a class-2 verb
 Class 2: transitive verbs with an incremental theme
- c. (further meanings of *an*)
 If P^0 is structurally adjacent to a class-3 verb
 Class 3: ...

A problem with the specification in (89a) is that it restricts the directed-towards meaning of *an* to configurations in which the particle is structurally adjacent to the verbal head. However, the directed-towards meaning of *an* also occurs in contexts where *an* appears as a preposition, as illustrated in (90).

(90) *Alex hing das Bild an die Wand.*

Alex hung the picture on the wall

‘Alex hung the picture on the wall.’

³⁷PART here stands for partiality rather than particles.

Recall that in Zeller's analysis, the head of a phrasal verb complement is embedded under one or more functional projections (cf. (86a)), a configuration that crucially distinguishes prepositional phrases from verbal particles, which are not separated from the verbal head by functional projections. If structural adjacency to the verb were indeed a necessary condition for licensing the directed-towards meaning of *an*, it would remain unexplained why the same meaning arises in prepositional uses, where *an* is embedded in a more articulated functional structure and is not structurally adjacent to the verb.

Moreover, since Zeller's theory assumes a single syntactic structure for all uses of a given particle, it cannot adequately account for the semantic ambiguity observed in particle verbs such as *ansingen*, which allows two distinct interpretations depending on argument structure (91).

- (91) a. *Er hat das Lied an-gesungen.*
 he has the song AN-sing.PTCP
 'He started singing the song.'
- b. *Er hat mich an-gesungen.*
 he has me AN-sing.PTCP
 'He sang to me.'

In (91a), *an* receives an aspectual or partial-affectedness reading, indicating that the singing event was just initiated. By contrast, in (91b), *an* has the directional interpretation, expressing orientation toward a goal argument. Within Zeller's framework, this ambiguity receives a lexicalist explanation: *ansingen* is taken to be ambiguous because the base verb *singen* itself is ambiguous. On this view, *singen* can occur either as an agentive intransitive verb, which, when combined with the directed-towards meaning of *an*, yields the interpretation 'to sing at someone' (cf. (89a)), or as a transitive verb taking an incremental theme, which, when combined with *an*, yields the aspectual interpretation 'to start singing' (cf. (89b)). Since Zeller's framework accounts for this ambiguity only in lexicalist terms, it is desirable

to investigate whether the empirical patterns can instead be derived from a direct mapping between syntactic configuration and structural semantics. Under such an approach, the observed ambiguity of particle verbs like *ansingen* follows from differences in syntactic structure rather than from ambiguity encoded in the lexical conceptual structure of the particle.

More generally, one challenge for a class-based analysis of particles is the need for precise delineation of class membership. Otherwise, the classification may either exclude items that should be included or incorporate unattested ones. For example, not all agentive intransitive verbs can combine with *an* to yield the intended meaning ‘an action directed towards an entity’: verbs such as **anzögern* (*an* + *zögern* ‘to hesitate’), **anplanen* (*an* + *planen* ‘to plan’), and **anwarten* (*an* + *warten* ‘to wait’) are non derivable in German with the intended meanings ‘to hesitate toward someone’, ‘to plan toward something’, and ‘to wait for someone’, respectively.

Furthermore, the different interpretations of a particle, as presented in (89), appear to be independent and unrelated. However, recent research on the semantics of verbal particles have proposed that the different meanings of a particle, whether superficially transparent or opaque, can, to some extent, be derived compositionally and are interrelated (see Kliche 2011; Lechler and Roßdeutscher 2009 on German, and Felfe 2018; Lindner 1981; Park 2001 on English). Given a single syntactic structure, the source of these different interpretations, as well as the connection between them, remains unexplained. From this perspective, Zeller’s approach to the different semantics of verbal particles is better characterised as a reinterpretation of the data rather than an explanation of the observed patterns.

Finally, Zeller’s system does not provide a clear account of how particles participate in and influence the derivation of compositional and grammatically relevant aspects of meaning, such as telicity and resultativity. Even if we specify, for instance, that the directed-towards meaning of the particle *an* arises when the particle combines with an agentive intransitive verb, it remains unclear why *this* particular meaning emerges in this context rather than another, such as its aspectual meaning, and why the directional meaning does not necessarily result in the telicity of the predicate.

In summary, syntactic analyses of German particle verbs have largely focused on the relationship between the particle and the base verb. Most accounts assume that particles occupy a single syntactic position within a uniform structural representation, regardless of their semantic contribution. This assumption, however, is problematic, as it effectively reduces much of the polysemy of particles such as *auf* to lexically specified idiosyncrasies rather than being given a principled structural account. While spatial and directional meanings are typically linked to the particle's prepositional uses, aspectual and other non-spatial interpretations are often treated as arbitrary, idiomatic, or lexically listed. As a result, the aspectual meanings of particles have been described as 'the most drastic way in which particles differ semantically from their underlying prepositions' (Zeller 2001b: 159), which has reinforced the view that the aspectual meanings of particles fall outside the scope of systematic syntactic explanation.

However, recent developments within syntactic approaches to morphology have reached a broad consensus that lexical aspect is syntactically encoded. Representative of research along this line are Ramchand (2008) and Borer (2005a, 2005b), which, however, differ significantly in their assumptions about the source of inner aspect and how the relevant information is encoded in syntax. The next section introduces these two frameworks in detail.

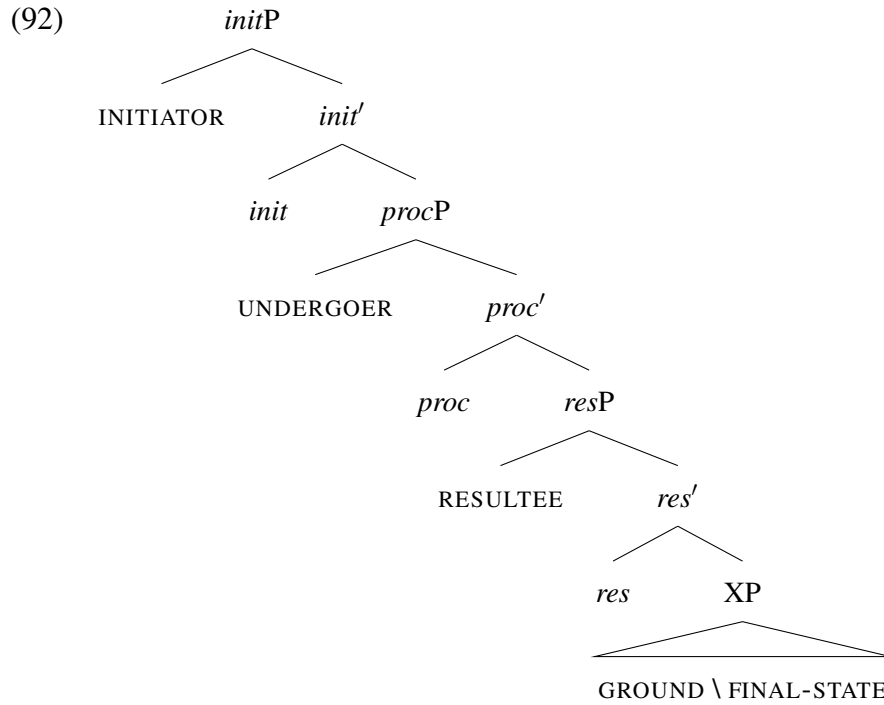
Despite their differences, both Ramchand (2008) and Borer (2005a, 2005b) converge on the view that lexical aspect can be analysed as a syntactic phenomenon rather than as information lexically specified on individual verbs. Neither, however, has been systematically extended to account for aspectual particles in German, and, as I will show at the end of Section 2.4, neither is readily extendable. But if lexical aspect is indeed a syntactic phenomenon, the question naturally arises whether the aspectual meanings of particles can likewise be derived syntactically; that is, whether their interpretive variation reflects the insertion of the particle into different syntactic positions. On such a view, the different uses of a particle would follow from a direct mapping between syntactic configuration and structural semantics. Such an analysis, of course, requires abandoning the premise that particles occupy a single,

invariant syntactic position. It is precisely this proposal that the present chapter pursues, and that Chapter 3 develops in detail for the particle *auf*.

2.4 Syntactic encoding of lexical aspect

2.4.1 Ramchand's (2008) First Phase Syntax

An explicit and influential formulation of a syntactic decompositional theory of verb meaning is provided by Ramchand (2008), who develops a fully articulated syntactic representation of event structure encoded by a fixed hierarchy of three functional heads corresponding to subevental components: *init* (initiation), *proc* (process), and *res* (result). The *init* head introduces causation, *proc* represents change and forms the core of all dynamic events, and *res* denotes the result state that emerges from the event expressed by *proc*. The specifier of each projection hosts the DP that represents the ‘subject’ of that particular subevent: the argument that causes the event (the INITIATOR) in *SpecinitP*, the subject that undergoes change (the UNDERGOER) in *SpecprocP*, and the holder of the result (the RESULTEE) in *SpecresP*. The syntactic structure that Ramchand proposes is demonstrated in (92) (Ramchand 2008: 32).



It should, however, be noted that while the syntax that encodes event structure is argued to be built up autonomously, verbs in Ramchand's system are not devoid of any syntactically relevant information (in contrast to more radical constructionist approaches such as Marantz (1997) and Borer (2005a)). In particular, Ramchand proposes that verbs are specified for one, two, or all three of the features [*init*], [*proc*] and [*res*], which determines the subevents they lexicalise. A verb can be legitimately inserted into the structure of an event only if the features specified on the lexical item match those of the corresponding functional heads.

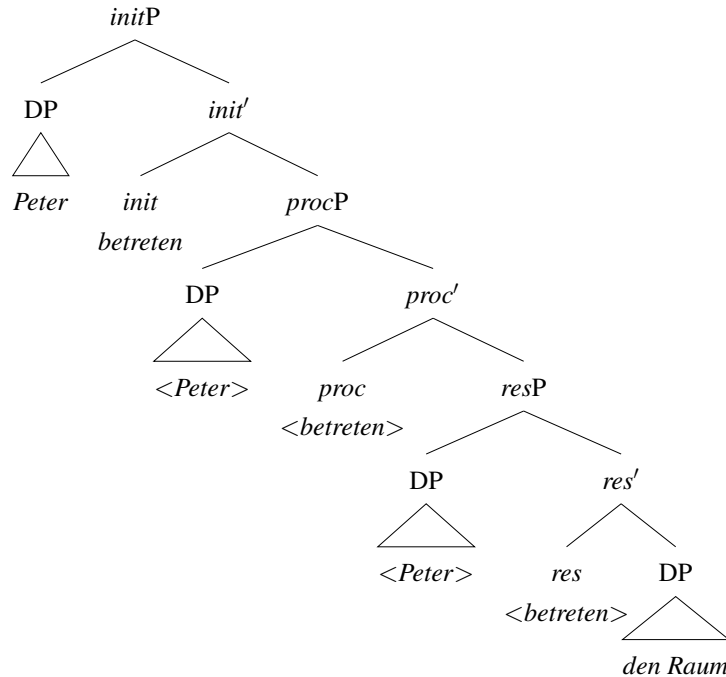
With respect to the traditional aspectual classes, states (e.g., *fürchten* 'to fear') are argued to be specified only for [*init*] and accordingly project *initP*. Both *initP* and *resP* are analysed as stative projections in this framework. The presence of *initP* in states therefore simply marks a state rather than introducing an initiational subevent. States crucially lack [*proc*], and hence *procP*, which is associated with dynamic events. Among the latter, activity verbs are specified as either [*init*, *proc*] (e.g., transitive *schmelzen* 'to melt') or just [*proc*] (e.g., intransitive *schmelzen* 'to melt'). Achievements are characterised by either [*init*, *proc*, *res*]

(e.g., transitive *brechen* ‘to break’) or [*proc*, *res*] (e.g., intransitive *brechen* ‘to break’). Their punctual interpretation arises from the overlap of *proc* and *res*, i.e., the collapse of the process and result subevents into a single point on the time line.

Accomplishments necessarily involve [*proc*], as they denote dynamic events. They may also contain [*res*], in which case the complement of *res* hosts a DP that specifies the ground that the moving object ultimately reaches. This is shown by the VP *den Raum betreten* ‘to enter the room’ in (93).

(93) Accomplishment involving *resP*

Peter betrat den Raum. ‘Peter entered the room.’

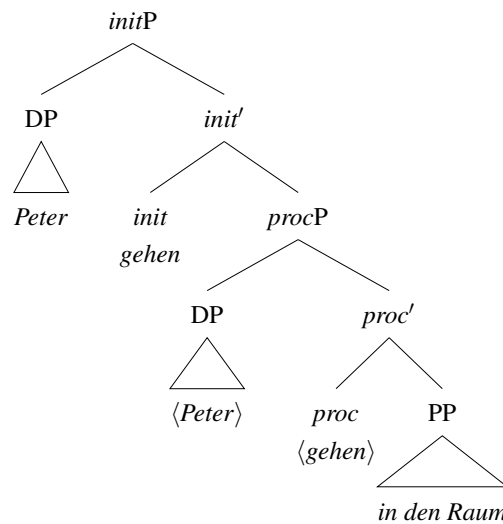


Accomplishments may also arise when the complement of *proc* is not *resP* but instead linguistic material that denotes a PATH. The PATH provides a bounded scale that maps homomorphically onto the event introduced by *proc* and holds of the undergoer in *SpecprocP*. As the event proceeds, the development of the event corresponds point by point to progress along the scale defined by the PATH, such that the extent of change undergone by the entity is

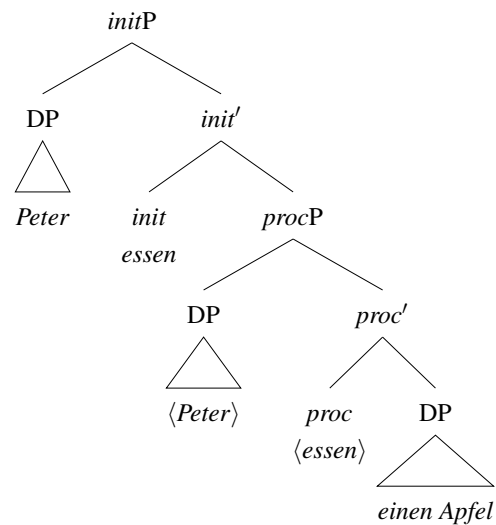
directly reflected in the temporal progression of the event. A PATH can be concretely realised by a directional PP (e.g., *in den Raum gehen* ‘to go into the room’) or a quantised DP (e.g., *einen Apfel essen* ‘to eat an apple’), both of which are merged as the complement of *proc*. The structures of accomplishments involving a PATH are given in (94).

(94) Accomplishment involving PATH

a. *Peter ging in den Raum.*
‘Peter went into the room.’



b. *Peter aß einen Apfel.*
‘Peter ate an apple.’



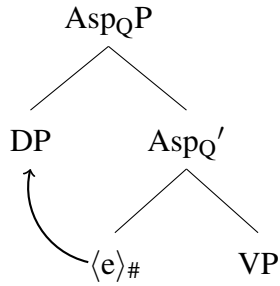
It can be seen that in Ramchand’s system, while the presence of *resP* entails telicity, telic predicates do not necessarily include a *res* head. Furthermore, telicity is not represented as a structural property in the syntax; rather, it arises from different types of aspectually relevant internal arguments. Accordingly, Ramchand treats the correlation between telicity and quantisation noted in the literature as a matter of ‘semantic entailment’ rather than something encoded in the lexical or syntactic representation of the verb (Ramchand 2008: 23).

2.4.2 Borer’s (2005a, 2005b) Exo-skeletal Model

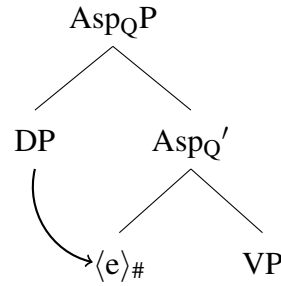
Borer (2005a, 2005b) advances an even more radical constructionist view of grammar, which she terms the Exo-skeletal (XS) Model, according to which roots lack any pre-packaged categorial or grammatical features, including those related to lexical aspect. Instead,

lexical aspect properties of verbs are argued to be determined structurally, by the syntactic configurations in which roots, or *listemes* in the XS Model, appear. Drawing on the influential proposal by Verkuyl (1972, 1989, 1993) that only arguments that are specified for quantity can give rise to telic predicates, Borer argues that telicity is not a lexical property of verbs, but rather reflects a cross-categorical notion of quantity, syntactically represented by an Aspectual Quantification Phrase Asp_QP . Crucially, telicity arises only when the head of Asp_QP , $\langle e \rangle_\#$, is assigned a range, which can be realised either directly or indirectly, depending on the language. In languages such as Slavic, range can be assigned to $\langle e \rangle_\#$ directly by perfective prefixes, which instantiate a quantity feature that merges onto Asp_Q . This feature is then transmitted to $\text{SpecAsp}_Q\text{P}$ via specifier–head agreement, ensuring that the DP in that position receives a quantised interpretation. As a result, telicity in these languages does not depend on the presence of a quantised object (cf. Section 2.1.2). In contrast, in English and German, $\langle e \rangle_\#$ is assigned a range indirectly, for example, through the merging of a quantised DP in $\text{SpecAsp}_Q\text{P}$, where it receives accusative case. In this configuration, the DP assigns range to $\langle e \rangle_\#$ via specifier–head agreement, thereby yielding a telic interpretation of the predicate. Telicity in these languages is therefore taken to depend on the presence of an internal argument specified for quantity (cf. Section 2.1.2). In addition to quantised DPs, $\langle e \rangle_\#$ can also be assigned range by a PP adjunct (e.g., *run to the store*) or an adverb of quantification (e.g., *Robin danced once in five hours*), both of which, like quantised DPs, are quantity expressions and assign range to $\langle e \rangle_\#$ indirectly. The difference between direct and indirect range assignment to $\langle e \rangle_\#$ with respect to the direction of the specifier–head agreement relation is illustrated in (95).

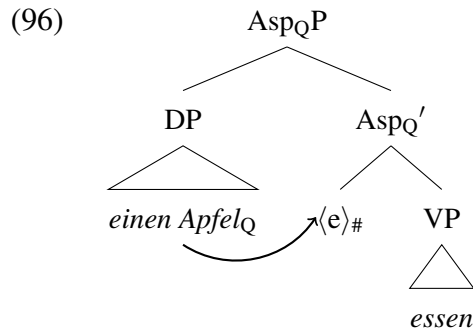
- (95) a. Direct range assignment to $\langle e \rangle_{\#}$
(e.g., Slavic languages)



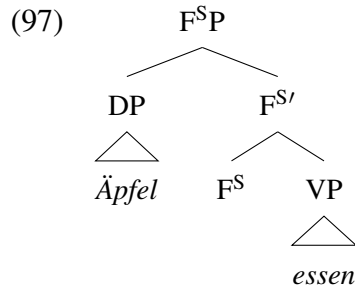
- b. Indirect range assignment to $\langle e \rangle_{\#}$
(e.g., German, English)



Accordingly, the syntactic structure Borer proposes for a transitive telic predicate in German, such as *einen Apfel essen* ‘to eat an apple’, is given in (96), where $\langle e \rangle_{\#}$ is assigned range indirectly by the quantised DP in the specifier of Asp_{QP} , giving rise to a telic interpretation.



Atelic predicates are analysed by Borer as involving the absence of telicity, and hence the absence of Asp_{QP} in the syntactic structure. In such cases, the position occupied by Asp_{QP} in telic predicates is instead filled by a shell Functional Projection (F^{SP}), whose specifier hosts a non-quantised DP and assigns partitive case to it. The difference between Asp_{QP} and F^{SP} with respect to case assignment is particularly evident in languages such as Finnish, which has a more fine-grained case marking system than English. The structure proposed for transitive atelic predicates such as *Äpfel essen* ‘to eat apples’ is given in (97).



Comparing Ramchand (2008) and Borer (2005b), it becomes clear that while both frameworks encode the notion of lexical aspect into syntax, they approach it from different perspectives. Ramchand (2008) proposes a direct mapping between semantic event decomposition and a layered syntactic structure involving *initP*, *procP*, and *resP*, along with a systematic mapping of event participants onto structural positions. Unlike in Borer (2005b), telicity is not a structural property in Ramchand (2008)’s framework, i.e., there is no dedicated structural position responsible for telicity marking. Instead, telicity in incremental-theme verbs arises from a homomorphic mapping between the development of the event and the scale denoted by the *PATH DP*. When this scale is bounded, whether by a defined material extent or by a delimited property, the development of the event is incrementally mapped onto it, yielding a temporally bounded and thus telic event.

By contrast, the XS Model proposed by Borer (2005) introduces a dedicated aspectual projection and provides a systematic account of the relationship between telicity and the quantity of the direct object. However, because this system restricts inner aspect to the computation of a single property, namely telicity, it does not distinguish all Aktionsarten in terms of syntactic structure. This is evident, for example, in its treatment of accomplishments and achievements in Germanic languages. Under Borer’s analysis, both event types share the same syntactic structure, in which *Asp_Q* is present. The distinction between them is purely lexical: while accomplishments depend on the quantity of the direct object to derive telicity, as shown in (96), achievements are analysed as idiomatic constructions, in which the relevant

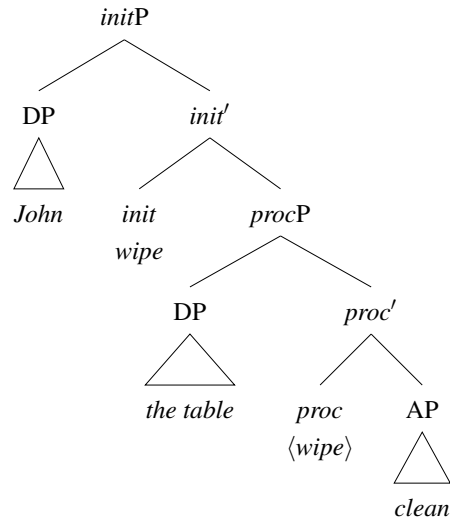
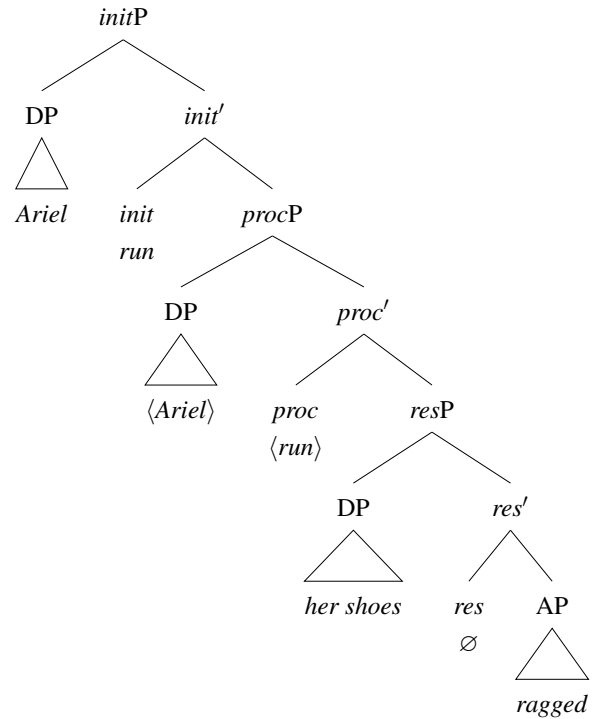
listemes are lexically specified to force the projection of an idiomatically specified Asp_Q , whose range is assigned directly by a phonologically unrealised head feature.

2.4.3 Aspectual particles in syntactic theories of aspect

This section examines how the frameworks proposed by Ramchand (2008) and Borer (2005b) analyse aspectual particles. As both analyses are based primarily on English, a further task is to determine whether they can be extended to the German aspectual particles under investigation here.

Ramchand (2008) does not address aspectual particles specifically, but she treats English verbal particles on a par with resultative APs: both function as secondary predicates that specifies the final state or location reached by a thematic argument. What distinguishes the two is their structural position. Resultative APs may occupy one of two positions, depending on whether the internal argument is selected by the verb. When the object is verb-selected, the AP merges as the complement of *proc* and serves as the path along which the undergoer progresses during the event (98a). By contrast, when the object is not selected by the verb, the AP appears instead in the complement of *res*, where it combines with the unselected object in *SpecresP* to yield a small clause headed by a phonologically null *res* (98b). On Ramchand's analysis, this null head contributes a possession semantics: the object is interpreted as coming to possess the property expressed by the AP.

(98) Resultative AP (Ramchand 2008: 108-109)

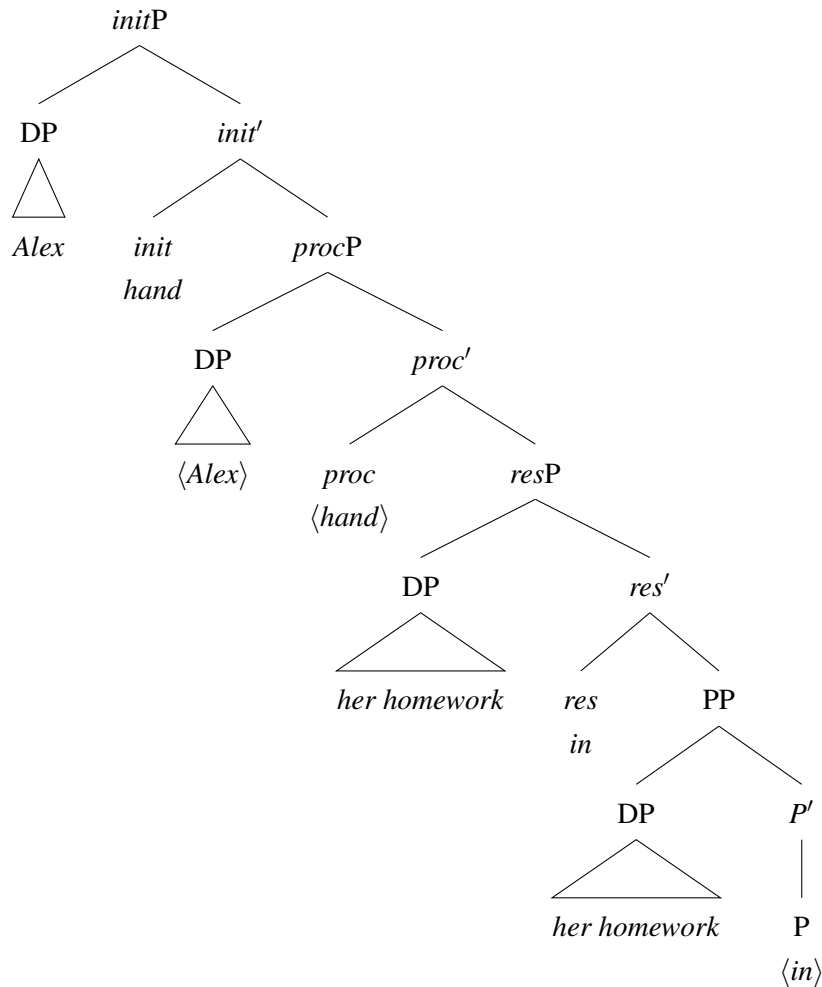
a. *John wiped the table clean.*b. *Ariel ran her shoes ragged*

Particles are analysed by Ramchand (2004) as intransitive prepositions (cf. Emonds 1976; Svenonius 1996), and accordingly originate as the head of a PP merged as the complement of *res*. Unlike resultative APs, however, particles obligatorily move to *res*, as illustrated in (99). The object may be spelled out either in *SpecresP* or in *SpecPP*, which accounts for the well-known ordering alternation between object and particle in English particle verb constructions.³⁸

³⁸Bruening (2010) points out that this raises the question of why only verbal particles give rise to multiple realisation options for the object.

(99) Verbal particle (Ramchand 2008: 117)

Alex handed her homework in. / Alex handed in her homework.



An obvious and undesirable consequence of Ramchand's analysis is that treating all verbal particles as realisations of the *res* head overlooks the semantic heterogeneity of these items, particularly those that do not encode a result state or yield telic predicates. A case in point is the atelic, inceptive use of the particle *an* in German, as in *anlesen* 'to start reading' and *ansingen* 'to start singing'. Beyond the domain of aspectual particles, German also exhibits cases such as *nachjagen* 'to run after', in which the locative use of *nach* expresses directional meaning without specifying a final location. Analysing such particles uniformly as instantiations of *res*

therefore oversimplifies their rich semantic contribution in particle verb constructions.

A further issue for Ramchand's treatment of verbal particles, as pointed out by Bruening (2010), concerns the interaction between particle verbs and the quantisedness of the object. Specifically, the analysis cannot account for the fact that the telicity of particle verb constructions in English depends on the quantisedness of the internal argument. As illustrated by the particle verb *think up* in (100), a non-quantised (mass) object yields an atelic reading, whereas a quantised object yields a telic one.

(100) (Bruening 2010: 269)

- a. I thought up plans for an hour/??in an hour.
- b. I thought up a plan in an hour/??for an hour.

Recall that in Ramchand's account, the influence of the quantisedness of the object on telicity is captured by analysing such event-measuring objects as paths occupying the complement position of *proc* (cf. (94)). Therefore, *resP* is not expected to project in these configurations, which contrasts with her analysis of verbal particles as spell-outs of the *res* head. To solve this problem, one might assume either that path-denoting objects are not the sole complement of *proc*, or, which I find to be the more promising option, that particles are not always realisations of the *res* head.

Turning to Borer (2005b), she observes that certain English particles appear to license telicity in the absence of a quantised object, a pattern that resists the generalisation that only arguments specified for quantity can give rise to telic predicates. The relevant examples are given in (101).

(101) (Borer 2005b: 203)

- a. The army took over (in two hours).
- b. John climbed down (in two hours).
- c. Jake pulled up alongside us (in two minutes).

- d. They paired up (in two minutes).
- e. Kim went out (in two seconds).

To account for these cases, Borer (2005b) proposes that particles in intransitive particle verbs are direct range assigners to $\langle e \rangle_{\#}$ on Asp_Q , thereby licensing a telic interpretation without requiring a quantity DP in $\text{SpecAsp}_Q\text{P}$.

At the same time, Borer also identifies cases parallel to (100), in which the quantisation of the object does play a role in determining the telicity of particle verb predicates. The particles involved appear to be the English counterparts of what are classified in this thesis as egressive particles in German. Crucially, when the object is non-quantised in these cases, the result is ungrammaticality rather than mere atelicity, as illustrated in (102).

(102) (Borer 2005b: 210)

- a. *Kim wrote letters up.
- b. Kim wrote *the* letters up.
- c. *Kim ate sandwiches up.
- d. Kim ate *the* sandwiches up.

For these particles, Borer proposes that they do not assign range to $\langle e \rangle_{\#}$ but instead function as modifiers of Asp_Q : they require Asp_QP to be projected but do not themselves saturate it. The intermediate status of these particles between direct and indirect range assignment to $\langle e \rangle_{\#}$ has no parallel elsewhere in Borer's system and that, accordingly, weakens the explanatory force of the analysis. Furthermore, she leaves open the question of what principle determines whether a particle functions as a range assigner or as a modifier in any given case.

More fundamentally, although Borer acknowledges that English verbal particles can contribute directly to the encoding of telicity in particle verb constructions, this contribution does not follow systematically from their semantics. For instance, the directional use of *down* in (101b) is analysed as encoding telicity, while the egressive use of *up* in (102) is

not. As a result, the analysis amounts to a restatement of the empirical pattern rather than an explanation of it. A further limitation, which Borer's account shares with Ramchand (2008), is that particles are examined exclusively with respect to their contribution to telicity, while particles that mark inceptivity are left out of consideration entirely.

2.4.4 Summary

To summarise, while Ramchand (2008) and Borer (2005b) both offer syntactic accounts of verbal particles, neither provides a fully satisfactory analysis of the aspectual particles examined in this chapter.

Ramchand does not treat telicity as an independent structural property in the syntax. All verbal particles are assigned to a single structural position as realisations of the *res* head, which forces a uniform result-state semantics onto items that, on closer inspection, are semantically heterogeneous. The analysis also encounters empirical difficulties in accounting for the interaction between particles and the quantisedness of the internal argument. Borer (2005), by contrast, locates the source of telicity in the functional head *Asp_Q*, and allows particles to enter the structure either as range assigners or as modifiers of it. While this allows for greater flexibility, it comes at the cost of introducing an underdetermined distinction between particles as range assigners and as modifiers, for which no independent principle is provided, and the resulting account is descriptive rather than explanatory.

More fundamentally, both frameworks examine particles exclusively through the lens of telicity, and consequently have nothing to say about particles that mark the initial boundary of an event. Taken together, these approaches demonstrate the plausibility of a syntactic treatment of aspectual meaning, but also reveal important limitations in existing accounts of verbal particles. This motivates a more fine-grained and systematically constrained analysis developed in Chapter 3, which classifies aspectual particles according to the event boundary they target and locates the resulting subtypes in distinct positions within the syntactic structure.

2.5 Chapter summary

In the first part of this chapter, I examined the semantics of German verbal particles, with particular attention to their aspectual uses. Building on previous work, I proposed a tripartite semantic classification of verbal particles into resultative, aspectual, and idiosyncratic types. A central concern in the literature has been whether aspectual particles, and telic particles in particular, warrant recognition as a distinct category, given their frequent conflation with resultative particles and the well-known objections to treating verbal morphology as a genuine marker of telicity in Germanic languages. I argued that aspectual particles do constitute a distinct subtype: they can be reliably distinguished from resultative particles and mark telicity independently of the quantisation of the internal argument. Aspectual particles therefore form a well-defined subcategory of verbal particles in German.

The principal contribution of the chapter lies in the proposal of an internal classification of aspectual particles. Whereas previous work has focused almost exclusively on telic particles, I argued that this emphasis overlooks particles that mark the initiation of states or events, an aspectual meaning of equal importance to telicity and one that is expressed by a number of verbal particles in German. Moreover, I showed that the class of so-called telic particles is itself heterogeneous, comprising both particles that mark the terminal boundary of an event and particles that mark its initiation. I therefore abandoned the division of aspectual particles into telic and non-telic types, and proposed instead that they should be classified according to whether they target the initial or the terminal boundary of an event. This yields two main subtypes: inceptive particles, which mark the initial boundary, and egressive particles, which mark the terminal boundary. Inceptive particles further subdivide into inchoative particles, which signal the onset of a new state and yield telic predicates, and ingressive particles, which signal entry into an activity or process and yield atelic predicates; egressive particles, by contrast, are uniformly telic. For each of these subtypes, I provided a comprehensive inventory of the German verbal particles that convey the relevant meaning. This classification expands

the empirical and theoretical scope of aspectual particles beyond the traditional focus on telicity and underscores the need to incorporate inceptivity into the classification of event types.

In the second part of the chapter, I first turned to the syntax of German particle verb constructions and showed that the existing analyses stand in marked contrast to the diversity of semantic classifications: they have generally assigned verbal particles to the same structural position across their different uses. I argued that this undifferentiated treatment is problematic, as it fails to provide a principled account of the semantic polysemy of particles, and proposed instead that the different uses of a particle should be located in distinct positions within the syntactic structure, such that their interpretive variation follows directly from structural configuration rather than being lexically stipulated.

I then placed this proposal within the broader context of syntactic approaches to inner aspect by engaging with two influential frameworks, namely those of Ramchand (2008) and Borer (2005a, 2005b). Although these frameworks diverge in their accounts of how telicity arises, they share the assumption that lexical-aspectual information is encoded in the syntax. At the same time, both exhibit systematic difficulties when extended to German aspectual particles. Ramchand's uniform treatment of particles as realisations of *res* obscures the variation within this class, and Borer's framework introduces a stipulative distinction between range-assigning and modifying particles, for which no general principle is provided. Most notably, neither framework engages with inceptive particles, as both restrict their analysis to the telicity dimension.

Taken together, these limitations reinforce the need for the alternative approach developed in Chapter 3, which takes the German verbal particle *auf* as a case study. This particle is particularly suitable as a test case, as it instantiates all three uses attested in particle verb constructions, i.e., aspectual, resultative, and idiosyncratic, and, within its aspectual uses, conveys both inceptive and egressive meanings. I argue that this variation is not accidental and cannot be reduced to lexical polysemy. Rather, *auf* provides direct evidence for the claim

defended in the present chapter, namely that the interpretation of German verbal particles is determined by their syntactic position rather than stipulated in the lexicon.

3

Particle verbs with *auf*

Contents

3.1	Introduction	99
3.2	An overview of the semantics of <i>auf</i>	101
3.2.1	Resultative <i>auf</i>	101
3.2.2	Idiosyncratic <i>auf</i>	108
3.2.3	Aspectual <i>auf</i>	108
3.3	The framework	113
3.3.1	A projection for inner aspect	115
3.3.2	Analysis of aspectual <i>auf</i>	125
3.3.3	Analysis of resultative <i>auf</i>	155
3.3.4	Aspectual and resultative <i>auf</i> in relation	160
3.3.5	A note on idiosyncratic <i>auf</i>	168
3.3.6	Summary	170
3.4	Discussion	171
3.4.1	Extending the analysis to Distributed Morphology	172
3.4.2	Extending the analysis to other aspectual particles in German	178
3.5	Chapter summary	183

3.1 Introduction

This chapter develops a syntactic analysis of the German verbal particle *auf* as a case study for the proposal advanced in Chapter 2, namely that the different uses of German verbal particles in particle verb constructions follow from variation in syntactic position.

The central claim of the chapter is that the three uses of *auf* are realisations of a single lexical item in different syntactic positions. In its aspectual uses, *auf* is merged in the head of an inner aspect projection iAsp, situated between *vP* and *VP*, where it introduces the event features responsible for its inceptive or egressive interpretation. In its resultative and idiosyncratic uses, by contrast, *auf* is merged as the head of a *PP* in the complement of *V*, where it encodes the result state associated with the action denoted by the base verb. Across all three uses, the lexical content of *auf*, namely an upward-oriented spatial meaning inherited from its prepositional source, is held constant; what varies is the syntactic environment in which this content is realised and the grammatical features that the particle expresses in the corresponding position.

Within the aspectual uses, the chapter develops a feature-based account of the inceptive–egressive distinction of *auf*. Building on the inceptive/egressive classification proposed in Chapter 2, I argue that inceptive *auf* spells out the feature bundle [init, telic], while egressive *auf* spells out [telic] alone. In contrast to earlier analyses in which verbal particles are invariably merged in the complement of *V* regardless of their semantics, the present proposal predicts that aspectual *auf* gives rise to mono-eventive predicates, a prediction shown to be borne out empirically. The analysis also provides principled explanations for why aspectual *auf* is incompatible with secondary resultative phrases and why the object of egressive *auf* must be quantised. The analysis furthermore captures the asymmetry between aspectual and resultative *auf* with respect to the role of object quantisation in the determination of telicity, which is shown to follow directly from the structural position of [telic] and its c-command relation to the object *DP*.

The novelty of the present proposal is threefold. First, it provides a fully developed syntactic analysis of the polysemy of a single German verbal particle, showing that the three semantically distinct uses of *auf* can be derived from a single lexical item realised in different syntactic positions. Second, it provides a feature-based analysis of inceptive and egressive aspectual readings in terms of the feature specification of iAsp, thereby extending the classification proposed in Chapter 2 directly into syntax. Third, it offers a systematic account of the encoding of telicity, explaining not only how telic interpretations arise in different structural configurations, but also why telic predicates exhibit different syntactic properties depending on whether telicity is enforced directly by [telic], jointly by [telic] and a quantised object, or merely permitted by a quantised object in the absence of [telic]. Taken together, the proposal argues for a structural account of particle polysemy, which, to the best of my knowledge, has not previously been developed in a systematic way for verbal particles in German.

The chapter is structured as follows. Section 3.2 first provides an empirical overview of the semantics of *auf*, surveying its resultative, idiosyncratic, and aspectual uses. Section 3.3 develops the proposed syntactic analysis. It begins by motivating the proposal of an inner aspect projection iAspP, which forms the structural basis of the analysis, through a discussion of Travis (2010) (Section 3.3.1). Building on this, it develops the analysis of aspectual *auf* in iAsp in Section 3.3.2, with separate treatments of its inceptive (Section 3.3.2.1) and egressive (Section 3.3.2.2) uses, and the analysis of resultative *auf* as the head of a PP in the complement of V in Section 3.3.3. Section 3.3.4 then draws together the consequences of the two analyses, examining the behaviour of aspectual and resultative *auf* under degree modification (Section 3.3.4.1), the semantic relatedness between the two uses (Section 3.3.4.2), and the encoding of telicity across the configurations identified in the chapter (Section 3.3.4.3). A brief discussion of idiosyncratic *auf* is given in Section 3.3.5. Finally, Section 3.4 considers two extensions of the proposal: its implementation within a Distributed Morphology (DM) architecture (Section 3.4.1) and its applicability to other aspectual particles in German (Section 3.4.2). Section 3.5 concludes the chapter.

3.2 An overview of the semantics of *auf*

A detailed analysis of the semantics of *auf* in particle verb constructions is provided by Lechler and Roßdeutscher (2009), where the authors identify eight general semantic categories to which *auf* contributes in particle verbs. These categories can be grouped into the three semantic types of particles introduced in Section 2.1, depending on whether *auf* contributes a resultative meaning, an idiosyncratic meaning, or, most relevant to the present discussion, an aspectual meaning in particle verb constructions.

3.2.1 Resultative *auf*

The first, prototypical meaning of the particle *auf* is its function of denoting a path of movement opposite to gravity, similar to the adjective *hoch* ‘high’. As the authors point out, this is the original meaning of the particle, which is historically related to the particle’s Old High German predecessor, the adverb *ûf*, and ultimately derives from Indo-European *upo* ‘under’. The path most prototypically manifests as a literal trajectory along which a figure—the entity that is located or moving (Talmy 1975)—or a part of it moves (103–104). The latter typically refers to a vertical growth of the figure, as illustrated by *aufblasen* ‘to blow up’, *aufschießen* ‘to shoot up’, *aufstehen* ‘to get up’ and *aufsetzen* ‘to sit up’ in (104).

- (103) a. *Der Rauch steigt auf.*
 the smoke rises AUF
 ‘The smoke rises up.’
- b. *Peter hebt die Handschuhe vom Boden auf.*
 Peter lifts the gloves from.the floor AUF
 ‘Peter picks up the gloves from the ground.’
- c. *Die Hunde schrecken die Tauben auf.*
 the dogs startle the pigeons AUF
 ‘The dogs startle the pigeons.’

- (104) a. *Wir haben für die Kinder eine Luftmatratze auf-geblasen.*
 we have for the children an air.mattress AUF-blow.PTCP
 ‘We inflated an air mattress for the children.’
- b. *Die Cannabis-Pflanzen schießen jetzt zum künstlichen Licht auf.*
 the cannabis-plants shoot now to.the artificial light AUF
 ‘The cannabis plants are now shooting up toward the artificial light.’
- c. *Alleine auf-stehen oder sich auch nur im Bett auf-setzen*
 alone AUF-stand.INF or REFL even only in.the bed AUF-sit.INF
geht nicht mehr.
 goes not anymore
 ‘Getting up on one’s own or even just sitting up in bed is not possible anymore.’

Lechler and Roßdeutscher also identify several ways in which this most prototypical meaning of *auf* can be extended. For example, the path need not always coincide with the vertical axis opposite to gravity. When *auf* combines with verbs of virtual perception, such as *blicken* ‘to look’ in (105), the axis may be reinterpreted as a conceptual line of perception extending from the observer toward the object of vision.

- (105) *Ich blicke zu meinem Freund auf.*
 I look to my friend AUF
 ‘I look up to my friend.’

In more metaphorical uses, the vertical meaning of *auf* is extended to denote increase, intensification, or improvement along an ordered scale. In (106), for example, the metaphorical upward direction maps onto higher degrees of properties such as polish, volume, or emotional intensity.

- (106) a. *einen Schuh auf-polieren*
 a shoe AUF-polish.INF
 ‘to polish a shoe’

- b. *Musik auf-drehen*
 music AUF-turn.INF
 ‘to turn up the music’
- c. *beide Seiten zur Gewalt auf-hetzen*
 both sides to.the violence AUF-incite.INF
 ‘to incite both parties to violence’

The ‘upward’ meaning of *auf* can also be metaphorically interpreted as signifying ‘positive’, giving *auf* the meaning of acting against physical downward movements (107a) or movements in directions perceived as negative or undesirable in some particle verb constructions (107b).

- (107) a. *den fallenden Ball auf-fangen*
 the falling ball AUF-catch.INF
 ‘to catch the falling ball’
- b. *Preissteigerungen auf-fangen*
 price.increases AUF-catch.INF
 ‘to offset price increases’

The second meaning associated with *auf* is its function of expressing a spatial support relation (or similar relations) between objects. The support relation can be vertically oriented (108), which then is similar to the meaning of *auf* stopping or preventing a downward movement as mentioned above, or it may involve mere contact between objects (109).

- (108) *aufsetzen* lit. AUF-set to set down on, to place on
aufliegen lit. AUF-lie to lie on, to rest on
- (109) *auflaufen* lit. AUF-run to run into
aufprallen lit. AUF-crash to crash into
auffahren lit. AUF-drive to collide with, to run into

Unlike its first prototypical meaning, this use of *auf* requires the supporting object to be specified. It can be explicitly introduced through a dative object (110), an *auf*-PP (111), or via a denominal verb that inherently specifies the supporting object, such as *aufgleisen* ‘to set on track’ (112), where the supporting object is *das Gleis* ‘the rail’.

- (110) *Jogger sollten sich beim Training im Winter eine Mütze auf-setzen.*
 runners should REFL at.the training in.the winter a hat AUF-put.INF
 ‘Runners should put on a hat when exercising in winter.’
- (111) a. *Ich habe gewöhnlich Zeige- und Mittelfinger vorne auf der Maus auf-liegen.*
 I have usually index and middle.finger front on the mouse AUF-lie.INF
 ‘I usually have my index and middle finger lying on the front part of the mouse.’
- b. *Zum Schutz der Wunde sollten Sie für 30 min auf einen Tupfer auf-beißen.*
 to.the protection of.the wound should you for 30 minutes on a pad AUF-bite.INF
 ‘To protect the wound you should bite onto a pad for 30 minutes.’
- (112) *LGB-Loks und Wagen lassen sich sehr leicht auf-gleisen.*
 LGB-locomotives and wagons let REFL very easily AUF-rail.INF
 ‘LGB engines and wagons can very easily be rerailed.’

The supporting object can also be implicitly inferred through world knowledge, as illustrated by examples in (113).

- (113) a. *Das Pferd ist fertig gesattelt und der Reiter möchte auf-steigen.*
 the horse is finished saddle.PTCP and the rider wants AUF-climb.INF
 ‘The horse is saddled and the rider wants to mount.’

- b. *Crème-Rouges können auch mit den Fingern als Lippenfarbe
 crème-rouges can also with the fingers as lip.color
auf-getupft werden.
 AUF.dab-PTCP become.INF
 ‘Cream blushes can also be dabbed on with the fingers as lip color.’*

The contact meaning of *auf* can undergo a metaphorical extension whereby it expresses the bridging of a gap or deficit, leading to a positively evaluated resulting state (114).

- (114) *Deutschland muss zu den führenden Online-Nationen auf-schließen.
 Germany must to the leading online-nations AUF-close.INF
 ‘Germany must close up with the leading online nations.’*

Another metaphorical extension of this meaning of *auf* occurs in contexts involving heavy loads that must be carried by a person. In such cases, *auf* has come to represent the bearing of non-physical burdens, particularly the possession of obligations, responsibilities, commitments, or other constraints on a person’s actions (115).

- (115) a. *Die Kirche dürfe nicht der gesamten Gesellschaft Dogmen und
 the church must not the entire society dogmas and
 Gebote auf-zwingen.
 commandments AUF-force.INF
 ‘The church must not force dogmas and commandments on the entire society.’*
- b. *Lehrende dürfen ihren Schülern nicht ihre Meinung auf-nötigen.
 teachers must their students not their opinion AUF-force.INF
 ‘Teachers must not force their opinion on their students.’*

The third meaning associated with *auf* in particle verb constructions is ‘open’. This use can be historically traced back to its shared origin with the adverb *offen* ‘open’ (Grmc. **up(o)* ‘auf’; **upena* ‘offen’ < IE **upo*). Examples of verbs with *auf* in this sense are given in (116).

- (116) a. *Peter machte die Tür auf.*
 Peter made the door AUF
 ‘Peter opened the door.’
- b. *Die Eichhörnchen knacken die Nüsse mit ihren scharfen Zähnen auf.*
 the squirrels cracked the nuts with their sharp teeth AUF
 ‘The squirrels cracked the nuts open with their sharp teeth.’

Like *offen*, *auf* can be used in predicative constructions, semantically denoting the removal of a barrier that makes some region inaccessible, whether the barrier is a physical part of the verbal object (117) or the object itself (118) (Lechler and Roßdeutscher 2009:44).

- (117) *Das Zimmer / das Gurkenglas / das Geschäft / das Auge ist auf / offen.*
 the room the cucumber.jar the shop the eye is AUF open
 ‘The room / the cucumber jar / the shop / the eye is open.’
- (118) *Die Tür / der Glasdeckel / der Riegel / das Augenlid ist auf / offen.*
 the door the glass.lid the bolt the eye-lid is AUF open
 ‘The door / the glass lid / the bolt / the eyelid is open.’

In this sense, *auf* typically combines with an activity verb in the terms of Vendler (1967), and the resulting particle verb can be viewed as a resultative construction where the particle refers to the resultant state or the outcome of an object being open, brought about by the action denoted by the base verb. For example, in *die Nuss aufbeißen* ‘to bite the nut open’, the nut is brought to a resultant state of being open, as indicated by the particle *auf*, through the action of an entity, for example a squirrel, biting it, denoted by the base verb *beißen* ‘to bite’. As Lechler and Roßdeutscher note, whether or not the interpretation of *auf* as open is possible mainly depends on encyclopaedic information, namely whether the object to which it refers can be described as open, conditioned by both the semantics of the base verb and the context.

Interestingly, *auf* in the sense of ‘open’ can also combine with accomplishment verbs whose inherent result state is the opposite, such as *schließen* ‘to close’, which denotes an ob-

ject's becoming closed. The combination of the particle and the verb, however, yields complex verbs that denote the opening of an object rather than its closure, thereby clearly illustrating the semantic contribution of the particle as a resultative predicate. Minimal pairs illustrating the semantic contrast between verbs with and without the particle *auf* are given (119).

- (119) a. *die Tür schließen* 'to lock the door'
 die Tür aufschließen 'to unlock the door'
- b. *die Schnürsenkel knoten* 'to tie the shoelaces'
 die Schnürsenkel aufknoten 'to untie the shoelaces'
- c. *die Tür sperren* 'to lock the door'
 die Tür aufsperren 'to unlock the door'
- d. *das Hemd knöpfen* 'to button the shirt'
 das Hemd aufknöpfen 'to unbutton the shirt'

Verbs in which the result expressed or implied by the base verb is reversed through the addition of a particle that contradicts this result were first observed by Stiebels (1996) and later referred to as *pseudo-reversatives* by McIntyre (2002). Although such verbs are largely absent in English, they are well-attested and productive in German.

A meaning of *auf* that can be understood as a conceptual extension of its *open* meaning is its marking of partition. Just as the *open* meaning denotes the transition of an entity from a closed, unified state to one in which its internal contents become physically accessible (e.g., the opening of a container), the partition meaning marks in a more abstract sense the decomposition of an integrated whole into its constituent parts. Examples are given in (120).

- (120) *die Torte aufschneiden* to cut up the cake
 die Kosten aufgliedern to break down the costs
 den Text in Abschnitte auftrennen to separate the text into sections
 den Konzern aufsplitten to split up a corporation

All four semantic meanings of *auf* introduced so far, namely its denotation of upward movement, support relations, openness, and partition, can be classified as resultative. In each case, *auf* indicates that, as a result of the action denoted by the base verb, an entity or a part of it has either moved to a higher position, come into a relation of support with another object, become open, or been divided into parts.

3.2.2 Idiosyncratic *auf*

In addition to the resultative meanings of *auf* discussed above, there are two further uses of *auf* that are seemingly completely unrelated to any of the patterns discussed so far. First, *auf* may denote summation, referring to actions that construct a set or collection from the entities denoted by the direct object of the verb (121).

- | | | |
|-------|------------------------------|--------------------------------|
| (121) | <i>Namen auflisten</i> | to list up names |
| | <i>Perlen aufreihen</i> | to make a string out of pearls |
| | <i>Beiträge aufsummieren</i> | to sum up the figures |

Auf can also contribute a meaning of planning or anticipation, as illustrated by verbs such as *aufpassen* ‘to keep an eye on’, *aufwarten* ‘to wait on’, and *Geld aufsparen* ‘to save money’. In these cases, the particle conveys the agent’s orientation toward a future action or event, involving readiness to act later, waiting for an anticipated event, or setting resources aside for later use. Crucially, neither of these two uses of *auf* is connected to the semantics of *auf* in its prepositional or adverbial use. They can therefore, to some extent, be considered idiomatic meanings that *auf* acquires only in its function as a verbal particle.

3.2.3 Aspectual *auf*

Finally, *auf* has two aspectual meanings that provide information about the lexical aspect of the complex verb. First, *auf* marks something’s being or coming to be (sensually or cognitively) perceived (122).

- | | | | |
|-------|-----------------------|-----------------|---------------|
| (122) | <i>auffallen</i> | lit. auf-fall | to stand out |
| | <i>aufmarschieren</i> | lit. auf-march | to march in |
| | <i>aufspüren</i> | lit. auf-detect | to track down |
| | <i>aufzeigen</i> | lit. auf-point | to point out |
| | <i>aufmerken</i> | lit. auf-notice | to notice |

Previous analyses have treated this sense of *auf* as an aspectual marker associated with short-duration events. Stiebels (1996), for example, argues that *auf*-particle verbs typically denote punctual events or events of short duration, as illustrated by *aufflimmern* ‘to flicker up’ in (123a), where *auf* commonly combines with verbs like *flimmern* ‘to flicker’ that denote optical or acoustic qualities inherently dependent on perceptual events.

- (123) *Eine der Szenen hat sogar auffällige Verfärbungen, die aber glücklicherweise*
 one of scenes has even noticeable stainings REL but fortunately
nur kurz auf-flimmern, bevor sich das Bild wieder beruhigt.
 only briefly AUF-flicker before REFL the picture again calms
 ‘One of the scenes even has noticeable stainings, which, however, luckily only flicker up briefly before the picture gets back to normal.’

Lechler and Roßdeutscher (2009), however, present examples where events expressed by *auf*-particle verbs may also develop gradually or persist over a longer period of time. In (124), for instance, *aufflimmern* refers to longer lasting events of flickering since it is made clear in the context that these events last for the duration of an ice hockey match. On this basis, they propose that *auf* should more accurately be analysed as marking the onset of an event or state, with its duration determined by the event structure of the base verb, the presence of temporal adverbials, and contextual information.

- (124) *Ab Freitag werden in tschechischen Wohnzimmern, Bars und Gaststätten*
 from Friday will in Czech living.rooms bars and pubs
wieder verstärkt die Fernsehgeräte auf-flimmern. Und zwar in
 again increased the TV.sets AUF-flicker.INF and indeed in
schöner Regelmäßigkeit bis einschließlich zum 13. Mai. Denn
 nice regularity until including to.the 13th May for
genau in den dazwischen liegenden siebzehn Tagen wird in den
 exactly in the in.between lying seventeen days becomes in the
russischen Städten Moskau und Mytishi die 71. Weltmeisterschaft
 Russian cities Moscow and Mytishi the 71st world.championship
im Eishockey aus-getragen.
 in.the ice.hockey AUS-carry.PTCP

‘From Friday onward television sets will flicker up again more frequently in Czech living rooms, bars and restaurants. This will happen regularly until 13 May because exactly on the 17 days in between the 71st world championship in ice hockey will take place in the Russian cities Moscow and Mytishi.’ (Lechler & Roßdeutscher 2009: 38)

Another meaning of *auf* that contributes to the aspectual composition of the complex verb is that *auf* marks the total affectedness of an object involved in a deconstructive or consumptive action contributed by the base verb. A non-exhaustive list of particle verbs with egressive *auf* is given in (125).³⁹

³⁹The list is based on that provided by Lechler and Roßdeutscher (2009), which includes verbs with which the particle *auf* is used in a sense comparable to the German adjective *alle* ‘all’. However, the classification adopted by the authors is largely based on conceptual criteria, and some of the verbs they include do not align with the notion of egressive *auf* adopted in the present study, where the particle is analysed as encoding egressivity, i.e., the termination of an event, independently of additional resultative or idiosyncratic meanings. For this reason, all verbs listed in Lechler and Roßdeutscher (2009) were checked against their definitions in Duden online (<https://www.duden.de>). An egressive use of *auf* was identified only where the dictionary entry explicitly contains expressions such as *völlig* ‘completely’, *zu Ende* ‘to the end’, or *nicht länger* ‘no longer’, which clearly indicate the endpoint of an event. Verbs that do not meet this criterion were excluded from the list in (125). Excluded examples include *aufopfern* ‘to sacrifice’, *auftragen* ‘to apply’, *auffüttern* ‘to feed up’, and *aufsacken* ‘to store in sacks’.

(125) Particle verbs with egressive *auf*

auffressen ‘to devour completely (of animals)’, *auffuttern* ‘to eat up’, *aufkaufen* ‘to buy up’, *aufknabbern* ‘to nibble up’, *aufflutschen* ‘to suck up’, *aufrauchen* ‘to smoke up’, *aufschlucken* ‘to swallow up’, *aufzehren* ‘to consume entirely’, *aufreiben* ‘to wear out’, *aufarbeiten* ‘to work through’, *aufbekommen* ‘to eat up (a portion, colloq.)’, *aufgehen* ‘to add up (to leave no remainder)’, *aufräumen* ‘to clear up’, *aflösen* ‘to dissolve/to resolve completely’, *auftrinken* ‘to drink up’

Note that many of the verbs listed in (125) are polysemous, and not all of their uses can be categorised as expressing an egressive meaning. For example, *aufarbeiten* can mean ‘to finish off something’, in which case the particle is used in an egressive sense, but the verb also has an idiosyncratic meaning ‘to refurbish’. Similarly, the verb *aufgehen* can denote a wide range of meanings including ‘to rise’, ‘to open’, or ‘to become understandable’, but the egressive use of *auf* arises only when the verb denotes ‘to leave no remainder/to divide exactly’. The discussion that follows in this chapter concerns only the egressive use of the particle and does not extend to its idiosyncratic or other non-aspectual uses.

Functioning similarly to the German adjective *alle* ‘all’ (Lechler and Roßdeutscher 2009), this egressive meaning of *auf* has frequently led to its analysis as a telicity marker in the literature, since its addition to an atelic activity verb obligatorily induces an event-type shift to a telic predicate (Penner et al. 2003; Schulz et al. 2001; van Hout 1998). This effect is illustrated by the contrast between the simple verb *essen* ‘to eat’ and the particle verb *aufessen* ‘to eat up’. While *essen*, when used without an object, is incompatible with temporal *in*-adverbials, which can only modify telic predicates (126a), and does not entail that the culmination point of the eating event is reached (127a), *aufessen* is compatible with *in*-adverbials (126b), and it is infelicitous to cancel the entailment that the culmination point is reached (127b).

- (126) a. **Er hat in zehn Minuten gegessen.*
 he has in ten minutes eat.PTCP
 ‘He ate in ten minutes.’
- b. *Er hat in zehn Minuten auf-gegessen.*
 he has in ten minutes AUF-eat.PTCP
 ‘He ate up in ten minutes.’
- (127) a. *Er hat gegessen, aber es ist noch was übrig.*
 he has eat.PTCP but it is still some left
 ‘He ate, but there is still something left.’
- b. #*Er hat auf-gegessen, aber es ist noch was übrig.*
 he has AUF-eat.PTCP but it is still some left
 ‘He ate it up, but there is still something left.’

Furthermore, as shown in Section 2.1.1, egressive particles neither function as copular predicates nor allow quantificational modification, as illustrated with egressive *auf* in (128).

- (128) a. *Peter aß einen Apfel auf.*
 Peter ate an apple AUF
 ‘Peter ate up an apple.’
- b. **Der Apfel ist (teilweise / völlig / ganz) auf.*
 the apple is partly completely completely AUF
 Intended meaning: ‘The apple is partly / completely eaten up.’

To summarise, this section has introduced the three uses of *auf* in particle verb constructions: resultative, aspectual, and idiosyncratic. In its resultative uses, *auf* contributes meanings of upward movement, support, openness, or partition, each of which encodes a result state brought about by the event denoted by the base verb. In its aspectual uses, *auf* encodes either the initiation or the termination of an event, functioning as an inceptive or egressive marker respectively. In its idiosyncratic uses, the meaning of *auf* is neither

resultative nor aspectual, and the interpretation of the particle verb cannot be compositionally derived from the meanings of its parts.

In the next section, I argue that these three uses differ not only semantically but also structurally. The central claim is that the interpretive variation of *auf* is not a matter of lexical ambiguity but follows from differences in the syntactic position into which the particle is merged.

3.3 The framework

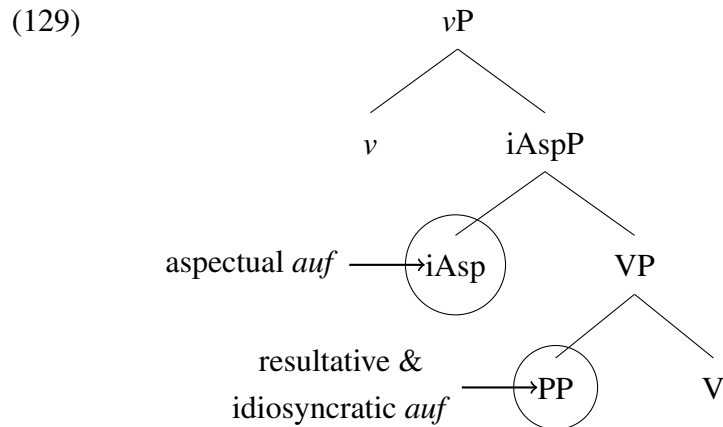
This section develops a syntactic analysis of the polysemy of the German verbal particle *auf*. The analysis is situated within the family of approaches commonly referred to as neo-constructionist approaches to verbal aspect, which assume that aspectual meaning is directly encoded in the syntax (among others, Borer 2005a, 2005b; Hale & Keyser 1993; MacDonald 2008b; Ramchand 2008; Travis 2010). Among the different approaches within this general tradition, I align most closely with those developed by Ramchand (2008), Travis (2010) and MacDonald (2008b), according to which vocabulary items can carry a limited amount of syntactically relevant information, including, crucially for the present discussion, specifications with respect to event features. Accordingly, vocabulary items are treated in the analysis below as being directly inserted into syntactic nodes. This perspective is adopted primarily because it allows the interpretive contribution of a given item, i.e., the particle *auf*, to be related transparently to the features it carries and the position in which it is merged. Therefore, it contrasts with purely constructionist approaches such as Borer's (2005a, 2005b) XS Model, in which listemes do not carry grammatical information, and all such information is instead supplied by the syntactic structure into which they are inserted. It also differs from frameworks such as DM, where syntax manipulates only abstract roots and feature bundles, and where phonological exponents are inserted only post-syntactically.

Despite their differences, all these approaches share the assumption that syntactic structure and, in some cases, vocabulary items themselves can encode information relevant to formal semantic properties such as telicity. The differences between them may ultimately reduce to the

extent to which the labor is distributed between lexicon and syntax, and how fine-grained the resulting classification of verb classes turns out to be (Alexiadou 2015). In Ramchand's system, for example, verbs are classified in relatively fine-grained terms, with each verb lexically specified for realising one or more features in its specification. This is obviously not the case in Borer (2005a, 2005b), and approaches working within DM occupy an intermediate position, typically assuming a coarse-grained classification (e.g., Harley 2005). In Section 3.4.1, I return to this issue and discuss how the present proposal can be extended to a DM-style architecture.

Returning to the German particle *auf*, I propose that its interpretive variation follows from its position in the syntactic structure. In particular, I propose that in its aspectual uses, the particle is merged in a functional head *iAsp* located between *vP* and *VP*, where it encodes inner aspect via its event feature specification, and together with elements in its *c-command* domain, determines the aspectual properties of the predicate. The contrast between inceptive and egressive interpretations is derived from the different feature specifications that *auf* contributes when merged in *iAsp* (cf. Section 3.2.3). In the resultative and idiosyncratic uses, by contrast, the particle is merged lower in the structure, more specifically in the complement of *V*, where it expresses the result state of the event denoted by the base verb. The two uses differ in their interpretive mechanism: resultative readings arise compositionally, while idiosyncratic readings draw on stored lexical information specified for the particle verb construction. The structure in (129) illustrates the different syntactic positions associated with each use of the particle.⁴⁰

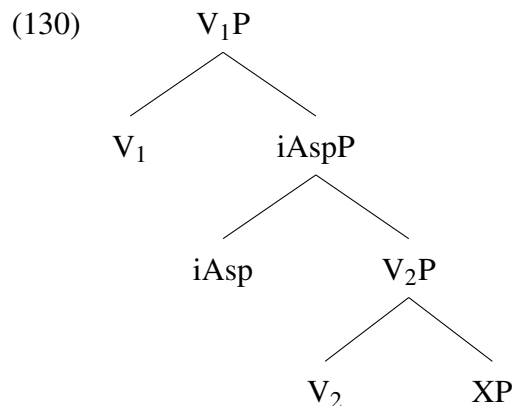
⁴⁰German is traditionally assumed to have head final VPs; the structures for German examples are therefore represented accordingly throughout this chapter.



Before turning to the analysis of each individual use of the particle *auf*, I first motivate the postulation of a functional projection for inner aspect within the verbal domain. The proposal is based on the idea put forward by Travis (2010), whose account is introduced in detail below.

3.3.1 A projection for inner aspect

Travis (2010) proposes an aspectual projection *iAspP*, which encodes inner aspect and is located between two verbal layers, as shown in (130).



Both *V₁P* and *V₂P* are lexical projections: *V₁* introduces the external argument and carries a meaning comparable to CAUSE, while *V₂* introduces the Theme argument in its specifier and an XP in its complement, which may encode the endpoint of an event. Furthermore, *V₁* and *V₂* differ in their event-structural features. *V₁* is specified for [$\pm$ process] (Verkuyl

1993): [+process] characterises event types with dynamic progression (e.g., activities and accomplishments), whereas [–process] characterises event types that lack temporal progression (e.g., states and achievements). V_2 , by contrast, encodes telicity via the feature [$\pm$ telic], where [+telic] and [–telic] correspond to telic and atelic event types, respectively.

The iAspP is proposed to be a functional projection, and its existence is primarily motivated by aspectual morphology in Tagalog and Navajo, where inflectional material associated with aspectual meaning appears between the idiosyncratic, lexical components of a complex predicate. In Tagalog, for example, an unaccusative verb can be transitivised by the prefix *pag-*, as shown with the unaccusative verb *tumba* ‘to fall down’ in (131). Since *pag-* introduces an external argument, it is analysed as occupying V_1 , with the unaccusative verb occupying V_2 .

- (131) a. $\sqrt{\text{tumba}}$ fall down
 b. *t-um-umba* X fall down
 c. *m-pag-tumba* Y knock X down
 (Travis (2010: 7), cited from Maclachlan (1989))

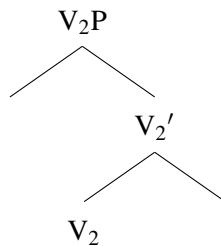
In addition, Tagalog has two sets of aspectual morphemes: (i) *n-/in-*, which encodes that an event has begun, and (ii) a reduplicative morpheme (RED) marking an event as incomplete. The former appears before the prefix *pag-*, while the latter surfaces between *pag-* and the root, as shown by the imperfective form of *tumba* in (132). Taking the surface order of morphemes to reflect hierarchical structure, Travis crucially analyses the reduplicative morpheme as occupying the iAsp head situated between *pag-* in V_1 and the root $\sqrt{\text{tumba}}$ in V_2 (TM in (132) for topic marker).

- (132) *nagtutumba* ‘is taking out’

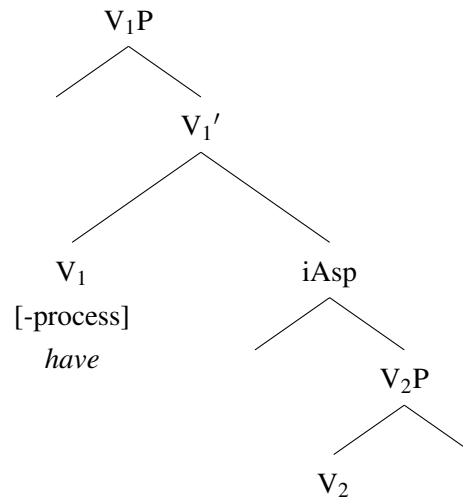
n	+	m	+	pag	+	RED	+	tumba
E ⁴¹	+	TM	+	V_1	+	iAsp	+	V_2

Inside the verbal domain, variations of V_1P , V_2P , and $iAspP$ in the configurations give rise to different Aktionsarten. States, for instance, may have two different structures depending on their transitivity (133). Intransitive states (e.g., *stay*, *lie*, *live*) consist solely of V_2P ; transitive states (e.g., *know*, *respect*, *fear*) additionally project V_1P , with V_1 hosting a *have*-type stative verb and being specified for [-process].

(133) a. State



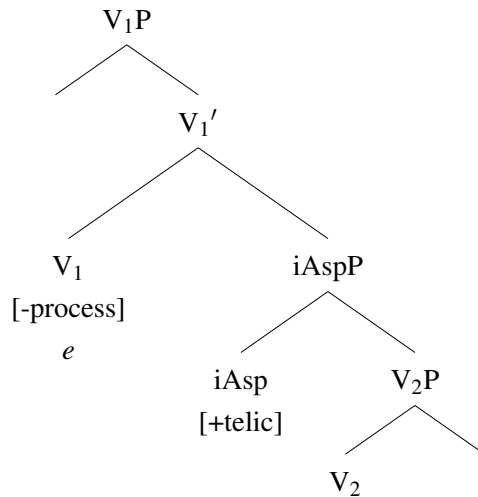
b. Transitive state



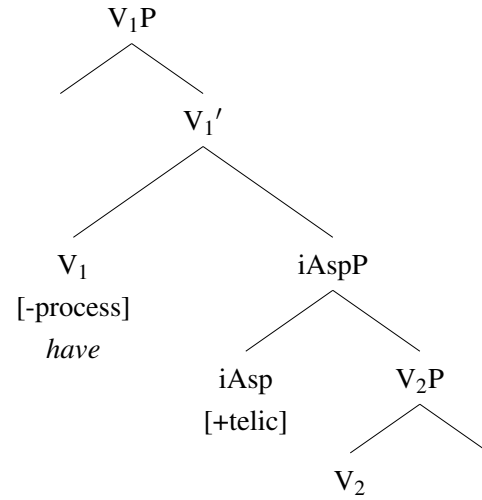
Achievements, depending on whether they are transitive or not, also have two possible structures. They have in common that both contain V_1P and V_2P , with V_1 specified as [-process] and the intervening $iAsp$ marked as [+telic], as both encode events with an endpoint. They differ, however, in that V_1 for unaccusative achievements (e.g., *arrive*, *die*, *fall*, *appear*) simply encodes the fact that the event is dynamic (indicated by *e* in V_1 in (134a)), whereas V_1 for transitive achievements (e.g., *find*, *discover*, *notice*, *remember*) hosts a *have*-style verb.

⁴¹The inceptive morpheme is analysed as occupying a higher functional head $E(vent)$ above V_1 . Following Higginbotham (1985), Travis (2010) argues that the primary function of EP is to bind the event argument of the verb.

(134) a. (Unaccusative) Achievement

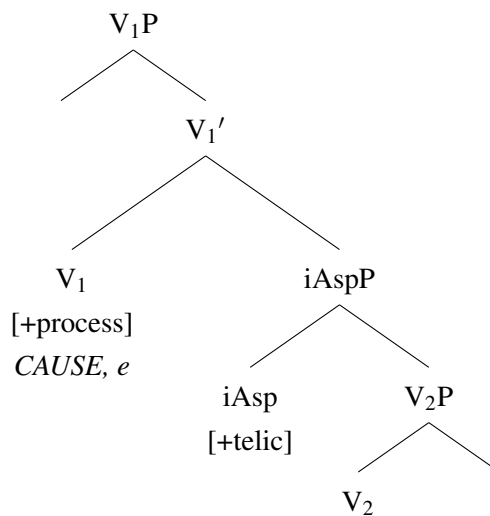


b. Transitive achievement

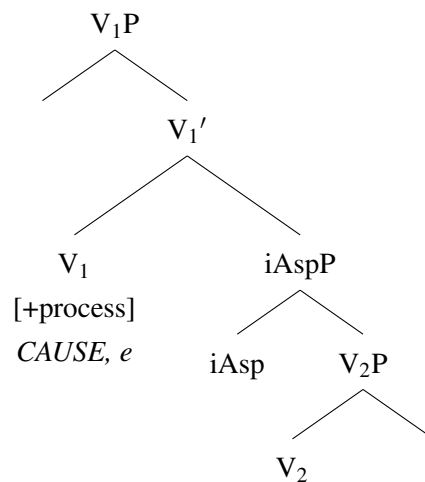


Finally, the structures proposed for accomplishments and activities are given in (135). They differ from states and achievements in that they are durative and therefore have a [+process] specification in V_1 . Furthermore, both predicate types are dynamic and involve a volitional agent, which is reflected by the presence of e and CAUSE in V_1 . The two structures differ only in the specification of the iAsp head: in accomplishments, iAsp is specified as [+telic], whereas in activities it lacks this specification.

(135) a. Accomplishment

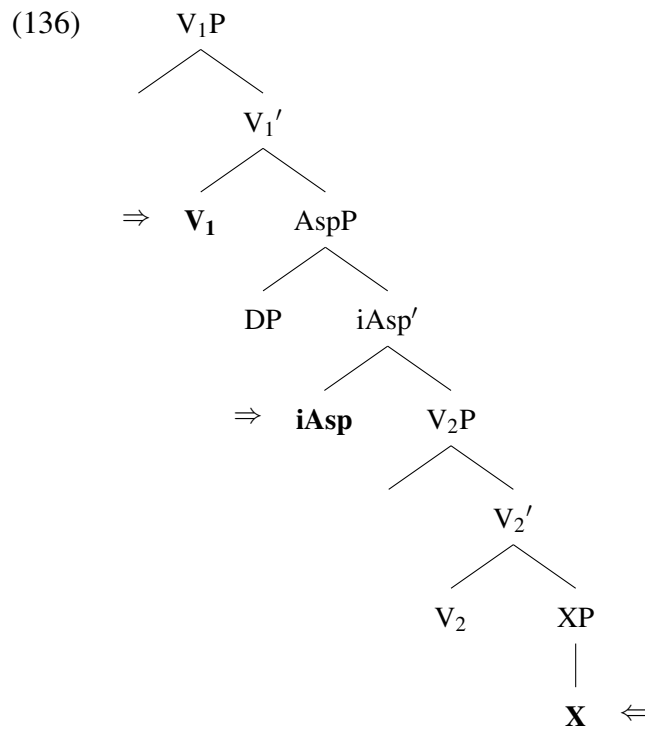


b. Activity



It can be seen that, similar to Ramchand (2008), who derives traditional event types through different combinations of the subevent heads *init*, *proc*, and *res*, Travis (2010) likewise derives them through different combinations of V_1 , V_2 , and the specification of aspectual features in iAsp. Furthermore, she agrees with Ramchand (2008) that verbs are specified with respect to which subevents they can instantiate. The crucial difference between the two approaches lies in the ontological status of the projection responsible for telicity. In Ramchand's system, telicity does not arise from a single dedicated source: it can be contributed either by the presence of *resP* or by a path-denoting DP or PP in the complement of *proc*, where a bounded path forces a bounded reading of the process. Telicity is thus a consequence of independently motivated event-structural and thematic configurations rather than the contribution of any single head. By contrast, Travis posits a dedicated functional projection for the encoding of inner aspect, which gives her account a clear empirical advantage in accounting for data from languages such as Tagalog, where inner aspect can be manipulated by the insertion of morphemes directly into this head.

As indicated by the [telic] feature in iAsp, the primary function of this aspectual head is to mark whether an event has an endpoint, i.e., its telicity. However, other than being marked in iAsp, Travis proposes that telicity can also be encoded in two other places in the structure: in V_1 and in the complement of V_2 by an XP. The three potential loci of telicity marking are indicated with arrows in the tree in (136).



Of particular relevance to the present discussion is the position XP, which, according to Travis (2010), is the only locus used for encoding telicity in Germanic languages. In most cases, XP is realised by a lexical category, typically an AP or PP, and denotes the natural endpoint of an event. In English, for example, the otherwise atelic verb *push* can receive a telic interpretation through the addition of a PP, as illustrated in (137).

(137) a. The child pushed the cart (*in three minutes/✓for three minutes).

b. The child pushed the cart to the wall (✓in three minutes/*for three minutes).

In addition to APs or PPs, a quantised object in English and German can also measure out an event and give rise to a telic interpretation. As mentioned in Section 2.1.2, this is particularly the case with incremental theme verbs (138).

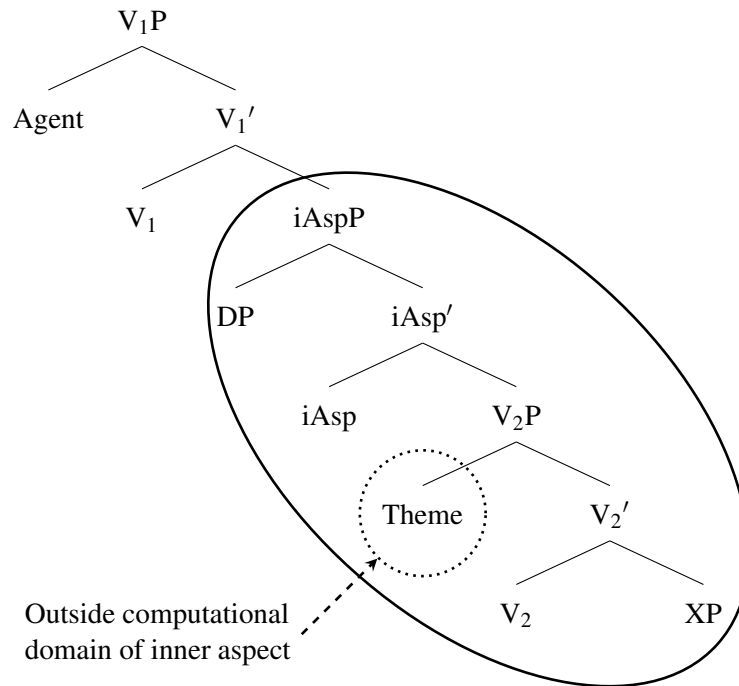
(138) a. The child ate apples (*in three minutes/✓for three minutes).

b. The child ate an apple (✓in three minutes/*for three minutes).

According to Travis, the internal arguments of transitive verbs are merged in SpecV₂P, which lies outside her proposed computational domain of inner aspect. This domain includes iAsp, its specifier, its complement, and the complements embedded within that complement, as illustrated in (139). For Travis, the exclusion of the Theme in SpecV₂P follows from the assumption that specifiers do not participate in aspectual composition: only heads and their complements along the event spine contribute to the calculation of inner aspect. The sole exception is Spec_iAspP, which interacts with iAsp via specifier–head agreement. SpecV₂P is thus the only constituent that falls within the c-command domain of iAsp while remaining outside the computational domain of inner aspect.⁴² In cases where the quantification of the internal object influences the telicity of the predicate, Travis proposes that the relevant object obligatorily moves to Spec_iAspP in order to enter into an agreement relation with iAsp, a mechanism that resembles range assignment to the head of Asp_QP in Borer (2005b). Together, ‘the verb head, the object (in Spec_iAspP), and the goal/result XPs’ constitute the elements that determine the specification of the [telic] feature on iAspP in Germanic languages (Travis 2010: 118).

⁴²The notion of computation domain in Travis (2010) is therefore used in a different sense from the one familiar from Phase Theory (Chomsky 2000 and subsequent work), where it corresponds to the complement of a phase head and includes all syntactic material within it.

(139) Computational domain of inner aspect (adapted from Travis 2010: 119)



In cases where both an XP and an object are present, it is the quantisation of the latter that ultimately determines the telicity of the predicate. This is clearly illustrated in (140): replacing the quantised object in (137b) with a bare plural renders the predicate atelic, despite the presence of a directional PP.

(140) The children pushed carts to the wall (*in three minutes/✓for three minutes).

Travis argues that this follows from the scope relation between the event-measuring DP (*the cart/carts*) and the telicity marker, here the PP *to the wall*. Syntactically, the relevant scope configuration is established by the DP occupying SpecAspP and c-commanding the PP in the complement of V_2 . Semantically, this allows the quantisation of the DP to take scope over the telicity marker, with the result that the DP determines the overall telicity of the predicate.

As an interim summary, the discussion above has presented Travis's (2010) proposal that aspectual properties are encoded by a dedicated functional projection *iAsp* within the verbal domain, which directly motivates the use of *iAsp* in the present analysis. However, Travis's

account is not adopted here in full, and two limitations in particular call for adaptation before it can be applied to the German aspectual particles.

The first concerns the syntactic position that Travis (2010) assigns to verbal particles in German and other Germanic languages, which are treated on a par with other telicity-inducing elements such as resultative APs and PPs and are accordingly analysed as merged in the complement of V_2 . Their low syntactic position is argued to explain why, although these particles may contribute aspectual meaning, it is ultimately the quantisation of the object DP that determines the telicity of the predicate. Travis derives this effect by proposing that the object DP moves to the specifier of *iAsp* (for reasons that remain unclear), from where it c-commands the particle in the complement of the verbal head. However, as already shown in Section 2.1.2, the generalisation that the quantisedness of the object DP determines the telicity of the predicate does not hold for egressive particle verbs in German.

In addition to egressive particles, Travis also discusses inceptive particles, drawing on data from Dutch, as shown in (141).

- (141) a. *reizen - afreizen* ‘travel - set out to travel’
 b. *varen - afvaren* ‘drive (by boat) - start driving (by boat)’
 c. *rijden - aanrijden* ‘drive - start driving’
 d. *fietsen - aanfietsen* ‘bicycle - start bicycling’
 (Travis 2010: 257)

For these particle verbs, Travis argues that telicity is still determined by the quantisation of the underlying object, which surfaces as the subject in unaccusative constructions via movement. The example she provides is given in (142).

- (142) *Zeemannen zijn jarenlang afgereisd naar Indonesië vanaf deze haven*
 sailors are years-long off-traveled to Indonesia from this harbor
 ‘Sailors have for years set off for Indonesia from this harbor.’
 (Travis 2010: 258)

To ensure, in her words, ‘a consistent analysis of all of these [aspectual] particles’, Travis proposes that inceptive particles, like egressive ones, should also be analysed as merged in the complement of V_2 . The desideratum of consistency, however, cannot on its own justify the analysis. As argued in Section 2.3, treating all uses of German particles as merged in a single syntactic position runs into systematic empirical and theoretical difficulties: it fails to capture the marked semantic divergence among resultative, aspectual, and idiosyncratic uses, and provides no principled account of the contrasts that emerge in their respective syntactic behaviour.

This relates to a further limitation of Travis’s framework, one shared with much previous work on the syntax of inner aspect, namely that iAsp is taken to encode only the endpoint of events, typically formalised as a [+telic] feature. Such a representation cannot be straightforwardly extended to the German particle *auf*, which in its aspectual uses contributes both egressive and inceptive meaning. More generally, it fails to capture the full range of aspectual contrasts attested in the inceptive domain.

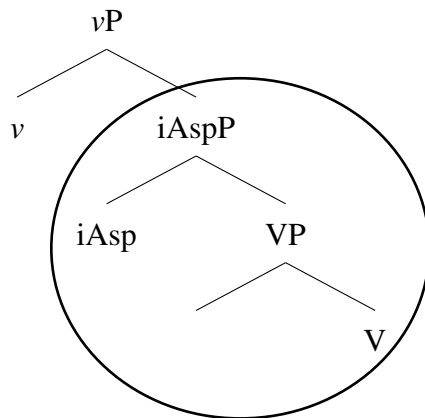
In light of these limitations, I adopt from Travis’s framework only the proposal of an inner aspect projection iAsp, and depart from her analysis in two important respects. First, I propose that the various meanings of verbal particles in German follow from the distinct syntactic positions they occupy. Taking *auf* as an example, I argue that the particle is merged in iAsp in its aspectual uses (Section cf. 3.3.2), but in the complement of V_2 in its resultative and idiosyncratic uses (cf. Sections 3.3.3 and 3.3.5). Second, I extend the feature inventory of iAsp to include a second event feature, [init], alongside [telic], which targets the initial boundary of events (see Section 3.3.2). In doing so, I follow, among others, Piñón (1997), Bar-el (2005), and Rozwadowska (2020), who likewise argue for the importance of incorporating the notion of inceptivity into the classification of event types.

Subsequent sections develop the syntactic analyses of the aspectual, resultative, and idiosyncratic uses of *auf* in detail.

3.3.2 Analysis of aspectual *auf*

I have proposed that *auf* is merged in the functional head iAsp in its aspectual uses, with its specific interpretation determined by the aspectual features it introduces. At the same time, aspectual features are not confined to iAsp alone: they may also be specified elsewhere in the syntactic structure, in particular within the complement of V. I therefore propose that the aspectual properties of predicates are compositionally derived from features not only on iAsp, but also on the domain it c-commands. On this basis, I define the computational domain of inner aspect as shown in (143).

(143) Computational domain of inner aspect



To capture both inceptivity and telicity within a unified system of inner aspect, I propose that inner aspect is encoded in the syntax by two event features: [init] and [telic]. Both are privative features and are interpreted as temporal points corresponding to the beginning and the end of an event, respectively. They should therefore not be understood as representing temporal intervals or as corresponding to durative subevents. In this respect, the present proposal differs from earlier approaches that analyse the beginning of an event as a temporally extended interval (e.g., Pustejovsky 1991) or its end as involving a resultant state (e.g., Ramchand 2008): in the present system, [init] and [telic] denote nothing more than punctual boundaries, and neither feature is associated with an extended subevent of any kind. However, one point that should be noted is that although [telic] encodes the terminal boundary of an event and not, in itself, a

resultant state, any structure containing a resultative predicate necessarily involves [telic], since a result state necessarily presupposes a terminal event boundary that the [telic] feature encodes.

The presence of [init] and [telic] reflects whether the beginning and end of an event are grammaticalised. A specification of [init] indicates that the initiation of the event is explicitly encoded as a time point in iAsp and in the semantics of the verb, while the absence of [init] indicates that no such grammaticalisation takes place. Similarly, a specification of [telic] indicates that the culmination of the event is encoded in iAsp and hence in the semantics of the verb, while its absence indicates that no such endpoint is grammatically represented.

A note of clarification is in order regarding the label [init], which is also used in Ramchand (2008) but with a different theoretical interpretation. In the present system, [init] is a purely featural specification that marks the presence of an initiation point in the event structure; it does not correspond to a dedicated syntactic projection. By contrast, Ramchand's *initP* is a structural layer in the syntax, forming part of a decompositional event hierarchy. Closely related to this, Ramchand's *initP* introduces the external argument of the event, namely the initiator, in its specifier, whereas [init] in the present proposal has no argument-introducing function. Instead, the external argument is introduced independently in *vP*, and is thus dissociated from the encoding of aspectual information.

The two notions also differ in their semantic content. In Ramchand's framework, *initP* encodes causation and agency, thereby conflating the initiation of an event with the presence of an initiator. In the present system, by contrast, [init] simply encodes the existence of an initial boundary, independently of whether an agent or causer is involved. Finally, whereas Ramchand's projections correspond to subevents in a decompositional event structure, the features [init] and [telic] operate at a more abstract level, specifying boundary properties without committing to a particular event decomposition.

With the definition of these two event features in place, I propose that the aspectual class of a predicate is determined by how it is specified with respect to [init] and [telic]. I propose that statives are specified for neither [init] nor [telic], as they describe non-dynamic situations

without grammatically encoded initial or terminal boundaries. Activities are specified for [init] but not [telic]: the presence of [init] marks the event as dynamic by encoding its initiation point, while the absence of [telic] reflects the atelic nature of activities: no terminal boundary is grammatically represented, rendering the event aspectually unbounded. The absence of [telic] does not entail that the event lacks an endpoint in the real world; rather, it reflects the fact that the culmination is not grammatically encoded.

Accomplishments are the mirror image of activities, being specified for [telic] but not [init]. The absence of [init] does not imply that accomplishments denote events that lack an initiation altogether; rather, [init] is simply unnecessary for the characterisation of accomplishments. The presence of [telic] not only captures the telic nature of the event but also semantically entails the existence of an initiation point: a telic event is necessarily dynamic and therefore has an initiation point by implication, which need not be independently encoded as a grammatical feature to be present in the interpretation. Finally, achievements are specified for both [init] and [telic]. Their punctual interpretation encodes a relation of coincidence between the initial and terminal boundaries of the event, which requires the presence of both features in the syntax. This relation is syntactically represented by the two features being hosted on a single head, namely iAsp. The presence of [init] is necessary in this case, as otherwise no coincidence of boundaries can be established and the punctual interpretation cannot be derived.

The feature specifications corresponding to the different aspectual classes are summarised in Table 3.1.

Aspectual predicate type	[init]	[telic]
Achievement	[init]	[telic]
Accomplishment	–	[telic]
Activity	[init]	–
Stative	–	–

Table 3.1: Event feature specifications of different aspectual classes

It can be seen that in the present system, the presence of [telic] alone is sufficient to classify a predicate as telic. Within the class of telic predicates, [init] is required only for achievements, whose punctual interpretation depends on the initial and terminal event boundaries coinciding at both semantic and syntactic levels. Semantically, the two boundaries coincide in being interpreted as a single temporal point; syntactically, they coincide in being encoded by the co-occurrence of [init] and [telic] on a single head.

The proposal that the punctuality of achievements is captured syntactically by the co-occurrence of two boundary-marking event features on a single head draws on MacDonald (2008b). Like Travis (2010), MacDonald (2008b) develops a syntactic framework of inner aspect that posits an aspectual projection AspP between ν P and VP in the verbal domain. For reasons of terminological consistency, I refer to this projection as iAspP. However, unlike in Travis (2010) where iAsp is only specified for [+telic] or its absence, MacDonald (2008b) proposes that iAsp can be specified for two independent event features, $\langle ie \rangle$ and $\langle fe \rangle$, representing the beginning and end of an event, respectively.⁴³ Similar to the [init] and [telic] features defined in the present study, MacDonald (2008b) defines $\langle ie \rangle$ and $\langle fe \rangle$ to refer to temporal points marking the initial and terminal boundaries of events, rather than extended phases. Furthermore, both features are proposed to behave like other interpretable features, such as ϕ -features, in being part of the lexical specification of certain elements (e.g., verbs, prepositions) and visible to syntactic operations.

MacDonald (2008b) defines the feature specifications of the four Vendlerian event types in terms of $\langle ie \rangle$ and $\langle fe \rangle$ as follows. States are taken not to project iAsp at all, which sets them apart from eventive predicates, in which iAsp is always present. Among eventive predicates, activities denote events with an initial boundary only and are accordingly specified for $\langle ie \rangle$. Accomplishments and achievements, by contrast, denote events with both an initial and a final boundary, and both feature specifications $\langle ie \rangle$ and $\langle fe \rangle$ are present in their structures.

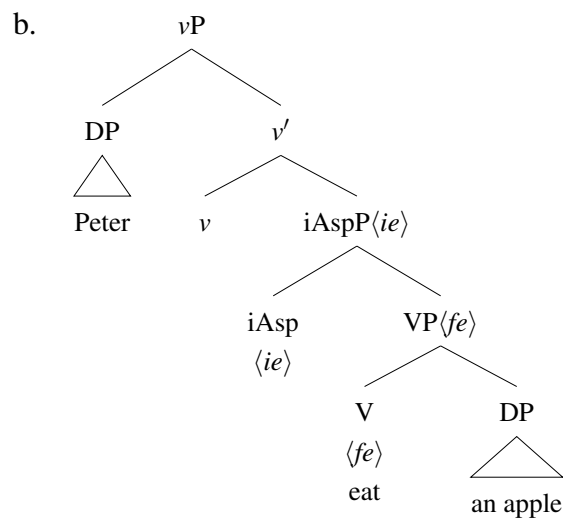
⁴³While $\langle ie \rangle$, if present, is always realised on iAsp, this is not the case for $\langle fe \rangle$, which may be realised on iAsp as well as on the head of VP or PP. A more detailed discussion follows.

What distinguishes the two, on MacDonald's account, is therefore not their event feature specifications, but the structural configuration in which $\langle ie \rangle$ and $\langle fe \rangle$ appear.

For accomplishments, MacDonald (2008b) proposes that $\langle ie \rangle$ and $\langle fe \rangle$ stand in a c-command relation, such that the temporal interval is interpreted as extending from the beginning to the end of the event described by the predicate. In these cases, $\langle ie \rangle$ is realised on iAsp, whereas $\langle fe \rangle$ may be realised either on V or on P, depending on whether the accomplishment is formed by an incremental theme verb or by the addition of a PP to an activity verb. The former are referred to by MacDonald (2008b) as *standard accomplishments* and the latter as *PP-accomplishments*. Examples of both types, along with their proposed syntactic structures, are given in (144) and (145), respectively.

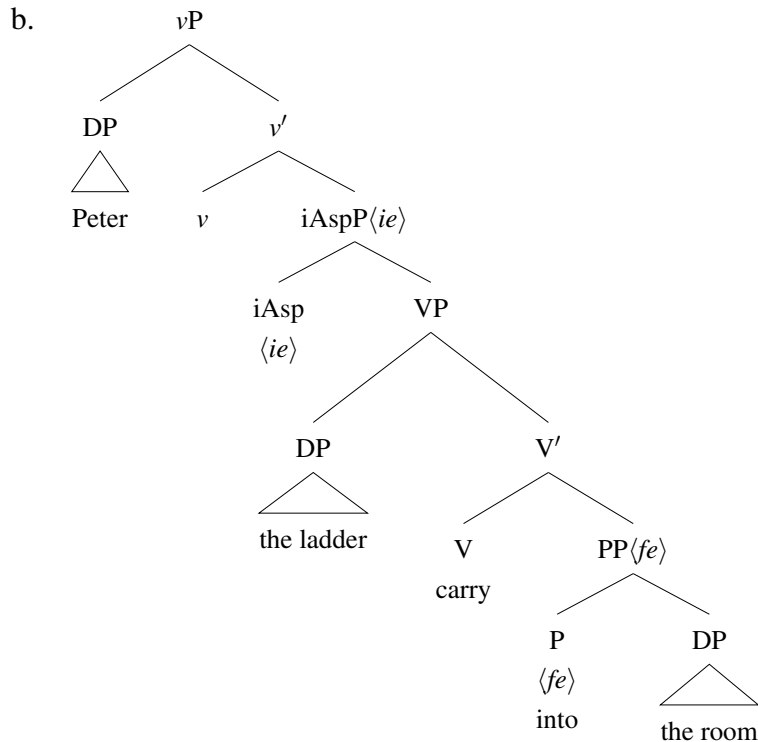
(144) Standard accomplishments

a. Peter ate an apple.



(145) PP-accomplishments

a. Peter carried the ladder into the room.



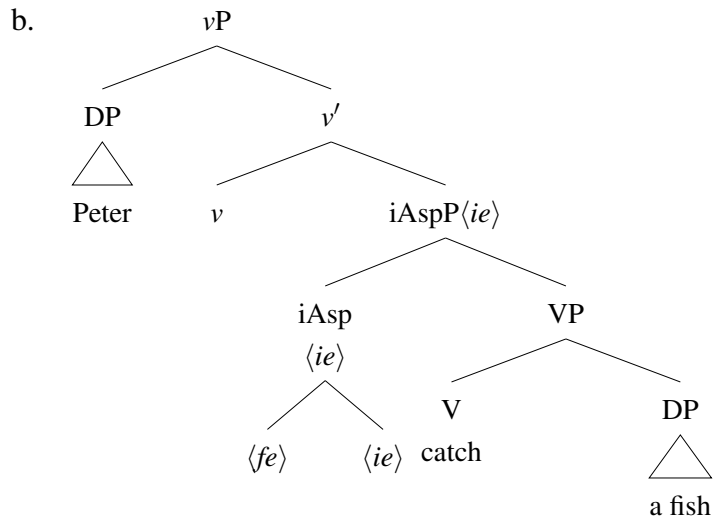
By contrast, for achievements, both <ie> and <fe> are realised on *iAsp*, as illustrated in (146).⁴⁴ Since both features are hosted on the same head, no temporal interval is interpreted between the beginning and the end of the event. In other words, the initial and terminal boundaries coincide, giving rise to the punctual nature of achievements.

⁴⁴ Two points are worth noting here. First, note that although both <ie> and <fe> are realised on *iAsp* in (146), only <ie> projects to *iAspP*. It is therefore predicted that only the initial boundary of achievements is accessible to modification by event structure modifiers such as *it takes x-time* and *almost*, whereas in accomplishments both the initial and the terminal boundaries are accessible, since <ie> and <fe> are realised on separate heads. This explains why accomplishments are ambiguous between a start-time and an end-time reading with *it takes x-time*, and between a counterfactual and an incomplete reading with *almost*, while achievements admit only the start-time and counterfactual readings, since only <ie> is accessible to modification.

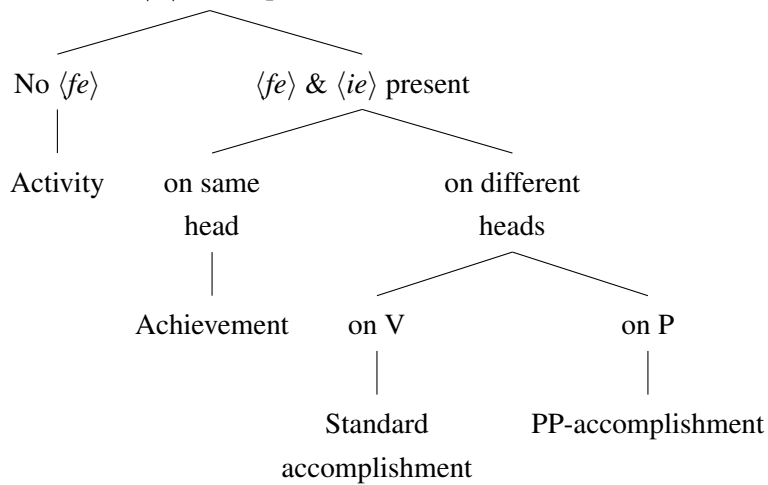
Furthermore, for achievement verbs, neither event feature is specified on the verb. For independent reasons, MacDonald (2008b) proposes that there are no genuine achievement verbs in the lexicon. Rather, all achievements are derived via the conflation of a lexical category with a null preposition (Hale & Keyser 2002; Hale & Keyser 1993). The null preposition carries the feature <ie> or <fe>, which is later projected in syntax onto *iAsp*.

(146) Achievements

a. Peter caught a fish.



A summary of the event feature specifications of different eventive predicate types is given in (147) (MacDonald 2008b: 79).

(147) Eventives: *iAspP* present(*<ie>* on *iAsp*)

The present system resembles that of MacDonald (2008b) in two respects. First, both frameworks assume two event features, which target the initial and the terminal boundary of events respectively, and their combination gives rise to predicates of different aspectual types.

Second, in both frameworks, the punctual semantics of achievements is encoded syntactically by merger of the initial-boundary and terminal-boundary features on a single head, which reflects the semantic identification of the initial and terminal timepoints.

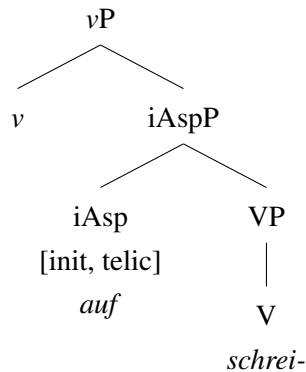
The two systems differ, however, in the role of the initial-boundary feature. In MacDonald (2008b), the feature $\langle ie \rangle$ does not itself distinguish between event types: as shown in (147), all eventive predicates contain $\langle ie \rangle$, and event classification is determined entirely by the presence and structural position of $\langle fe \rangle$. In the present proposal, by contrast, [init] is an aspectually contrastive feature. As specified in Table 3.1, it serves to distinguish achievements, which are specified for both [init] and [telic], from accomplishments, which are specified only for [telic], as well as from activities, which are specified only for [init]. In particular, the absence of [init] in accomplishments does not imply the absence of an initial boundary. Rather, in the present system, the presence of [init] entails that the initial boundary is singled out as a punctual transition and thus plays a central role in the aspectual interpretation of the predicate. Accordingly, [init] is reserved for predicates whose aspectual contribution is to foreground the initial boundary, as in activities, and for predicates in which this boundary is essential to their interpretation, as in achievements. Accomplishments meet neither condition: their initial boundary forms part of a temporally extended structure spanning the event from beginning to end. Grammatically specifying the initial boundary in the presence of the terminal boundary would thus be unnecessary, and indeed dispreferred on grounds of economy of representation (Chomsky 1991). I therefore assume that [telic] alone suffices both to mark accomplishments as telic and to distinguish them from atelic activities.

In addition to distinguishing achievements from accomplishments, [init] plays a further contrastive role in distinguishing inceptive from egressive particles. This distinction will be illustrated in detail in the next two subsections using the particle *auf*. I begin with an analysis of its inceptive use.

3.3.2.1 Analysis of inceptive *auf*

I propose that, in its inceptive use, *auf* is merged in the functional head *iAsp* and introduces the features [init] and [telic]. Under this analysis, the syntactic structure of the particle verb *aufschreien* ‘to shout out’ is as shown in (148).

(148)



Given that both event features are specified on a single head, predicates containing inceptive *auf* are predicted to be achievements, according to the feature system proposed above. The event feature specification of inceptive *auf* is primarily motivated by its semantics: as introduced in Section 2.2.3, inceptive *auf* frequently combines with activity verbs that denote perception, sound emission or emotional expression, and thereby marks the onset of the event. Furthermore, it often introduces a punctualising effect and yields particle verbs that denote achievements. The relevant examples are repeated in (149).

(149) Inceptive *auf*-

- | | | | |
|----|------------------------------------|---|--|
| a. | <i>hören</i> ‘to listen carefully’ | → | <i>aufhören</i> ‘to become alert’ |
| b. | <i>lachen</i> ‘to laugh’ | → | <i>aufhachen</i> ‘to start laughing’ |
| c. | <i>schreien</i> ‘to scream’ | → | <i>aufschreien</i> ‘to scream out’ |
| d. | <i>weinen</i> ‘to cry’ | → | <i>aufweinen</i> ‘to burst into tears’ |

The proposed analysis of inceptive *auf* not only captures its inceptive and punctual meaning, but also makes correct predictions about the eventive structure of the predicate that

previous analyses of verbal particles fail to derive. As discussed in Section 2.3, many existing accounts of German verbal particles assume that particles occupy a single syntactic position regardless of their semantic contribution, and the designated position for particles is typically the complement of V. Within neo-constructionist approaches to verb semantics, however, syntactic structure is taken to reflect event structure directly: each projection in the verbal domain corresponds to a distinct subevent, and the relation between adjacent projections is interpreted as a causal or a ‘lead-to’ relation between the subevents they denote. Accordingly, the complement of V, parallel to the *resP* of Ramchand (2008), is interpreted as denoting a result state that is brought about by the event encoded in VP (see also Acedo–Matellán & Mateu 2014; Harley 2008; Marantz 1997; Mateu & Acedo-Matellán 2012). As a consequence, analyses that merge the particle in the complement of V derive a bi-eventive structure: the predicate contains both a process subevent contributed by the lexical verb and a result-state subevent contributed by the particle, with the former understood as causing the latter. The two subevents are structurally distinct and are interpreted as temporally ordered. By contrast, under the present proposal, where the particle is not merged in the complement of V but instead occupies the functional head *iAsp*, no independent result state is introduced. The predicate is therefore predicted to be mono-eventive.

This structural contrast yields a clear empirical prediction: if particles are merged in the complement of V, the resulting predicates should exhibit bi-eventive behaviour, whereas particles merged in *iAsp* should give rise to mono-eventive predicates. The following diagnostics for bi-eventivity in German show that only the latter prediction is borne out.

The first diagnostic concerns the interpretation of predicates in combination with durative adverbials, which may give rise to a result state-related (RS-related) reading or an eventuality-related (E-related) reading (Piñón 1999). In the RS-related reading, the durative measures the duration of a result state caused by the event, whereas in the E-related reading, it measures the duration of the event itself. It therefore follows that mono-eventive predicates combined

with durative adverbials should allow only the E-related reading, as they lack a result-state subevent that can be targeted by the RS-related interpretation.

According to Piñón (1999), in German the RS-related and E-related readings can be distinguished by different adverbials. E-related readings are expressed by durative adverbials containing *lang* ‘long’, whereas RS-related readings are expressed by durative adverbials headed by the preposition *für* ‘for’. For example, (150a), with the *lang*-adverbial, yields an E-related reading in which Peter repeatedly opened the window for five minutes, while (150b), with the *für*-adverbial, yields an RS-related reading in which the window remained open for five minutes after the opening event.

- (150) a. *Peter hat das Fenster fünf Minuten lang geöffnet* (Piñón 1999: 421)
 Peter has the window five minutes long open.PTCP
 ‘Peter opened the window (repeatedly) for five minutes.’ (E-related reading)
- b. *Peter hat das Fenster für fünf Minuten geöffnet* (ibid.)
 Peter has the window for five minutes open.PTCP
 ‘Peter opened the window for five minutes.’ (RS-related reading)

Turning now to particle verbs with inceptive *auf*-, these verbs predominantly denote punctual events and are therefore generally incompatible with durative adverbials of any kind. In the cases where they do combine with durative adverbials, they occur with *lang*-adverbials and yield only an E-related reading.

- (151) a. *Das sind die trockenen Zahlen, die einen einen Moment lang*
 this are the dry numbers which one a moment long
auf-horchen lassen und dann vergessen gehen.
 AUF-listen.INF let and then forget.INF go
 ‘Those are the dry figures that make one sit up and take notice for a moment,
 and then get forgotten.’

(NZZ am Sonntag (5 March 2023) <https://www.alexandria.unisg.ch/server/api/core/bitstream/c386a449-b64c-4c36-b685-610f37bbb3b4/content>)

- b. *Die Erleichterung ließ sie **einen irrsinnigen Moment lang** auf-lachen.*

the relief let her a crazy moment long AUF-laugh.INF

‘The relief made her burst out laughing for a crazy moment.’

(*Schattenzeit*, Arenz 2008: 11)

- c. *Als sie ihren Namen hörte, horchte sie **einen Moment lang** auf.*

when she her name heard listened she a moment long AUF

‘When she heard her name, she became alert for a moment.’

At the same time, some variation in judgements can be observed. Many of my German native speaker consultants report that replacing the *lang*-adverbial in (151) with duratives headed by *für* is acceptable. According to their judgments, the two forms are frequently interchangeable in modern spoken German when used with duration expressions. Crucially, however, regardless of whether *lang*- or *für*-adverbials are used, the duration is restricted to short intervals, such as *einen Moment* ‘for a moment’, *ein Augenblick lang* ‘for a moment’, or *eine Minute* ‘one minute’ (with the latter already judged marginal by some speakers), and the sentence consistently receives an E-related reading. Longer durations, such as *zehn Minuten* ‘ten minutes’, are entirely unacceptable, and they never give rise to an RS-related reading.⁴⁵ The particular fact that inceptive *auf*-verbs such as *aufschreien* never allow an RS-related reading with duratives indicates that they lack a result-state component.

⁴⁵A Google search yielded a few exceptional examples in which *aufhorchen* appears with durative adverbials denoting longer durations. In these cases, however, the particle verb seems to have the non-inceptive meaning of merely ‘paying attention’, without contributing the inceptive meaning normally associated with the particle.

- (i) *Mozart, Bach alt, Bach jung – dies die Trias, mit der Bozzetti und Dipper **eine gute Konzertstunde lang** auf-horchen ließen.*
 Mozart Bach old Bach young this the triad with which Bozzetti and Dipper one good
 concert.hour long AUF-listen.INF let
 ‘Mozart, old Bach, young Bach – this was the triad with which Bozzetti and Dipper commanded attention for a good concert hour.’
 (<https://www.muensterschezeitung.de/lokales/staedte/muenster/musik-mit-hoher-sinnlichkeit-1455903>)

Another diagnostic of bi-eventivity concerns the interpretation of predicates in combination with the adverb *wieder* ‘again’. Like its English counterpart *again*, *wieder* in German is ambiguous between a restitutive and a repetitive reading: the former refers to the restoration of a prior state, whereas the latter denotes the repetition of an event.⁴⁶ As illustrated in (152), the sentence is ambiguous between these two interpretations: on the repetitive reading, Peter has opened this particular window before and opens it again; on the restitutive reading, Peter opens the window, thereby restoring a state in which the window had previously been open, but it is not necessary that he opened the window before.

(152) *Peter hat das Fenster wieder geöffnet.*

Peter has the window again open.PTCP

Repetitive: ‘Again, Peter opened the window.’

Restitutive: ‘Peter opened the window, and the window had been opened before.’

This ambiguity has been argued by several scholars to be structural.⁴⁷ For example, von Stechow (1996) proposes that on the repetitive reading, *wieder* is merged above vP, whereas on the restitutive reading it is attached lower in the structure, immediately above the VP-internal result PP. Similarly, Pittner (2003) argues that the interpretation of *wieder* depends on the syntactic constituent with which it is associated: when adjoined to the minimal verbal domain,

- (ii) *Zwei junge Cellistinnen ließen 30 Minuten lang auf-horchen und es gibt ja wirklich kaum etwas Attraktiveres als Frauen mit Cello.*
 two young cellists let 30 minutes long AUF-listen.inf and it gives MP really
 hardly something more.attractive than women with cello
 ‘Two young cellists commanded attention for 30 minutes, and there really is hardly anything more attractive than women with cellos.’
 (<https://www.innsbruck.info/blog/de/events/hilfe-ein-konzert/>)

⁴⁶The two readings may, however, be disambiguated by stipulating the position of *wieder*. For instance, when *wieder* appears before the object, only the repetitive reading is available (i). I will not pursue this issue further here; see Pittner (2003) for a detailed discussion.

- (i) *Peter hat wieder das Fenster geöffnet.*
 Peter has again the window open.PTCP
 ‘Again, Peter opened the window.’

⁴⁷But see Dowty (1979), Fabricius-Hansen (2001), Jäger and Blutner (2003), and Reyle et al. (2007) for analyses that account for this ambiguity in terms of lexical ambiguity rather than structural ambiguity.

it modifies a situation-internal result state, yielding a restitutive reading; when attached to a higher verbal projection, it modifies the entire eventuality, producing a repetitive interpretation. Crucially, this ambiguity arises only when the verb implies a result state. In the absence of such a resultative component, the restitutive reading is unavailable, and *wieder* receives only the repetitive interpretation, as shown by the activity verb *singen* ‘to sing’ in (153).

- (153) *Peter hat wieder gesungen*
 Peter has again sing.PTCP
 ‘Peter sang again.’ (Repetitive)

Testing the compatibility of particle verbs with inceptive *auf*- and *wieder*, it can be seen that no ambiguity arises; only the repetitive reading is available. This suggests that these verbs are mono-eventive and lack a distinct result-state subevent.

- (154) a. *Das Kind hat wieder auf-gehorcht / auf-gelacht / auf-geschrien*
 the child has again AUF-listen.PTCP AUF-laugh.PTCP AUF-shout.PTCP
/ auf-geweint.
 AUF-cry.PTCP
 ‘The child took notice / burst out laughing / let out a scream / cried out again.’
 (Repetitive)

The final diagnostic for event structure concerns *-ung* nominalisation, with *-ung* being a suffix in German that derives nominals from verbs in a productive yet restricted manner. According to Roßdeutscher and Kamp (2010), the internal structure of a verb determines whether a corresponding *ung*-nominal can be formed. Specifically, verbs with a bi-eventive structure allow corresponding *-ung* nominals, whereas mono-eventive verbs do not. To illustrate how mono- and bi-eventive verbs behave differently in this respect, compare the *-ung* nominals derived from change-of-state verbs in (155) with those derived from simple activity verbs in (156).

- (155) a. *säubern* ‘to clean’ → *Säuberung* ‘cleaning’
 b. *schärfen* ‘to sharpen’ → *Schärfung* ‘sharpening’
 c. *trocknen* ‘to dry’ → *Trocknung* ‘drying’
- (156) a. *arbeiten* ‘to work’ → **Arbeitung*
 b. *essen* ‘to eat’ → **Essung*
 c. *malen* ‘to draw’ → **Malung*

Applying this diagnostic to particle verbs with inceptive *auf*-, it becomes apparent that such verbs do not form *-ung* nominals, which further supports the conclusion that they are mono-eventive.

- (157) **Aufhorch-ung* (become alert-ing)
 **Auflach-ung* (burst into laughter-ing)
 **Aufschrei-ung* (scream out-ing)
 **Aufwein-ung* (burst into tears-ing)

To summarise, particle verbs with inceptive *auf*- do not combine with RS-related adverbials, yield only the repetitive reading with *wieder*, and do not form *-ung* nominalisations. Taken together, these diagnostics indicate that such verbs are mono-eventive predicates and their syntactic structure does not include a result-state component. This is predicted by the proposed analysis of inceptive *auf*-verbs, but not by previous analyses that position the particle in the complement of V.

One potential issue that bears on the high merger of inceptive *auf* in iAsp concerns its interaction with resultative predicates. If the particle is not merged in the complement of V, one might expect that this position could still be occupied by a resultative XP. However, this is not borne out empirically: particle verbs with inceptive *auf* do not combine with secondary resultative predicates, as shown by the ungrammatical, though conceptually possible examples in (158).

- (158) a. **Er schrie heiser auf.*

he screamed hoarse AUF

Intended meaning: ‘He screamed out and as a result, he became hoarse.’

- b. **Sie lachte zu Tränen auf.*

she laughed to tears AUF

Intended meaning: ‘She burst into laughter so suddenly and intensely that it brought her to tears.’

- c. **Der Verletzte stöhnte müde auf.*

the injured groaned tired AUF

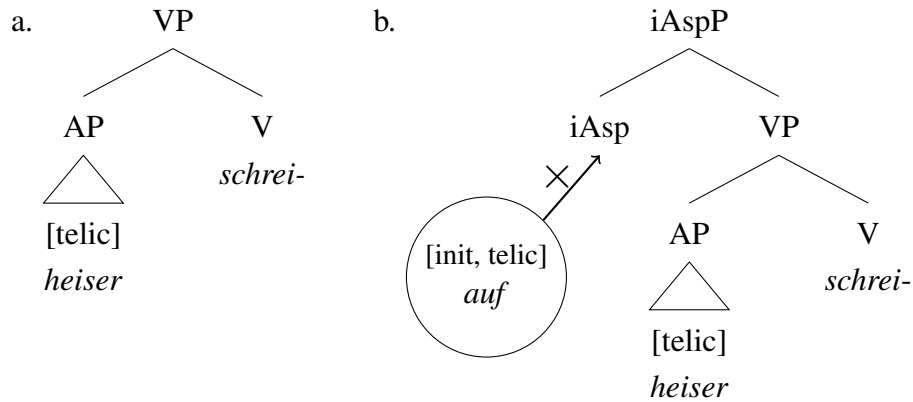
Intended meaning: ‘The injured person gave a sudden groan and as a result felt tired immediately.’

The incompatibility of inceptive *auf*-particle verbs with resultative XPs, I argue, follows from the order in which event features are introduced into the derivation. Given the widely assumed semantic properties of the complement of V introduced above, namely that it encodes the telos or resultativity of an event, I propose that any phrase merged in this position has its head specified for the [telic] feature. When iAsp is subsequently merged above VP, the presence of [telic] within its c-command domain renders any further specification of [telic] on iAsp redundant, as duplicate specification of the same feature within a single extended projection is ruled out by principles of economy (cf. Chomsky 1995). Consequently, the early merger of a resultative phrase in the complement of V blocks any further specification of [telic] on iAsp, and thus prevents the insertion of inceptive *auf*, which is specified for both [init] and [telic].

This blocking effect can be concretely illustrated with the example in (158a). The derivation begins with the merger of the verb with the resultative AP in the complement of V, where the head of the AP introduces the feature [telic] (159a). When the resulting VP subsequently merges with iAsp, the feature [telic] is already present within its domain and therefore blocks the re-specification of [telic] on iAsp itself (159b). As a result, the inceptive *auf*, which

requires an iAsp head specified for both [init] and [telic], cannot be inserted, and the derivation of the inceptive *auf* co-occurring with a resultative XP is therefore ruled out.

(159)



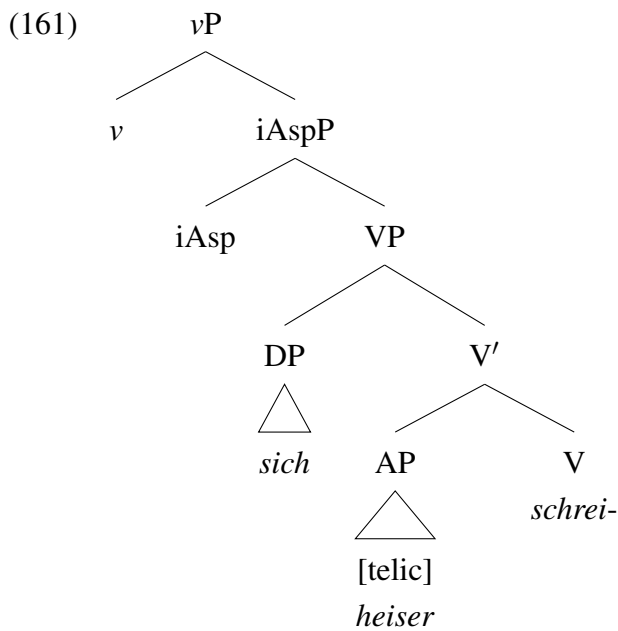
The mechanism at issue closely parallels Borer's notion of range assignment (Borer 2005a, 2005b), on which an open functional value may be assigned a range either directly or indirectly, but only once: simultaneous assignment by more than one range assigner yields vacuous quantification and is consequently ungrammatical. The same logic applies here. Once [telic] has been introduced into the derivation by the resultative XP, the same feature on iAsp is no longer available, since its presence would amount to a redundant specification of an already-saturated value.

Although inceptive *auf* is incompatible with secondary resultative predicates, the corresponding base verbs readily co-occur with resultative phrases. In such cases, a reflexive object is obligatory, as illustrated in (160).

- (160) a. *Er schrie sich heiser.*
 he screamed REFL hoarse
 'He shouted himself hoarse.'
- b. *Sie lachte sich zu Tränen.*
 she laughed REFL to tears
 'She laughed herself to tears.'

- c. *Der Verletzte stöhnte sich müde.*
 the injured groaned REFL tired
 ‘The injured person groaned himself tired.’

Taking (160a) as an example, I propose that it has the VP-structure in (161). As only [telic] is present in the computational domain of inner aspect, the predicate is interpreted as an accomplishment. Resultative constructions are discussed in more detail in Section 3.3.3.

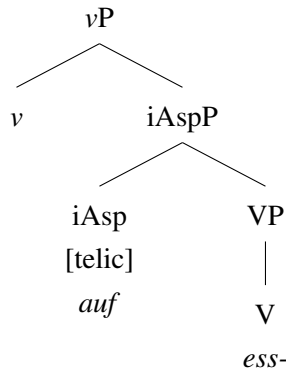


In the next subsection, I turn to the other aspectual use of *auf*, where it expresses egressivity.

3.3.2.2 Analysis of egressive *auf*

I propose that egressive *auf* realises only the [telic] feature on *iAsp*, and accordingly yields a telic interpretation. The syntactic structure of the particle verb *aufessen* ‘to eat up’ under this analysis is given in (162).

(162)



As with particle verbs containing inceptive *auf*, those with egressive *auf* cannot co-occur with resultative phrases of any kind, as illustrated in (163).

(163) a. **Er aß den Teller leer auf*

he ate the plate empty AUF

Intended meaning: 'He ate his plate empty.'

b. **Sie brauchte den Akku alle auf*

she used the battery empty AUF

Intended meaning: 'She used up the battery.'

c. **Er arbeitete die Akten zu Ende auf*

he worked the files to end AUF

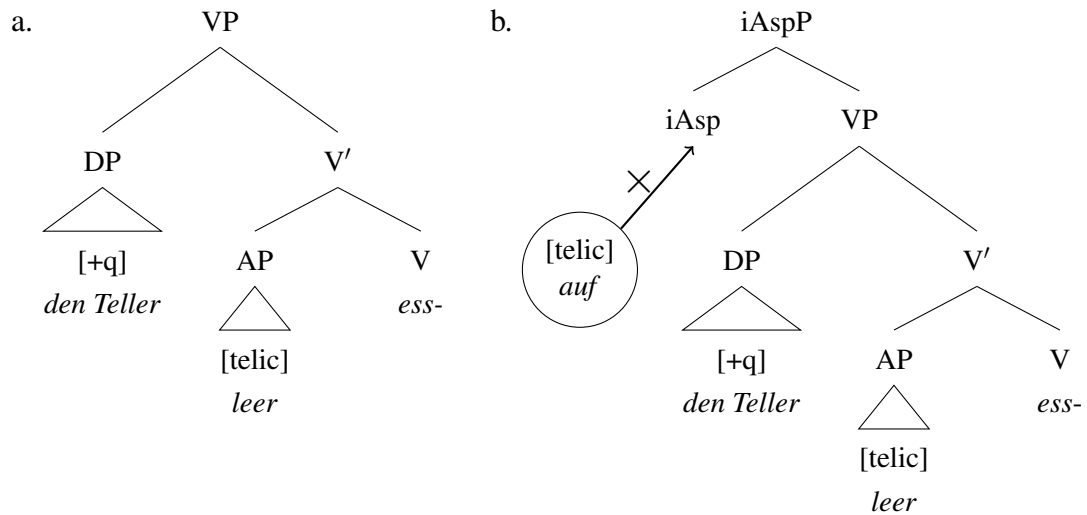
Intended meaning: 'He worked through the files to completion.'

As in the case of inceptive *auf*, I argue that the incompatibility of particle verbs containing egressive *auf* with secondary resultative predicates follows from the early merger of the resultative phrase in the complement of V. Such a phrase is specified for [telic] on its head and introduces this feature into the syntactic structure. When iAsp is subsequently introduced into the structure, [telic] is already present within its c-command domain, and any further specification of [telic] on iAsp would be redundant. Since egressive *auf* realises [telic] on iAsp, the unavailability of [telic] on iAsp in the relevant configuration prevents *auf* from

being inserted into iAsp at all. The presence of a resultative phrase in the complement of V and the realisation of egressive *auf* in iAsp are therefore incompatible, and any derivation that attempts to combine them fails to converge.

The mechanism outlined above can be made concrete with reference to (163a). First, the verb merges with the resultative adjectival phrase *leer*, whose head is specified for [telic], as shown in (164a). When the resulting VP subsequently merges with iAsp, as in (164b), the presence of [telic] within its c-command domain precludes a duplicate specification of the same feature on iAsp. As a result, iAsp cannot bear the [telic] feature that egressive *auf* would realise, and the co-occurrence of egressive *auf* with a resultative phrase is correctly ruled out.

(164) **Er aß den Teller leer auf*.



Furthermore, as in the case of inceptive *auf*, analysing egressive *auf* as merged in iAsp predicts the resulting predicate to be mono-eventive, in contrast to analyses in which the particle is merged in the complement of V and the predicate is therefore bi-eventive. This prediction is also borne out. Recall the diagnostics for bi-eventivity introduced in Section 3.3.2.1. The first concerns the interpretation of durative adverbials. As discussed above, bi-eventive predicates are expected to allow both an RS-related reading, in which the durative measures the duration of the result state, and an E-related reading, in which it measures the

duration of the event itself. Mono-eventive predicates, by contrast, allow only the E-related reading. This diagnostic cannot be straightforwardly applied to verbs with egressive *auf*, since such predicates are inherently telic and therefore generally incompatible with durative adverbials (165a). However, in cases where the two do co-occur, only an E-related reading is available. For example, the only possible interpretations of (165b–c) are that the children spent hours engaged in tidying up their toys and that Peter spent hours working through the pending correspondence, respectively; no reading is available in which the durative measures the duration of a result state.

- (165) a. **Peter hat stundenlang den Apfel auf-gegessen.*

Peter has hours.long the apple AUF-eat.PTCP

‘Peter ate up the apple (*for hours).’

- b. *Die Kinder haben stundenlang ihre Spielsachen auf-geräumt.*

The children have hours.long their toys AUF-clear.PTCP

‘The children tidied up their toys (for hours).’

- c. *Peter hat stundenlang die unerledigte Korrespondenz auf-gearbeitet.*

Peter has hours.long the pending correspondence AUF-work.PTCP

‘Peter finished off the remaining correspondence (for hours).’

The second bi-eventivity diagnostic considered here is the *wieder*-test, according to which bi-eventive predicates are expected to admit both a repetitive and a restitutive reading of *wieder*, while mono-eventive predicates admit only the repetitive reading. Particle verbs with egressive *auf* pattern with mono-eventive predicates and admit only the repetitive reading, as shown by the examples in (166).

- (166) a. *Peter hat das Brot wieder auf-gegessen.*

Peter has the bread again AUF-eat.PTCP

✓Repetitive: ‘The eating-up event happened again.’

✗ Restitutive: ‘A previously eaten-up state of the bread is restored.’

b. *Sie haben die Vorräte wieder auf-gebraucht.*

they have the supplies again AUF-use.PTCP

✓ Repetitive: ‘The using-up of the supplies happened again.’

✗ Restitutive: ‘A previously exhausted state of the supplies is restored.’

One might object that the absence of the restitutive reading in (166) follows from the lexical semantics of the base verb rather than from the mono-eventive structure of the predicate. Indeed, as shown in Section 3.2.3, the verbs that combine with egressive *auf* predominantly denote consumptive or destructive actions (e.g., *essen* ‘to eat’, *schlucken* ‘to swallow’, *zehren* ‘to consume’), with the consequence that the affected object is no longer recoverable once the event has taken place: in (166a–b), a given loaf of bread, once completely eaten, no longer exists as that loaf, and a given stock of supplies, once exhausted, can be replenished only by acquiring new supplies, not by recovering the original ones.

The pattern in (167), however, shows that this objection cannot be sustained. The verb *aufarbeiten* is built on *arbeiten* ‘to work’, which is not a consumption or destruction verb in the standard sense. Yet the same restriction holds: the only felicitous reading of *wieder* is repetitive, picking out a new processing event applied to new outstanding correspondence. A restitutive reading would require the same correspondence to have returned to an unprocessed state and then been processed again, but this is semantically incoherent: once a given backlog has been cleared, it ceases to exist as a backlog, and any subsequent accumulation is a new backlog rather than a restoration of the original one.⁴⁸

(167) *Er hat die unerledigte Korrespondenz wieder auf-gearbeitet.*

he has the pending correspondence again AUF-work.PTCP

✓ Repetitive: ‘The working-through of the correspondence happened again.’

✗ Restitutive: ‘The correspondence is processed again.’

⁴⁸Judgements to this sentence appear to vary among German speakers. For some, the restitutive reading is entirely unavailable, whereas others find it acceptable in sufficiently supportive contexts. Even for the latter group, however, the reading remains markedly less natural than the repetitive interpretation.

Taken together, the patterns in (166) and (167) are precisely what the present analysis predicts. Since egressive *auf* is merged in iAsp and contributes [telic] without introducing a low result-state projection, the predicate is mono-eventive, and only the event-related repetitive reading of *wieder* is structurally available. The fact that the same restriction extends to *aufarbeiten*, despite the non-consumptive base verb, indicates that the absence of the restitutive reading is a structural property of the egressive construction rather than a lexical-semantic side effect of the meaning of the base verb.

The last diagnostic with respect to bi-eventivity is nominalisation with *-ung*: verbs with a bi-eventive structure allow corresponding *-ung* nominals, whereas mono-eventive verbs do not. Most particle verbs with egressive *auf* listed in Section 3.2.3, repeated below in (168), do not have *ung*-nominalisations.

(168) Particle verbs with egressive *auf*

auffressen ‘to devour completely (of animals)’, *auffuttern* ‘to eat up’, *aufkaufen* ‘to buy up’, *aufknabbern* ‘to nibble up’, *aufputschen* ‘to suck up’, *aufrauchen* ‘to smoke up’, *aufschlucken* ‘to swallow up’, *aufzehren* ‘to consume entirely’, *aufreiben* ‘to wear out’, *aufarbeiten* ‘to work through’, *aufbekommen* ‘to eat up (a portion, colloq.)’, *aufgehen* ‘to add up (to leave no remainder)’, *aufräumen* ‘to clear up’, *auflösen* ‘to dissolve/to resolve completely’, *auftrinken* ‘to drink up’

In the relatively rare cases where *-ung* nominals are attested, their meaning does not preserve the egressive interpretation of the particle; rather, they denote only the event described by the base verb, with the particle being semantically vacuous. For example, the nominal *Aufzehrung* denotes ‘consumption’ rather than ‘complete consumption’, as shown by its compatibility with the degree modifier *teilweise* ‘partial’ in (169a). The same holds for *Auflösung* ‘dissipation’ in (169b).⁴⁹

⁴⁹A similar pattern appears to hold for *Aufarbeitung*, where the nominal may simply denote the processing of, for example, files, without necessarily implying a completed or terminated state. Judgements vary, however. For some speakers, *die Aufarbeitung der Akten* ‘the *Aufarbeitung* of the files’ may also receive a reading referring to the state of having worked through the files completely. Beyond mere speaker variation, this may also raise the

- (169) a. *teilweise Aufzehrung der Versorgung / Versicherungssumme*
 partial consumption of.the supply insurance.sum
 ‘partial consumption of the supply / sum insured’
- b. *nur teilweise Auflösung der Nebeldecke gegen Abend*
 only partial AUF.dissolution the fog.cover towards evening
 ‘only partial dissipation of the fog cover towards evening’

Some attested nominals may reflect idiosyncratic meanings of the corresponding verbs rather than their egressive uses. For instance, *Aufarbeitung* can mean ‘renovation’ and likewise combines with *teilweise*, as shown in (170), which again indicates the absence of an egressive interpretation.

- (170) *Gegenstand dieser Ausschreibung ist die Lieferung, Montage sowie teilweise Aufarbeitung und Ergänzung von Mobiliar zur Umsetzung des Interior-Design-Konzeptes in der neuen Firmenzentrale der HPA.*⁵¹
 subject this tender is the delivery assembly as.well.as partial
 AUF.working and supplementation of furniture for.the implementation the
 interior-design-concept in the new company.headquarters the HPA
 ‘The subject of this tender is the delivery, assembly, as well as partial refurbishment and supplementation of furniture for the implementation of the interior design concept in HPA’s new company headquarters.’

Crucially, none of the attested nominals preserve the egressive meaning of the particle *auf* found in the corresponding particle verbs. Particle verbs with egressive *auf* thus fail all three diagnostics for bi-eventivity, which supports the conclusion that they are mono-eventive, as predicted by the present analysis.

broader question of what exactly *-ung* nominalisations do and do not diagnose with respect to event structure and resultativity.

⁵¹<https://ted.europa.eu/de/notice/-/detail/232225-2026>

One aspect where particle verbs with egressive *auf* differ from those where *auf* contributes an inceptive meaning is that the former can take objects, while the latter are mostly used intransitively. Recall that with morphologically simplex incremental theme verbs such as *essen* ‘to eat’, the quantity of the direct object affects the telicity of the predicate: a quantised object yields a telic interpretation, as evidenced by its compatibility with *in*-adverbials (171a), whereas a non-quantised object yields an atelic interpretation (171b).

- (171) a. *Peter hat einen/den Apfel in zehn Minuten gegessen.*
 Peter has an/the apple in ten minutes eat.PTCP
 ‘Peter ate the apple in ten minutes.’
- b. **Peter hat Äpfel / Reis in zehn Minuten gegessen.*
 Peter has apples rice in ten minutes eat.PTCP

This dependence on the quantisation of the object persists even in the presence of a resultative phrase. In (172), *essen* ‘to eat’ yields a telic interpretation when combined with a quantised object and a resultative AP (172a), whereas replacing the quantised DP with a bare plural renders the predicate atelic (172b–c).

- (172) a. *Das Kind aß (in drei Minuten) den Teller leer.*
 the child ate in three minutes the plate.SG empty
 ‘The child finished the plate (in three minutes).’
- b. *Das Kind aß (*in drei Minuten) Teller leer.*
 the child ate in three minutes plates.PL empty
 ‘The child ate plates empty (*in three minutes).’
- c. *Das Kind aß (drei Minuten lang) Teller leer.*
 the child ate three minutes long plates.PL empty
 ‘The child ate plates empty (for three minutes).’

However, as discussed in Section 2.1.2, this dependence on object quantisation disappears in the case of egressive particle verbs, as these verbs can occur without an overt object and

still yield a telic interpretation (173a). This pattern is unexpected under analyses in which telicity of predicates involving aspectual particles is still determined by the quantisation of the direct object.

(173) *Peter hat (in zehn Minuten) auf-geessen.*

Peter has in ten minutes AUF-eat.PTCP

‘Peter ate up (in ten minutes).’

At the same time, when a direct object is present with egressive *auf*, it must be quantised (174a). Replacing it with a non-quantised object renders the sentence ungrammatical rather than merely atelic for some speakers (174b), thus contrasting with the behaviour of simple verbs illustrated in (172).

(174) a. *Peter hat die Äpfel aufgegessen.*

Peter has the apples AUF-eat.PTCP

‘Peter ate up the apples.’

b. **/?Peter hat Äpfel aufgegessen.*

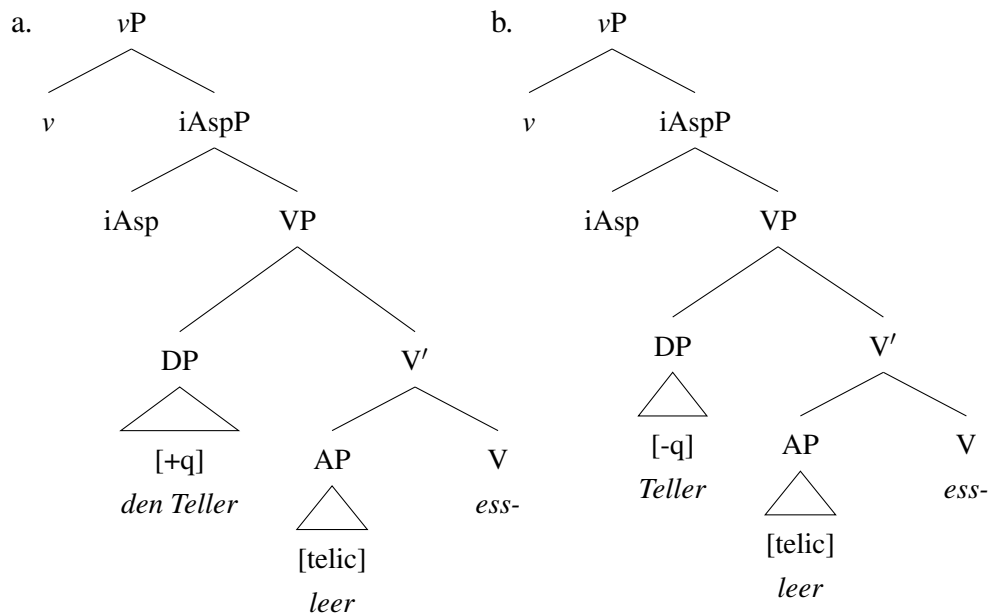
Peter has apples AUF-eat.PTCP

In the present analysis, the differing behaviour of morphologically simplex verbs and particle verbs with egressive *auf* with respect to the quantisation of the direct object can be explained in terms of their relative syntactic positions with respect to the object. In line with both Travis (2010) and MacDonald (2008b), I assume that the internal argument is generated in SpecVP. In configurations involving a resultative XP, the feature [telic] is introduced low in the structure, namely within the complement of V, and thus occupies a position below that of the object. Since the object DP c-commands [telic] in this configuration, I propose that it is the quantisation of the DP that determines whether the predicate as a whole is interpreted as telic or atelic.

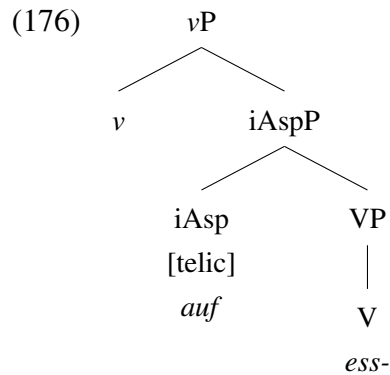
As a concrete illustration, the syntactic structures proposed for (172) are given in (175). The quantisation property of the object is marked with the feature [$\pm$ q(uantisation)]. In (175a), the

resultative AP *leer* carries [telic] in the complement of V, and the quantised object *den Teller* in SpecVP bears the feature [+q]. Since [+q] c-commands [telic], it is the value of the quantisation feature that determines the telicity of the whole predicate, yielding a telic interpretation. In (175b), the same resultative AP carries [telic], but the object *Teller* is a bare plural specified for [-q]. As the non-quantised object scopes over [telic], the predicate is interpreted as atelic.

(175)

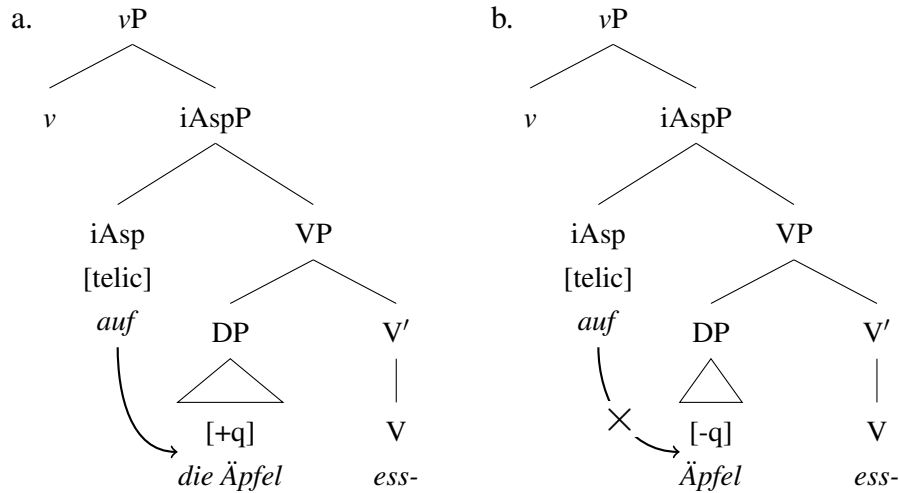


By contrast, in the presence of an egressive particle, the particle is merged in iAsp and blocks the occurrence of other telicity markers, such as resultative phrases, in the structure. As a result, [telic] is realised only on iAsp, where it crucially c-commands the object DP in SpecVP. In this case, the particle determines the telicity of the predicate independently of whether a direct object is present and, if so, of its quantisational properties. Accordingly, the example in (173) is proposed to have the structure in (176).



When [telic] is specified on iAsp, the telicity of the predicate is computed independently of the quantificational properties of the direct object. However, when an object is overtly realised in SpecVP, it falls within the c-command domain of [telic] on iAsp and is therefore subject to a requirement imposed by this feature. I propose that [telic] requires any DP within its domain to be specified for [+q], yielding morphosyntactic realisation of the object as quantised and reflecting the bounded quantity entailed by the semantics of telicity. This explains why the direct object of particle verbs with *auf* must be quantised: the quantisedness requirement is not optional, but follows directly from the feature specification of iAsp. Consequently, the appearance of an unquantised object does not merely result in an atelic interpretation, but leads to ungrammaticality, since the agreement requirement imposed by [telic] is not satisfied and the derivation fails to converge. I propose the structures in (177a–b) for the examples in (174a–b), respectively, where the arrow indicates the requirement imposed by [telic] on iAsp on the DP within its c-command domain.

(177)



Therefore, on the proposed analysis, the quantificational properties of the object in particle verbs containing egressive *auf* do not contribute to the computation of telicity, contrary to earlier accounts (Borer 2005a, 2005b; Travis 2010). Instead, telicity of the predicate is fully determined by the [telic] feature on iAsp, and the quantisedness of the object arises as a by-product of an agreement relation with [telic] on iAsp, which regulates the well-formedness of the morphosyntactic representation: DPs within the c-command domain of a telic iAsp must be realised as quantised. Failure to satisfy this requirement results in a mismatch between the morphosyntactic form of the object and the telic interpretation of the predicate, yielding degraded or ungrammatical sentences, as illustrated in (174b).

3.3.2.3 Summary

This section has developed an analysis of the two aspectual uses of the German particle *auf*, the inceptive and the egressive, both of which involve the merger of *auf* in the head of the inner aspect projection iAspP within the verbal domain. The analysis departs from previous accounts of German verbal particles, which uniformly merge particles in the complement of V. Contrary to such accounts, which predict that particle verbs instantiate bi-eventive structures, the present analysis predicts a mono-eventive structure for particle verbs with

aspectual *auf*, and three independent diagnostics (*wieder*-modification, durative adverbials, and *-ung* nominalisation) were shown to confirm this prediction.

The two aspectual uses of *auf* are distinguished by the event features that the particle realises on iAsp. In its inceptive use, *auf* spells out the feature combination [init, telic], while in its egressive use, *auf* spells out [telic] alone. In both uses, the presence of [telic] on iAsp blocks any further specification of the same feature elsewhere in the structure, on general grounds of feature economy. This correctly predicts that particle verbs with aspectual *auf* are incompatible with secondary resultative predicates, which would themselves introduce [telic] in the complement of V. The data confirm this prediction: aspectual *auf* systematically resists co-occurrence with resultative XPs, in contrast to morphologically simplex verbs, which freely admit them.

A further consequence of merging aspectual *auf* in iAsp concerns its interaction with the internal argument of the verb. Since iAsp c-commands the object DP in SpecVP, in particle verbs with egressive *auf*, the [telic] feature on iAsp imposes a quantisation requirement on the object: the object is obligatorily quantised, and a non-quantised object renders the derivation ungrammatical rather than merely atelic. This contrasts sharply with simplex verb constructions, where [telic] is introduced low, namely in the complement of V via a resultative XP, and is c-commanded by the object. In this case, the quantisation property of the object determines the telicity of the whole predicate.

Taken together, the analysis of aspectual *auf* as merged in the iAsp head yields a set of predictions that accurately capture the empirical data: the mono-eventive behaviour of the resulting predicates, the incompatibility with secondary resultative phrases, and the obligatory quantisation of the object in the egressive use all follow directly from the syntactic position of the particle and the features it realises there. The next section turns to the resultative use of *auf*, which, unlike its aspectual uses, is analysed as involving the merger of the particle in the complement of V.

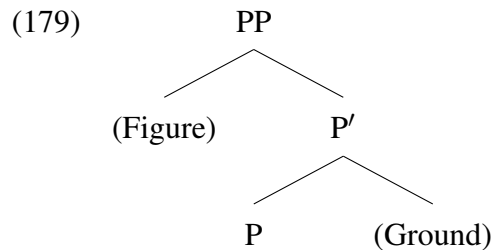
3.3.3 Analysis of resultative *auf*

As introduced in Section 3.2, resultative uses of *auf* include cases where the particle contributes upward movement, support relations between objects, openness, and partition. An example of each is given in (178). In each case, *auf* specifies the resulting state of the theme argument brought about by the event denoted by the base verb, namely, being at a higher location, being positioned on a supporting surface, being in an open state, or being divided into parts, respectively.

- (178) a. *Peter hebt die Handschuhe auf.*
 Peter lifts the gloves AUF
 ‘Peter picks up the gloves.’
- b. *Jogger sollten sich beim Training im Winter eine Mütze aufsetzen.*
 runners should REFL at.the training in.the winter a hat AUF.put
 ‘Runners should put on a hat when exercising in winter.’
- c. *Die Eichhörnchen knacken die Nüsse mit ihren scharfen Zähnen auf.*
 the squirrels cracked the nuts with their sharp teeth AUF
 ‘The squirrels cracked the nuts open with their sharp teeth.’
- d. *Bevor die Gäste kamen, schnitt sie die Torte auf und verteilte die Stücke.*
 before the guests came cut she the cake AUF and distributed the pieces
 ‘Before the guests arrived, she cut up the cake and handed out the pieces.’

In these resultative uses, I follow a well-established tradition in the literature that treats spatial prepositions and their homophonous adverbs and particles as instances of a single syntactic category P (cf. Emonds 1976; Ramchand 2008; Svenonius 1996; Zwarts 2020). Accordingly, I propose that in its resultative use, *auf* originates as the head of a PP merged in the complement of V. The semantic content of P is characterised by Talmy (1975) as an asymmetric spatial relation between a *ground* and a *figure*, with the ground serving as the landmark or reference object with respect to which the figure is located or moves. Svenonius

(2007) proposes that this relation is encoded syntactically by merging the ground as the complement of P and the figure in SpecPP, where it functions as the external argument of the prepositional phrase, as illustrated in (179).

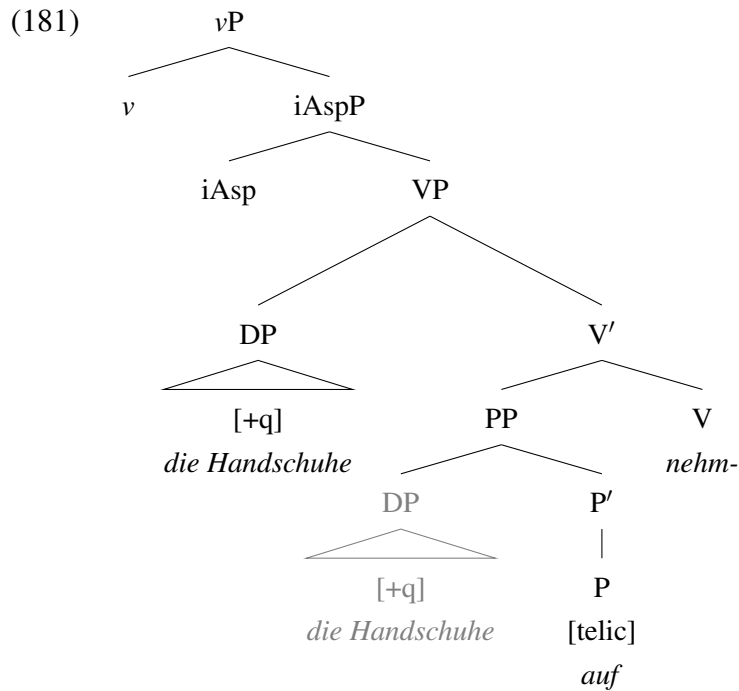


Verbal particles differ from prepositions primarily in the number of arguments they overtly realise. Whereas most prepositions in German overtly realise both the figure and the ground, as shown in (180a), where the figure is realised as the direct object of the verb and the ground as the complement of the preposition, particles overtly realise at most one, typically the figure (180b) but sometimes also the ground (180c). On this basis, prepositions are analysed as transitive Ps and particles as intransitive Ps (Zwarts 2020).

- (180) a. *Er schreibt den Namen auf das Papier.*
 he writes the name on the paper
 ‘He writes the name on the paper.’
- b. *Er schreibt den Namen auf.*
 he writes the name AUF
 ‘He writes down the name.’
- c. *Er füllt den Tank auf.*
 he fills the tank AUF
 ‘He fills the tank.’

Building on these assumptions, I propose that in its resultative use, *auf* heads a PP that is merged in the complement of V, with the figure or the ground base-generated inside this PP and able to move subsequently into the verbal layer. Accordingly, the structure proposed for

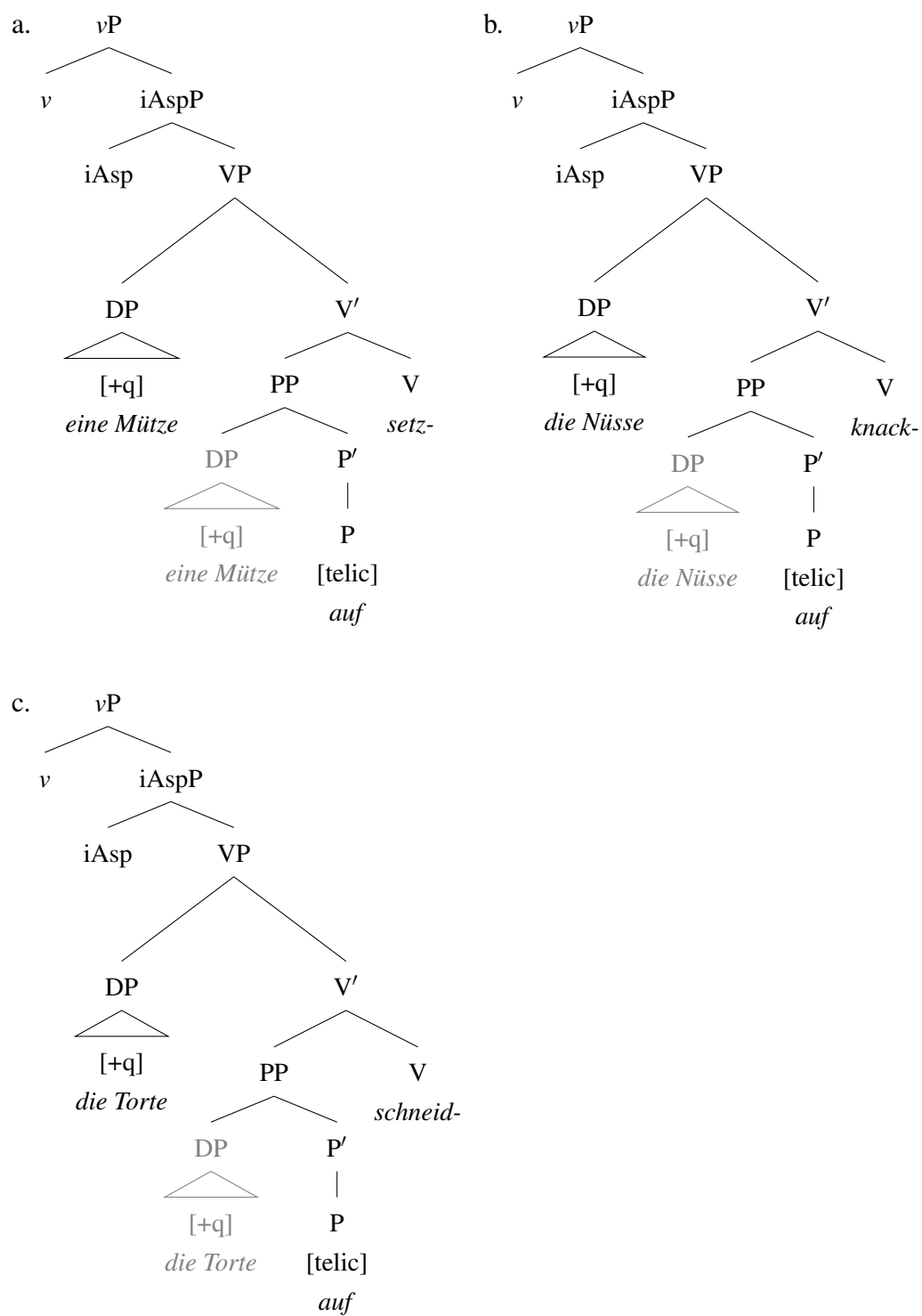
(178a) is given in (181). The derivation proceeds as follows. First, the particle *auf* projects a PP whose specifier hosts the figure *die Handschuhe* ‘the gloves’.⁵² The PP then merges as the complement of V headed by the verb *nehm-*, and is consequently marked as [telic], since the complement of V is the structural position in which result states are encoded. The figure later raises from SpecPP to SpecVP, where it is assigned accusative case.



The same structure also applies to (178b–d), where the particle denotes a support relation, openness, and partition, respectively, all of which can be analysed as resultative. The corresponding structures are given in (182).

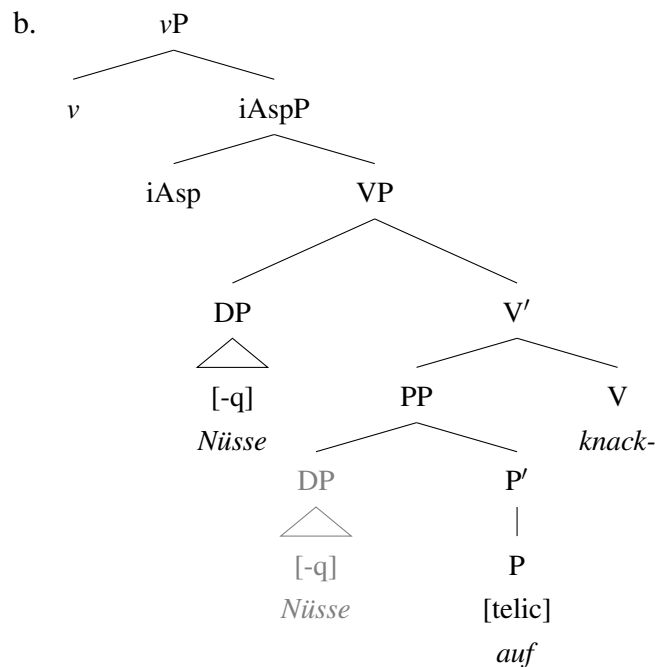
⁵²The structural distinction between specifier and complement is eliminated in Bare Phrase Structure (BPS) as developed in Chomsky (1995) and subsequent work, where structural relations are not primitively encoded but emerge derivationally through Merge. I do not pursue the technical consequences of this architecture here. What matters for present purposes is that the prepositional and particle uses of P differ in argument realisation: the prepositional use requires the simultaneous realisation of both figure and ground, whereas the particle use arises when only one of these arguments is overtly realised. In this sense, the distinction relevant to the present analysis is not fundamentally one between complement and specifier, but between full and reduced argument realisation within the PP domain.

(182)



Note that in (181) and (182), once the PP merges with VP, the direct object moves from SpecPP to SpecVP, from where it c-commands the [telic] feature in the complement of V. As proposed above, the telicity of the predicate as a whole is therefore determined by the quantificational properties of the object DP, rather than by the resultative element itself. In both (181) and (182), the direct objects are quantised, and the predicates accordingly receive a telic interpretation. Replacing the quantised object with a non-quantised one yields the opposite result, as illustrated in (183a). With a bare plural object, the predicate yields an atelic, repetitive reading in which the squirrels repeatedly crack open nuts. The structure of (183a) is given in (183b).

- (183) a. *Die Eichhörnchen knacken Nüsse auf.*
 the squirrels cracked nuts AUF
 ‘The squirrels cracked nuts open.’



3.3.4 Aspectual and resultative *auf* in relation

This section brings together the analyses developed in the previous two sections and discusses several implications that follow from the proposed treatment of the aspectual and resultative uses of *auf*. The discussion focuses on three aspects: (i) the distinct behaviour of resultative and aspectual *auf* with respect to degree modification, (ii) the semantic relatedness between the aspectual and resultative uses of *auf*, and (iii) the emergence of telicity in configurations involving aspectual particles, direct objects, or both.

3.3.4.1 Aspectual and resultative *auf* under degree modification

Analysing resultative *auf* as the head of a PP in the complement of V, in contrast to the aspectual uses of the particle in iAsp, accounts for an interesting contrast between the two uses that was introduced in Chapter 2. As shown in (184), resultative particles admit quantificational modification by degree adverbials such as *teilweise* ‘partly’, *völlig* ‘completely’, and *ganz* ‘entirely’, whereas egressive particles systematically resist such modification.

- (184) a. *Peter machte das Fenster halb / völlig / ganz auf.*
 Peter made the window half completely entirely AUF
 ‘Peter opened the window half / completely / entirely.’
- b. **Peter aß den Apfel teilweise / völlig / ganz auf.*
 Peter ate the apple partly completely entirely AUF
 Intended: ‘Peter ate the apple partly / completely / entirely up.’

Under the proposed analysis, this contrast follows directly from the difference in the syntactic position of the particle in the two uses. Degree adverbials are state-modifiers: they target a property and specify the degree to which it holds. They are therefore semantically compatible with predicates that denote a state admitting degrees of fulfilment, but not with inner aspectual properties. In (184a), *auf* heads a PP merged in the complement of V and introduces a result state, i.e., the window being open, which is gradable: the window can

be in a state of being half open, fully open, or anywhere in between. Degree adverbials can modify this result state directly, picking out partial or complete fulfilment of the property denoted by the particle. In (184b), by contrast, *auf* is merged in iAsp and contributes the [telic] feature, which encodes the terminal boundary of the event as a punctual point rather than as a gradable state. There is no state of the right type for the degree adverbial to target: the apple cannot be in a state of being partially eaten up in the way that a window can be partially open. Modification by *teilweise* is accordingly semantically uninterpretable, and the resulting structure is judged ungrammatical. The contrast in (184) thus provides independent evidence that resultative and egressive *auf* occupy distinct syntactic positions and contribute distinct semantic content, in line with the analysis developed here.

3.3.4.2 The semantic relatedness between aspectual and resultative *auf*

I now turn to how the semantic relatedness between the aspectual and resultative uses of *auf* is reflected in the present analysis. In the semantic literature, the aspectual uses of *auf* have been argued to be derivable from the lexical content of the same word in its prepositional use. As introduced in Section 3.2, prepositional *auf* most basically denotes an upward spatial orientation or movement. Building on Lindner's (1981) analysis of the English particle *up*, Eichinger (2000) and Lechler and Roßdeutscher (2009) argue that the inceptive use of *auf* is derived from its upward meaning via a conceptual extension: upward movement brings an entity into the viewer's field of perception, and this notion is then metaphorically extended to denote the coming-into-being or the onset of an event.

This lexical and aspectual relatedness of *auf* is naturally captured under the present proposal. I argue that *auf* is associated with a stable lexical content, i.e., the upward-oriented spatial meaning inherited from its prepositional use, which it retains across all its uses. What varies across uses is the syntactic position into which *auf* is inserted, and in particular whether that position is associated with grammatical features. In its aspectual uses, *auf* is merged in iAsp, a position that carries aspectual features such as [init] and [telic]. In these cases,

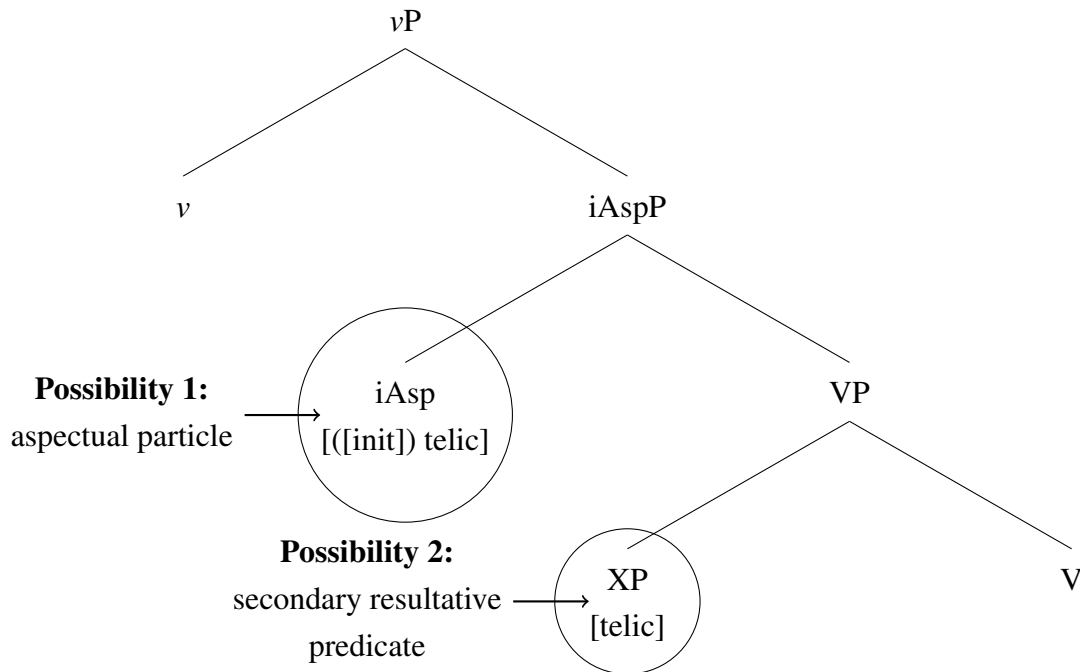
the event features are interpreted together with the lexical content that *auf* contributes. As a result, aspectual *auf* marks the onset or termination of an event while simultaneously retaining a semantic component of upward-oriented movement, which is then metaphorically extended to the emergence or completion of an event. The intuitive continuity between the prepositional and the aspectual uses of *auf* thus follows from the persistence of its lexical content across syntactic environments.

The same logic extends to the resultative use of *auf* discussed in the present section. When *auf* heads a PP merged in the complement of V, no aspectual features are present on the position into which it is inserted; the lexical content of *auf* is therefore expressed without additional grammatical modification, and the predicate denotes the result state in which the figure stands in the spatial relation encoded by *auf* to the overt or implicit ground. This explains why the upward-oriented spatial meaning of *auf* is preserved most directly in its resultative uses, while in the aspectual uses it is overlaid with grammatical event-feature content contributed by iAsp. The aspectual and resultative uses of *auf* examined in this and the preceding section are therefore interrelated in that a single lexical content is retained in all different syntactic environments (albeit to varying degrees), even when the particle is merged in iAsp, where it realises event features.

3.3.4.3 The encoding of telicity

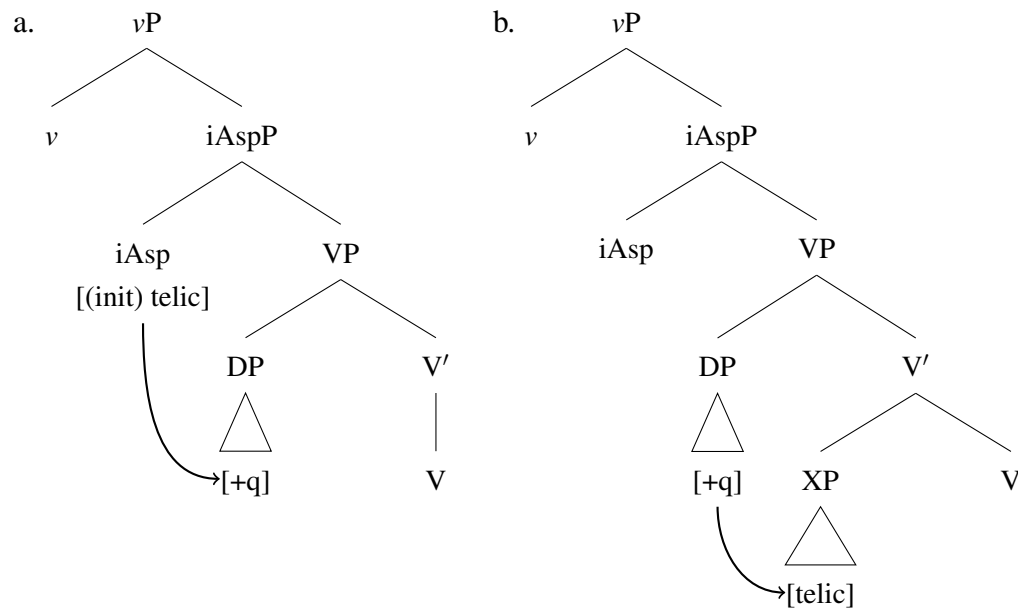
Finally, I consider the question of how telicity is encoded in the proposed system. As established in the Sections 3.3.2 and 3.3.3, the feature [telic] can be present in two distinct syntactic positions in the system proposed here: either on iAsp, or on the head of the complement of V (185). In the first case, [telic] is lexicalised as the aspectual uses of *auf*; in the second, it is realised as a resultative predicate, whether a particle, a resultative AP, or a PP. Crucially, these two realisations cannot co-occur within a single structure, since the simultaneous presence of [telic] in both positions would constitute vacuous double specification of the same feature.

(185) Possible realisation positions of the feature [telic]



The two positions of [telic] interact differently with the direct object, when one is present, in SpecVP (where it may have been moved from SpecPP). The two configurations are illustrated in (186), with arrows pointing from the node that determines telicity to elements within its c-command domain. In (186a), [telic] sits on iAsp and the object in SpecVP. Since iAsp c-commands the object, the telicity of the predicate is determined by [telic] on iAsp itself, irrespective of whether an object is present at all. When an object is present, however, it must be morphosyntactically realised as quantised. As argued in Section 3.3.2.2, this is the consequence of an agreement requirement imposed by [telic] on the c-commanded object: the object must agree in quantisation with the [telic] feature on iAsp in order for a well-formed semantic interpretation to be derived. In (186b), the object sits in SpecVP as in (186a), but [telic] now sits lower, on the head of the complement of V. The c-command relation is reversed: now the object c-commands the feature [telic], and accordingly it is the quantisation of the object that determines the telicity of the predicate. In this case, a quantised object yields a telic interpretation; a non-quantised object yields an atelic one.

(186)



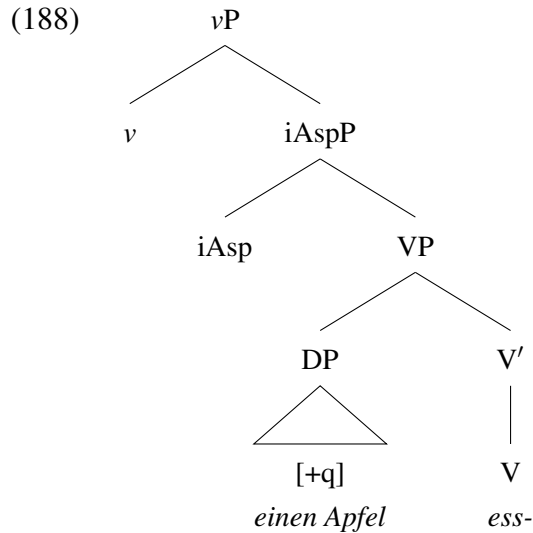
Besides these two telic configurations, there is a third one to consider: one in which no [telic] feature is present in the structure at all, yet the predicate can nevertheless receive a telic interpretation. This situation arises with morphologically simplex incremental theme verbs taking a quantised object, as illustrated in (187).

(187) *Peter hat einen Apfel (in zehn Minuten) gegessen.*

Peter has an apple in ten minutes eat.PTCP

‘Peter ate an apple (in ten minutes).’

I propose that the syntactic structure for cases of this kind is the one given in (188).



The absence of a [telic] feature in (188) might initially appear anomalous, since the cases discussed so far have all involved structures in which [telic] is present, whether or not it is the determining factor for the predicate's telicity (cf. (186)). This absence is, however, empirically motivated by the interpretive flexibility of simplex incremental-theme verbs. Unlike particle verbs with telic particles, which uniformly yield telic predicates, simplex incremental-theme verbs admit both telic and atelic interpretations, depending on the temporal modifier: a sentence such as (187) is compatible with the telic adverbial *in zehn Minuten*, but equally with a durative adverbial, under which the predicate is interpreted as atelic (189).

(189) *Peter hat (zehn Minuten lang) einen Apfel gegessen.*

Peter has ten minutes long an apple eat.PTCP

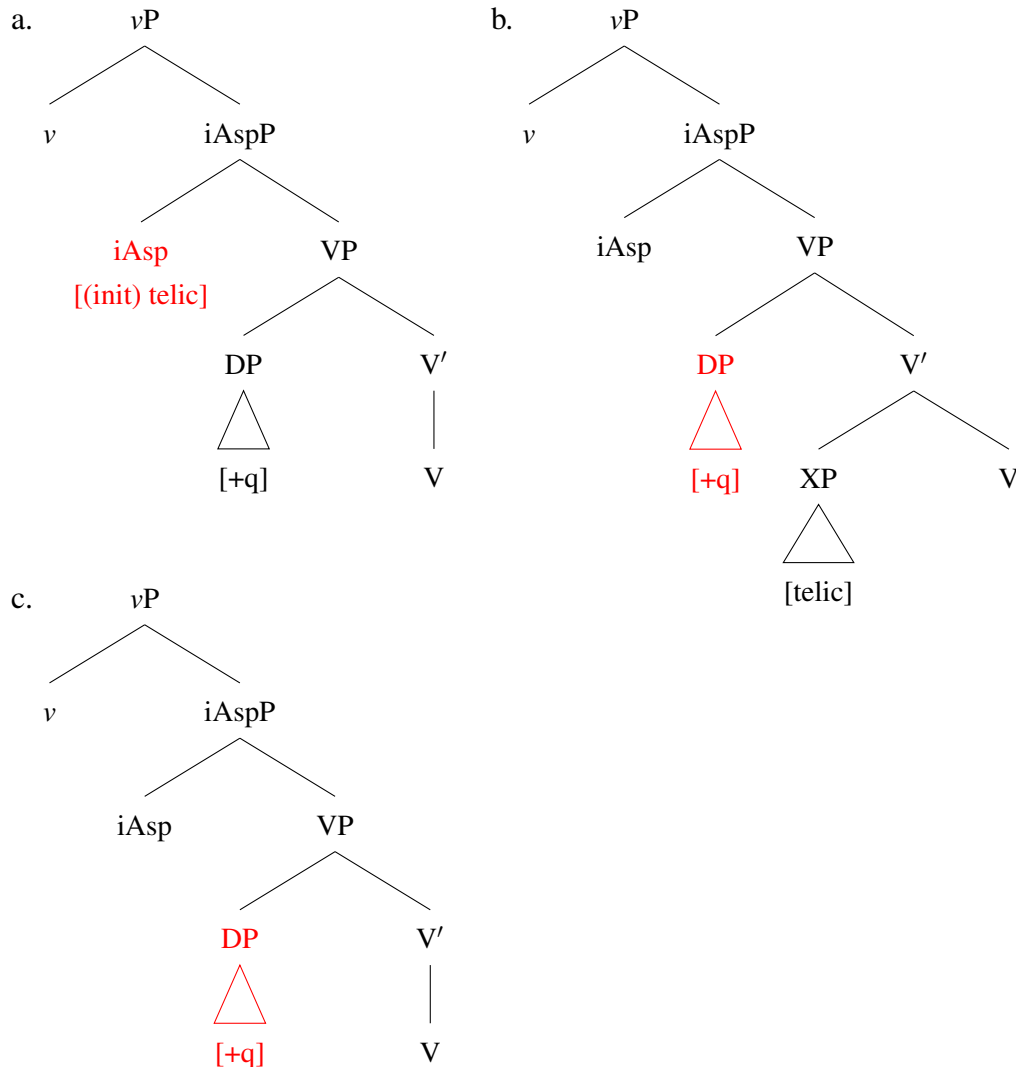
‘Peter ate an apple (for ten minutes).’

If [telic] were obligatorily present in the structure of simplex incremental-theme verbs, the atelic interpretation in (189) would be unexpected: a quantised object together with [telic] in the structure would be predicted to enforce a telic reading, just as it does in (186b) above. The structure in (188), in which [telic] is absent, captures the observed flexibility directly. Without [telic] in the structure, a telic interpretation is no longer guaranteed, and the quantised object is correspondingly released from the telicity-enforcing pressure observed in (186b). It can

still contribute a bounded reading of the event, in the same way as it does in the presence of a secondary resultative predicate (cf. (186b)), but this contribution is now optional rather than obligatory. As a result, the bounded reading is one of two interpretive options, the other being an atelic reading on which the bounded interpretation associated with the quantised object is simply not invoked. The interpretive flexibility characteristic of simplex incremental theme verbs with quantised objects thus follows directly from the absence of [telic] in their syntactic representation: where [telic] is present, a quantised object necessarily enforces a telic reading; where [telic] is absent, the same quantised object permits a telic reading without enforcing it.

As an interim summary, the proposed system identifies three distinct configurations in which a predicate may receive a telic interpretation (190), with the element crucial for the determination of telicity highlighted in red in each case. In (190a), [telic] is realised on iAsp, where it lexicalises the aspectual uses of *auf* (and other aspectual particles; cf. Section 3.4.2). In this configuration, [telic] c-commands the object DP in SpecVP, and the telic interpretation is enforced directly by the feature itself, irrespective of whether an object is overtly realised and irrespective of its quantisation properties. In (190b), [telic] is realised lower in the structure, namely on the head of a phrase in the complement of V, typically lexicalised as a secondary resultative predicate. Here, the object DP in SpecVP c-commands [telic], and the telic interpretation arises from the interaction of the two: telicity is guaranteed as long as the object is quantised, and is uniformly absent when it is not. In (190c), which corresponds to morphologically simplex incremental theme verbs, [telic] is not present in the structure at all. In this case, a telic interpretation is possible but not enforced, and an atelic interpretation is equally available.

(190) Possible telic syntactic constructions



The three configurations therefore form a hierarchy with respect to the contribution of [telic] to the determination of telicity (191). At the upper end, the realisation of [telic] on iAsp involves direct determination, in which the feature alone fixes the telic interpretation. At the middle, where [telic] is realised in the complement of V, telicity is determined indirectly through interaction with the quantisation of the object. Crucially, although [telic] in this configuration is no longer the sole determining factor of telicity, its contribution remains non-trivial: it guarantees that a telic interpretation arises whenever the object is quantised.

This is what distinguishes the second configuration from the third, where [telic] is absent altogether. In the latter case, a quantised object merely permits a telic interpretation, but does not enforce one, and an atelic interpretation remains available. The role of [telic] thus weakens systematically across the three configurations.

(191) Hierarchy of telicity determination

[telic] on iAsp > [+q] object + [telic] in the complement of V > [+q] object

One point that emerges clearly from the discussion above is that the [telic] feature is neither a necessary nor a sufficient condition for a telic interpretation. It is not necessary, since simplex incremental theme verbs with a quantised object can yield a telic reading without [telic] being present anywhere in the structure. Nor is it sufficient on its own across configurations, since [telic] in the complement of V requires the support of a quantised object to yield a telic reading. Telicity, on the present analysis, is therefore derived from a structural interaction between the position of [telic] and the quantisation properties of the object DP, rather than from any single element in isolation. What [telic] does contribute, when present, is to restrict the range of available interpretations: in iAsp, it enforces telicity outright; in the complement of V, it ensures that telicity is the outcome whenever a quantised object is present. In its absence, no such restriction applies, and the interpretation of the predicate is left to be determined by the quantisation of the object together with contextual modification (e.g., the presence of temporal modifiers).

3.3.5 A note on idiosyncratic *auf*

The framework developed in the previous sections analyses the aspectual and resultative uses of *auf* as deriving from two distinct syntactic positions: the head of iAsp and the head of a PP in the complement of V, respectively. This section briefly discusses the last use of *auf* that has not been discussed so far, i.e., its idiosyncratic use. A non-trivial number of cases involve idiosyncratic readings in which the meaning of the particle verb cannot be predicted from the meanings of *auf* and the base verb taken in isolation. Examples include *aufgeben*

‘to give up’, *aufpassen* ‘to pay attention’, and *aufhören* ‘to stop’, where neither the spatial nor the aspectual meaning of *auf* is straightforwardly recoverable.

Such idiosyncratic meanings necessarily require some form of listing. This holds independently of the theoretical framework adopted. In lexicalist approaches, idiosyncratic meanings are specified for each lexical item as part of its lexical entry and stored in the lexicon. By contrast, in anti-lexicalist approaches such as Distributed Morphology, idiosyncratic meanings of roots, together with the contexts in which they arise, are treated as extralinguistic and stored in a separate component referred to as the Encyclopedia.

Any framework that posits such listed meanings must in addition specify a licensing condition under which the listed information is activated. A broad consensus among non-lexicalist approaches is that idiosyncratic interpretations are subject to strict locality conditions. For example, Zeller (2001b) proposes that the idiosyncratic interpretation of particle verbs requires structural adjacency between the verb and the particle, defined as a configuration in which the particle heads a phrasal complement of the verb, with no intervening functional projection between the two (cf. Chapter 2, Section 2.3). Within Distributed Morphology, idiomatic meaning has likewise been argued to be constrained by locality: only material within a sufficiently local domain can participate in non-compositional interpretation. For example, the observation, going back to Marantz (1984), that external arguments do not form part of idiomatic meanings has been taken as evidence that they are introduced by a separate functional head (little *v*), rather than by the root itself, and therefore fall outside the domain accessible to encyclopedic interpretation.

In the present analysis, I do not commit to a specific implementation of these mechanisms, as long as two assumptions are maintained: first, that idiosyncratic meanings are listed, and second, that their interpretation is subject to locality conditions. However, I tentatively propose that these locality requirements can be satisfied with the particle merged in the complement of V. On this view, idiosyncratic *auf* does not require a separate designated syntactic position alongside iAsp and the complement of V. I propose that it shares its syntactic structure

with resultative *auf*, and the difference between the two lies in the mode of interpretation. Resultative readings are derived compositionally from the figure-ground semantics of the PP and the [telic] feature on P, while idiosyncratic readings draw on stored lexical information associated with the combination of the verb and the particle as a whole. The precise mechanism by which such stored information interacts with syntactic structure is left for future work.

3.3.6 Summary

This section has developed a unified syntactic analysis of the polysemy of the German verbal particle *auf*, on which its three uses in particle verb constructions, namely aspectual, resultative, and idiosyncratic, follow from the syntactic position into which the particle is inserted. In its aspectual uses, *auf* is proposed to be merged in the head of an inner aspect projection iAspP, situated between *v*P and VP. In both its resultative and idiosyncratic uses, by contrast, *auf* is merged as the head of a PP in the complement of the verb. Across all uses, *auf* is argued to be associated with a stable lexical content; what varies is whether its basic meaning is modified by grammatical features in the syntactic environment in which it is merged.

Within the aspectual uses, the distinction between inceptive and egressive interpretations is captured by a feature based account of inner aspect. I proposed that inceptive *auf* spells out the feature combination [init, telic] on iAsp, while egressive *auf* spells out [telic] alone. The analysis yields several structural predictions that were shown to be borne out. First, aspectual *auf* gives rise to mono-eventive predicates, as confirmed by *wieder*-modification, durative adverbials, and *-ung* nominalisation. Second, aspectual *auf* is incompatible with secondary resultative phrases, since [telic] on iAsp blocks any further specification of the same feature in the complement of V. Third, in the case of egressive *auf*, the direct object is obligatorily quantised: as the DP falls within the c-command domain of [telic] on iAsp, it is subject to a quantisation requirement imposed by [telic] via agreement.

In the resultative use, *auf* introduces [telic] low in the structure, which is now c-commanded by the object DP in SpecVP. This correctly predicts that the telicity of resultative configurations

is determined by the quantisation of the object. The structural distinction between resultative and aspectual *auf* is further supported by the contrast in their compatibility with degree adverbials such as *teilweise*: resultative *auf* introduces a gradable result state on the object and admits degree modification, whereas egressive *auf* encodes event aspectual information on iAsp and is incompatible with it.

Idiosyncratic uses of *auf* were argued to share the low syntactic position with the resultative use, and were proposed to be subject to the same structural locality condition that licenses non-compositional interpretation in particle verb constructions more generally. The difference between the two lies in how their meanings are computed: in the resultative case, interpretation is derived compositionally from the figure-ground semantics of the PP and the [telic] feature, whereas in the idiosyncratic uses it relies on stored lexical information associated with the combination of the verb and the particle.

To summarise, the central claim of the proposed analysis is that the interpretive variation of *auf* follows from variation in syntactic structure rather than from lexical polysemy, with a single lexical item giving rise to three distinct uses through interaction with two distinct syntactic positions. The next section turns to the applicability of this proposal to the root based framework of Distributed Morphology, as well as to other aspectual particles in German.

3.4 Discussion

This section addresses two extensions of the analysis developed above. I first discuss how the proposed analysis can be extended to a root-based framework such as DM. While a direct application is not quite straightforward and raises a number of questions that will remain unresolved, I will point to a possible direction that may prove promising for integrating the present proposal into such a framework. I then consider how the analysis generalises to other aspectual particles in German.

3.4.1 Extending the analysis to Distributed Morphology

In the proposed analysis, the aspectual uses of the particle *auf* arise when the particle is merged in iAsp, which is a functional head, whereas its resultative uses arise when the particle heads a prepositional phrase in the complement of the verb, which is a lexical position. In DM, word formation starts with roots. Therefore, a straightforward translation of the present analysis into a DM framework would be to assume that the aspectual and resultative meanings of *auf* arise depending on whether the root of the particle is merged in a functional position or in a lexical position.

This raises an immediate problem, since DM imposes strict constraints on the distribution of roots. Specifically, roots can only be inserted into terminal nodes that do not bear syntactic features, so-called root terminal nodes (RTNs), whereas terminal nodes that bear syntactic features are classified as functional terminal nodes (FTNs). Crucially, RTNs and FTNs are subject to different insertion mechanisms at PF. The realisation of FTNs is governed by the Subset Principle, as stated in (192) (Halle 1997: 428), according to which the preferred vocabulary item is the one whose feature specification most closely matches that of the terminal node.

(192) **Subset Principle**

The phonological exponent of a Vocabulary item is inserted into a morpheme in the terminal string if the item matches all or a subset of the grammatical features specified in the terminal morpheme. Insertion does not take place if the Vocabulary item contains features not present in the morpheme. Where several Vocabulary items meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen.

Consider, for example, the following Hupa suffixes and their feature specifications for person, number, and case (Embick and Noyer 2007: 300).

(193) **Hupa suffixes**

- a. [PL, 1ST, SUBJ] $\leftrightarrow$ *di-*
- b. [PL, 2ND, SUBJ] $\leftrightarrow$ *oh-*
- c. [PL, OBJ] $\leftrightarrow$ *noh-*

Given a syntactic node bearing the features [PL, 2ND, OBJ], the Subset Principle selects the suffix *noh-* as the optimal realisation, since the alternatives contain incompatible features such as [1ST] or [SUBJ]. In this way, a vocabulary item may realise a node even if it matches only a subset of its features.

By contrast, the realisation of RTNs is not determined by feature matching, but free and non-deterministic. In early versions of DM, as long as a root position is realised by a content morpheme, the syntax is indifferent to whether it is, for example, spelled out as *cat* or *dog*. In other words, content morphemes do not compete with one another for insertion.⁵³ This leads to a strict division between functional vocabulary items, which realise FTNs, and lexical vocabulary items, which realise RTNs. Under these assumptions, the present analysis encounters a difficulty with DM: if *auf* is treated as a root, it cannot be inserted into a functional head such as *iAsp*, since roots are restricted to RTNs. This restriction makes a direct implementation of the present proposal within DM less straightforward and calls for some adjustment. In the following, I outline one possible approach to addressing this issue, which draws on De Belder's 2011 discussion of so-called semi-lexical vocabulary items in Dutch.

In her dissertation, De Belder (2011) identifies a set of vocabulary items in Dutch, which are traditionally analysed as functional, but that can also be used in a lexical manner with substantive semantic content. She refers to them as semi-lexical Vocabulary Items (VIs), adopting the terminology from van Riemsdijk (1998) and Corver and Van Riemsdijk (2001). Examples of such semi-lexical VIs are given in (194), where *wh*-words, personal pronouns, and

⁵³However, see Acquaviva (2009), Harley (2014), Harley and Noyer (2000), and Pfau (2000, 2009) for proposals within DM that roots should be indexed and individuated in syntax.

adversatives in Dutch show non-canonical uses where these VIs participate in the construction of lexical categories: nouns in (194a–c) and verbs in (194d–e).

(194) (De Belder 2011: 42)

- a. *Ik heb het waarom van de zaak nooit begrepen.*
 I have the why of the case never understood
 ‘I have never understood the motivation behind the case.’
- b. *In een krantenartikel komt het wat/hoe/wie/waar altijd voor*
 in a newspaper comes the what/how/who/where always before
het waarom.
 the why
 ‘In an article in a newspaper the what/how/who/where always precede the why.’
- c. *Martha is mijn tweede ik.*
 Martha is my second I
 ‘Martha is my best friend.’
- d. *De studenten jij-en onderling.*
 the students you-INF mutually
 ‘The students are on a first-name basis with one another.’
- e. *Niets te maar-en!*
 nothing to but-INF
 ‘Don’t object!’

Note that (194b–d) can be translated directly and naturally into German, as shown in (195).

- (195) a. *In einem Zeitungsartikel kommt das Was/Wie/Wo/Wer immer*
 in a newspaper comes the what/how/where/who always
vor dem Warum.
 before the why
 ‘In an article in a newspaper the what/how/where/who always precede the why.’

- b. *Martha ist mein zweites Ich.*
 Martha is my second I
 ‘Martha is my best friend.’
- c. *Die Studenten duz-en sich gegenseitig.*
 the students you-INF REFL each.other
 ‘The students are on a first-name basis with one another.’

De Belder (2011) further observes that *ge*-prefixation in Dutch is a productive derivational process that normally forms nominals denoting pluractional events from verb stems (196). But as shown in (197), functional VIs can also serve as valid inputs to this derivational process.

(196) (De Belder 2011: 43)

- a. *het ge-tik van de klok*
 the GE-tick of the clock
 ‘the ticking of the clock.’
- b. *het ge-fluit van de vogeltjes*
 the GE-whistle of the birds
 ‘the whistling of the birds.’

(197) (De Belder 2011: 43-44)

- a. *Ik hoef al dat ge-maar niet.*
 I need all that GE-but not
 ‘I don’t like those constant objections.’
- b. *Ik hoef al dat ge-alhoewel niet.*
 I need all that GE-although not
 ‘I don’t like those constant considerations.’

- c. *Ik hoef al dat ge-of niet.*
 I need all that GE-or not
 ‘I don’t like those constant alternatives.’
- d. *Ik hoef al dat ge-waarom niet.*
 I need all that GE-why not
 ‘I don’t like the constant need for justification.’
- e. *Ik hoef al dat ge-ik niet.*
 I need all that GE-I not
 ‘I don’t like the constant egocentrism.’

The behavior of semi-lexical VIs in Dutch cannot be readily accommodated in DM, where functional words are not permitted to be inserted as roots and realised in RTNs. To account for these data, De Belder (2011) proposes a Revised Subset Principle (RSP), presented in (198), which is argued to regulate the post-syntactic spell-out of both FTNs and RTNs.

(198) The Revised Subset Principle (RSP) (De Belder 2011: 62)

Given a terminal node A with feature set F_0 and vocabulary items (VIs) $/B_{1,2,\dots,n}/ \leftrightarrow F_{1,2,\dots,n}$:

$/B_i/$ is inserted in A if $F_0 \times F_i \subseteq F_0 \times F_0$. When several VIs meet this condition, the one for which $F_0 \times F_i$ most closely matches $F_0 \times F_0$ is chosen.

To illustrate how the RSP allows VIs that otherwise realise functional features in FTNs to also be inserted into RTNs, consider, as a toy example, an RTN R0, which, by definition, does not bear any syntactic features (199). Four candidate VIs that could potentially realise R0 are listed in (200). Among them, */bik/* is a lexical vocabulary item (LVI), as it is not specified for any grammatical features, whereas the other three are function vocabulary items (FVIs).

(199) R0 = $\emptyset$

(200) Possible VIs

- a. $/bik/ \leftrightarrow \emptyset$
- b. $/ta/ \leftrightarrow \{a\}$
- c. $/plo/ \leftrightarrow \{a, b\}$
- d. $/stu/ \leftrightarrow \{a, b, c\}$

Following RSP, to determine which VI is best suited to realise R0, we calculate the Cartesian product of the feature set of each VI with the feature set of the terminal node, as shown in (201).

- (201) a. $R0 \times F_{/bik/} = \emptyset \times \emptyset = \emptyset$
- b. $R0 \times F_{/ta/} = \emptyset \times \{a\} = \emptyset$
- c. $R0 \times F_{/plo/} = \emptyset \times \{a, b\} = \emptyset$
- d. $R0 \times F_{/stu/} = \emptyset \times \{a, b, c\} = \emptyset$

By comparing (201a-d) with the Cartesian product of the feature set of R0 with itself, given in (202), the RSP predicts that all four VIs, whether LVIs (e.g., */bik/*) or FVIs, are equally qualified to be inserted in R0, since each of them matches to the same degree. In this case, no VI is more specified than any other. Insertion is therefore decided by free choice, and the four VIs are predicted to be in free variation as exponents of R0, as long as no further selectional or contextual restrictions apply.

- (202) $R0 \times R0 = \emptyset \times \emptyset = \emptyset$

The RSP therefore allows De Belder's system to accommodate the use of functional VIs as roots, an option that is not available in standard versions of DM, where the distinction between lexical and functional VIs is strictly maintained. If this line of analysis is on the right track, it removes a major obstacle to implementing the present proposal within a DM framework. I leave a full implementation along this line for future work.

3.4.2 Extending the analysis to other aspectual particles in German

In this section, I discuss how the feature system proposed for the aspectual uses of *auf* can be extended to other aspectual particles in German.

I begin with egressive particles, which, in addition to *auf*, include the particle *aus*. Since egressive particles uniformly yield telic predicates, I propose that egressive *aus*, like egressive *auf*, bears the feature [telic] and is merged in iAsp. By the same reasoning developed for egressive *auf*, the presence of [telic] on iAsp should block any further specification of [telic] elsewhere in the structure, including on a secondary resultative phrase in the complement of V. This predicts that egressive *aus* is incompatible with resultative phrases, a prediction that is borne out by the data in (203).

- (203) a. **Er trank die Flasche leer aus.*
 he drank the bottle empty AUS
 Intended: ‘He drank the bottle empty.’
- b. **Peter ließ mich nicht zu Ende aus-reden.*
 Peter let me not to end AUS-talk.INF
 Intended: ‘Peter didn’t let me finish talking to the end.’
- c. **Das ganze Fass ist leer aus-gelaufen.*
 the whole barrel is empty AUS-flow.PTCP
 Intended: ‘The whole barrel ran empty.’

In the examples above, removing either the particle or the resultative phrase rescues the sentence from ungrammaticality, as shown in (204).

- (204) a. *Er trank die Flasche {leer / aus}.*
 he drank the bottle empty AUS
 ‘He drank the bottle empty.’

- b. *Peter ließ mich nicht {zu Ende reden / aus-reden}.*
 Peter let me not to end talk.INF AUS-talk.INF
 ‘Peter didn’t let me finish talking.’
- c. *Das ganze Fass ist {leer gelaufen / aus-gelaufen}.*
 the whole barrel is empty run.PTCP AUS-run.PTCP
 ‘The whole barrel ran empty.’

The picture is more complex with inceptive particles, which include *auf*, *an*, and *ein*. While these particles share the property of targeting the initial boundary of events and contributing the meaning of inceptivity, they do so without specifying an inherent endpoint and accordingly do not pattern uniformly with respect to the telicity of the resulting particle verbs. As established for inceptive *auf*, in its inceptive use, the particle marks the punctual onset of a new state and yields telic, achievement-type predicates. The picture is different for *an* and *ein*. The particle *an* attaches productively to activity verbs, and the resulting particle verbs remain atelic. The examples of inceptive *an* introduced in Chapter 2 are repeated in (205).

(205) Inceptive *an*-

- | | |
|------------------------------------|---|
| a. <i>singen</i> ‘to sing’ | → <i>ansingen</i> ‘to start singing’ |
| b. <i>lesen</i> ‘to read’ | → <i>anlesen</i> ‘to start reading’ |
| c. <i>diskutieren</i> ‘to discuss’ | → <i>andiskutieren</i> ‘to start discussing’ |
| d. <i>braten</i> ‘to roast’ | → <i>anbraten</i> ‘to start roasting / to roast partly’ |
| e. <i>trocknen</i> ‘to dry’ | → <i>antrocknen</i> ‘to start drying / to dry partly’ |
| f. <i>wärmen</i> ‘to warm’ | → <i>anwärmen</i> ‘to start warming / to warm slightly’ |

On the basis of these data, I tentatively propose that in its inceptive use, *an* realises [init] alone on iAsp. A challenge for this analysis concerns the behaviour of inceptive *an* with secondary resultative predicates. Even though *an* is taken here to bear only [init], it still resists co-occurrence with secondary resultative, as shown in (206).

- (206) a. **Ich habe das Lied zu Ende an-gesungen.*

I have the song to end AN-sing.PTCP

Intended: 'I sang the song to the end.'

- b. **Ich habe das Buch fertig an-gelesen.*

I have the book finished AN-read.PTCP

Intended: 'I read the book to the end.'

- c. **Wir haben das Thema fertig an-diskutiert.*

we have the topic finished AN-discuss.PTCP

Intended: 'We discussed the topic to the end.'

- d. **Er hat das Fleisch gar an-gebraten.*

he has the meat done AN-roast.PTCP

Intended: 'He roasted the meat done.'

- e. **Sie hat die Suppe heiß an-gewärmt.*

she has the soup hot AN-warm.PTCP

Intended: 'She warmed the soup hot.'

I suggest two possible accounts of the data, one syntactic and one from a cognitive perspective. Syntactically, recall that in the argument developed for aspectual *auf* (cf. Section 3.3.2), it was proposed that an event-feature specification on iAsp is incompatible with a structure that already contains a specification of the same feature. This idea may now be strengthened in that it is not the double marking of an identical feature that produces the incompatibility, but rather the presence of any event-feature specification on iAsp, which blocks further specification of event features elsewhere in the same syntactic structure, irrespective of whether those features are identical. The underlying intuition is that iAsp constitutes a dedicated functional projection for inner aspect. Event features introduced directly on iAsp are therefore in a sense *primary*, while features introduced in lower projections, such as on a resultative phrase, are *secondary*. Once a particle is merged in iAsp and introduces

an event feature, this direct specification precludes any additional indirect specification within the same predicate.

This line of reasoning can be related to the distinction between direct and indirect range assignment in Borer's XS framework (2005a, 2005b). In her system, a functional value can be assigned either directly by a functional morpheme or indirectly through structural relations, but multiple assignments lead to vacuous interpretation and are ruled out. Extending this to the current proposal, direct specification of aspectual features on iAsp blocks any further indirect specification within the same predicate, since the two would jointly constitute the kind of multiple assignment that Borer's system excludes. On this view, the incompatibility of inceptive *an* with secondary resultative phrases follows directly: since *an* introduces [init] directly on iAsp, no additional aspectual specification can be introduced indirectly in the complement domain.

A complementary explanation can be given from a cognitive perspective. Cognitively, an event description appears to foreground a single transition as its focal moment, either the initial boundary (giving inceptive readings) or the terminal boundary (giving egressive or culminating readings). A predicate that simultaneously directs attention to two temporally distinct transitions would impose a cognitive complexity that natural-language predicates tends to systematically avoid. Under this view, the difficulty with combining inceptive *an* and a resultative predicate lies in a conflict of focalisation: [init] on iAsp highlights the initial transition of the event, whereas [telic] on the resultative phrase highlights a distinct terminal transition, resulting in two competing points of prominence within a single predicate.

I propose that this cognitive constraint has a syntactic reflex: a given predicate contains at most one locus of event-feature specification. This locus may realise [telic] (as with egressive *auf*), [init] (as with inceptive *an*), or both [init] and [telic], provided that they are realised on a single head (as with inceptive *auf*). Crucially, the realisation of [init] and [telic] on a single head does not violate the cognitive tendency described above, since the two features are interpreted as a single, coincident transition rather than as two independent boundaries.

What is structurally prohibited is the realisation of [init] and [telic] on separate heads, and by two distinct lexical items within the same predicate, in which case they would encode two temporally distinct boundaries.

The syntactic and cognitive accounts thus converge on the same generalisation. Syntactically, direct specification of event features on iAsp blocks further specification elsewhere in the structure. Cognitively, predicates favour a single focal boundary in event representation. The asymmetry between direct and indirect specification can be understood as the grammatical reflex of the cognitive tendency toward single-boundary focalisation: iAsp, as the dedicated locus of inner-aspectual interpretation, is the position from which event boundaries are foregrounded, and the prohibition on indirect specification elsewhere ensures that only one boundary is foregrounded. The grammar, on this view, encodes structurally what cognition appears to favour conceptually.

Finally, the inceptive particle *ein* presents a more intricate picture than either *auf* or *an*. In its inceptive uses, *ein* clearly marks the onset of an event, but the resulting particle verbs are predominantly telic, and the onset itself may be either abrupt or gradual depending on the base verb and contextual factors. Examples of inceptive *ein* are listed in (207), repeated from Section 2.2.3.

(207) Inceptive *ein*-

- | | |
|-----------------------------------|--|
| a. <i>setzen</i> ‘to put’ | → <i>einsetzen</i> ‘to set in / begin’ |
| b. <i>treten</i> ‘to kick / step’ | → <i>eintreten</i> ‘to begin / to enter (an event)’ |
| c. <i>brechen</i> ‘to break’ | → <i>einbrechen</i> ‘to begin’ |
| d. <i>regnen</i> ‘to rain’ | → <i>(sich) einregnen</i> ‘to go into a period of steady rain’ |
| e. <i>arbeiten</i> ‘to work’ | → <i>(sich) einarbeiten</i> ‘to get settled into the job’ |
| f. <i>leben</i> ‘to live’ | → <i>(sich) einleben</i> ‘to settle in’ |

This combination of properties sets *ein* apart from the two particles already analysed: while inceptive *auf* consistently yields telic, achievement-type predicates, and inceptive *an*

consistently yields atelic, ingressive ones, *ein* falls between these two patterns and admits a wider range of aspectual outcomes.

A full analysis of *ein* lies beyond the scope of the present chapter, but I tentatively propose that, in its aspectual use, *ein* spells out [init] alone on iAsp, just as *an* does. The telicity observed in *ein*-particle verbs is not contributed by the feature specification on iAsp but rather implied by the lexical content of the particle itself, inherited from its related preposition *in*, which denotes entry into a contained state. I leave a detailed examination of the empirical patterns and of the aspectual contribution of *ein* in particle verbs for future work.

3.5 Chapter summary

This chapter has presented a detailed syntactic case study of the German verbal particle *auf*, with the aim of substantiating the claim, advanced in Chapter 2, that the polysemy of German verbal particles arises from the syntactic positions in which they are realised rather than from a multiplicity of lexical entries. *Auf* was selected as the focal item because it manifests the entire range of uses attested in particle verb constructions, including both subtypes of aspectual interpretation, and accordingly serves as a stringent test of the structural-driven analysis of particle polysemy.

The analysis rests on two central proposals. The first is the proposal that *auf* occupies one of two structural positions, with each position determining a distinct interpretation. When merged in the head of an inner aspect projection iAspP, situated between *v*P and VP, *auf* receives an aspectual interpretation; when merged as the head of a PP in the complement of V, it gives rise to resultative and idiosyncratic uses. The interpretive distinctions among the three uses of the particle thus reduce to a difference in its structural position within the verbal projection.

The second proposal is a feature-based treatment of the inceptive–egressive contrast within the aspectual uses of *auf*. I proposed that inceptive *auf* realises the joint specification [init, telic] on iAsp, encoding the punctual transition characteristic of achievement predicates, while

egressive *auf* realises [telic] alone, encoding only the terminal boundary of the event. The feature inventory of iAsp was thereby extended beyond the [telic]-only specification commonly assumed in the syntactic literature on inner aspect, allowing the system to capture the full range of aspectual contrasts attested with German particles.

The proposal yields a number of empirical predictions that were shown to be borne out. Particle verbs with aspectual *auf* pattern as mono-eventive predicates, as confirmed by independent diagnostics involving *wieder*-modification, durative adverbials, and *-ung* nominalisation. Aspectual *auf* also resists co-occurrence with secondary resultative phrases, which follows from the early merger of the resultative predicate in the complement of V: once [telic] has been introduced into the derivation by the resultative phrase, a further specification of the same feature on iAsp would constitute redundant double marking, and aspectual *auf* is accordingly blocked. The object of egressive *auf* is moreover obligatorily quantised, since [telic] on iAsp c-commands the object DP and imposes a quantisation requirement on it. Each of these predictions distinguishes the present analysis from earlier accounts that locate verbal particles uniformly in the complement of V.

A further outcome of the analysis is a structural typology of the encoding of telicity in particle verb constructions and beyond. Three configurations were identified, characterised by where the [telic] feature is realised in the structure and how it interacts with the object DP: in iAsp (where [telic] enforces telicity directly), in the complement of V (where [telic] interacts with the quantised object to force a telic outcome), and not in the structure at all (where a quantised object alone permits but does not enforce a telic interpretation). The role of [telic] diminishes systematically across the three configurations, and the resulting picture establishes that [telic] is neither a necessary nor a sufficient condition for telicity, which arises instead from the interaction between the feature's structural position and the quantisation properties of the object.

The chapter also demonstrated that the syntax-driven account is compatible with the intuitive lexical relatedness between the aspectual and resultative uses of *auf*. Because the

lexical content of the particle is held constant across uses, the intuitive continuity among them follows naturally: aspectual *auf* retains the upward-orientation of its prepositional source, layered with the grammatical specification of iAsp, while resultative *auf* expresses this same content most directly, since no aspectual features are added. The polysemy of *auf* on the present account is therefore not lexical multiplicity but a consequence of structural variation operating on a single lexical item.

Two extensions were considered in the discussion section. First, the analysis was situated within the broader landscape of root-based architectures such as DM, with reference to De Belder's (2011) system as a possible avenue for accommodating functional vocabulary items as roots, although a number of questions were left for future work. Second, the feature-based account of aspectual readings was extended to the other aspectual particles in German. I argued that the egressive particle *aus* patterns with egressive *auf* in spelling out [telic] alone on iAsp, while the inceptive particles *an* and *ein* present more intricate pictures. For *an*, I proposed that the particle spells out [init] alone on iAsp and accordingly yields atelic, ingressive readings. The resulting predicates were nevertheless shown to resist secondary resultative phrases, which I argued follows from a more general principle that a single predicate can lexicalise at most one event boundary; the presence of [init] on iAsp, foregrounding the initial boundary, accordingly blocks purely inceptive particles such as *an* from co-occurring with resultative phrases that would introduce a temporally distinct, terminal boundary. For the particle *ein*, I suggested that it carries the feature [init], and the telicity of *ein*-particle verbs is contributed by the lexical content of the particle itself, inherited from its prepositional counterpart *in*, rather than by a [telic] feature on iAsp. Together, these extensions provide initial evidence that the syntax-driven analysis advanced here is not idiosyncratic to *auf* but applies more generally to the German aspectual particle inventory.

Taken together, the chapter offers a fully elaborated instantiation of the syntax-driven view of particle polysemy. The polysemy of a single particle is shown to be derivable from the interaction of a stable lexical content with two distinct syntactic positions and the

grammatical features they realise. The case of *auf* thereby provides concrete empirical support for the broader claim that the interpretive variation of German verbal particles is structurally determined rather than lexically stipulated, with consequences that extend beyond the analysis of any single particle to the typology of inner aspect more generally.

The structural account developed for *auf* raises a broader question concerning the relationship between morphological complexity and syntactic representation. If the interpretive variation associated with a morphologically simplex particle follows from the structural position in which that particle is merged, it becomes necessary to ask what consequences this has for particles that are morphologically complex on the surface. German provides a particularly suitable testing ground in the form of double particles, which consist overtly of a deictic h-particle (*hin* or *her*) combined with a base particle such as *auf*, *aus*, or *ein*. Under the widely held assumption that transparent morphological and semantic structure corresponds to transparent syntactic composition, one might expect the two morphemes within a double particle to project independently and contribute distinct meaning compositionally. The existing literature on double particles, however, has converged on quite a different picture: across both syntactic and semantic approaches, double particles have been argued to behave as unitary objects, contrary to what their morphological make-up might suggest.

One way of addressing the divergence between the seemingly transparent morphological structure of double particles and their less transparent treatment in the syntactic and semantic literature is to ask how double particles are perceived by native speakers of German, and more specifically whether their compositional morphology gives rise to processing patterns that distinguish them from their single particle counterparts. Chapter 5 offers an empirical investigation of this question by presenting an EEG priming experiment on the morphological processing of German single and double particle verbs. Before turning to the experimental investigation, however, Chapter 4 surveys the principal syntactic and semantic analyses of double particles proposed in the literature and reviews current findings concerning their

acquisition, thereby establishing the theoretical and empirical background necessary for the processing study developed in the subsequent chapter.

4

Double particle verbs in German

Contents

4.1	Introduction	188
4.2	Syntax of double particles	192
4.2.1	Zeller (2001a): Double particles as semi-lexical functional heads	195
4.2.2	Noonan (2010, 2017): Double particles in cartographical approach	205
4.3	Semantics of double particles	211
4.3.1	H-particles are non-deictic in double particles	211
4.3.2	Distinctions between single and double particle verbs	216
4.3.3	H-particles: reinforcement and disambiguation	225
4.3.4	Summary	227
4.4	Double particles in acquisition	228
4.5	Chapter summary	231

4.1 Introduction

This chapter examines double particle verbs (DPVs) in German, a term introduced by McIntyre (2001b) as a translation of the German *Doppelpartikelverb* in Hinderling (1982). Double particles, following McIntyre (2001b), are particles with the morphological structure *h-particle* + *base particle*. H-particles concern the deictic morphemes *hin* and *her*, whose distinction

roughly corresponds to that between ‘thither’ and ‘hither’ in English. Base particles are particles of a prepositional nature that can also occur independently as single particles. The full inventory of double particles in German is given in (208).

(208) Double particles in German (McIntyre 2001b: 1)

herab, hinab; heran, hinan, ran; herauf, hinauf, rauf; heraus, hinaus, raus; herbei; herein, hinein, rein; hernieder; herüber, hinüber, rüber; herum, rum; herunter, hinunter, runter; hervor; hinzu

The deictic meanings of *hin* and *her* are most clearly reflected in their use as single particles, where they combine with motion verbs to specify the direction of motion relative to the deictic center, typically the speaker’s location. For example, (209a) could be naturally uttered by a German speaker observing a dog running toward them, whereas (209b) would be appropriate in a situation in which the dog is moving away from the speaker.

(209) a. *Warum rennt der Hund her?* (Roßdeutscher 2009: 439)

why runs the dog HER
‘Why is the dog running over here?’

b. *Wo rennt der Hund hin?*⁵⁴ (ibid.)

where runs the dog HIN
‘Where is the dog running to?’

The deictic contrast between *hin* and *her* may be preserved when these morphemes occur as part of a double particle. For example, in a context where a speaker invites a visiting friend to enter a room, *herein* is more natural than *hinein*, as the path is directed toward the speaker’s location. By contrast, in the context in (210b), where the speaker instructs the addressee to

⁵⁴The split between *wo* and *hin* in (209b) is non-standard but frequent in spoken German; the standard form employs *wohin* as a single *wh*-word, as shown in (i).

(i) *Wohin rennt der Hund?*
where runs the dog
‘Where is the dog running to?’

insert a letter into a mailbox that is not within the speaker's reach, *hinein* is more appropriate, since the path is directed toward a goal away from the speaker.

- (210) a. (Context: The speaker is inside a room; someone knocks at the door.)

Kommen Sie bitte herein!

come you please HEREIN

'Please come in here!'

- b. (Context: The speaker is on the street and instructs the addressee to put a letter into a mailbox.)

Du musst den Brief in den Schlitz hinein-stecken.

you must the letter in the slot HINEIN-stick.INF

'You have to insert the letter into the slot.'

Double particle verbs occur predominantly in spoken rather than written language (Engelen 1995), probably because the spatial deixis encoded in the deictic element is more salient in spoken than written registers. In cases where the direction of movement is not communicatively relevant, the *h*-morpheme in double particles can be reduced to *r*- before a base particle that starts with a vowel (e.g., *hin-/herauf* → *rauf* 'onto'; *hin-/herein* → *rein* 'into').⁵⁵ In these contracted *r*-forms, the directional distinction is neutralised, leaving it unspecified whether the movement is away from or toward the deictic center.

Double particles are closely related to another group of particles formed with the adverb *da* 'there' and a prepositional element (e.g., *darauf* 'there-onto', *darin* 'there-in', *darunter* 'there-under'), which, in contrast to double particles, emphasise the endstate of the motion event rather than the path leading to it. In informal registers, these *da*-particles can likewise be reduced, to a clitic *dr*- form (e.g., *darauf* → *drauf*, *darin* → *drin*). These forms have also been analysed as double particles by some scholars (e.g., Behrens 2009). However, in order to remain consistent with the definition of double particles proposed by McIntyre (2001b), the

⁵⁵This is the canonical pattern in Northern German. Behrens (2009) notes that in Southern German dialects, the *h*-particles are shortened to *n*- rather than *r*-, e.g., *nauf*, *nein*.

present study restricts the term double particles to those containing the deictic morphemes *hin* and *her*, and refers to forms containing *da* as *da*-forms.

It should be noted that both the h-particle and the base particle of a double particle can be used independently as single particles, and in those independent uses both contribute directional meaning. The previous two chapters argued, in line with much of the literature on German particle verbs, that the directional or locative content of a particle is contributed by a lexical P head in the complement of the verb. Extrapolating from this, one might expect a double particle to consist of two such lexical P heads, with each morpheme contributing its own directional meaning and the meaning of the complex derived compositionally.

The existing literature on double particles has nevertheless largely converged on a rather different view, which this chapter surveys in detail. Syntactically, double particles are generally not analysed as a combination of two single particles, but as functional objects forming a comparatively compact structural unit. This stands in clear tension both with the surface morphology of double particles, which is straightforwardly bipartite, and with the analyses of locative/directional uses of single particles motivated in the preceding chapters and in the broader literature, where these uses are generally treated as the most direct manifestations of the lexical spatial meanings associated with their homophonous prepositions. The semantic literature on double particles likewise suggests that their interpretation is less compositionally transparent than the surface form initially implies. In particular, the h-particles have been argued not to retain their ordinary deictic contribution in double particles, but instead to fulfil secondary functions such as reinforcement or disambiguation of the base particle (McIntyre 2001b). Therefore, the overt two-part morphology of double particles does not straightforwardly correspond to a fully decomposed semantic representation.

Across both syntactic and semantic approaches, then, double particles are assigned a more unitary status than their morphological make-up, spatial semantics, and the available analyses of single particles would initially lead one to expect. This mismatch between surface transparency and theoretical representation makes the question of how speakers internally

represent double particles empirically pressing. Unfortunately, findings from acquisition research provide supportive evidence in both directions. Children's treatment of double particles appears to oscillate between holistic and compositional representations: at some stages double particles seem to be acquired as lexicalised wholes, while at others children productively decompose and recombine their component parts (e.g., Harr 2013). Chapter 5 takes up the question of the representation of double particles from a different perspective, investigating whether single and double particle verbs pattern alike in real-time morphological processing, using evidence from an EEG priming experiment. The present chapter prepares the ground for that investigation by surveying what is currently known about the syntax, semantics, and acquisition of double particles, and by identifying the central theoretical disagreements to which the processing data may ultimately speak.

The chapter is structured as follows. Section 4.2 surveys the syntactic analyses of double particles that have been advanced in the literature, focusing on Zeller (2001a)'s functional-head analysis and the cartographic approach developed in Noonan (2010, 2017). Section 4.3 turns to the semantics of double particles, drawing primarily on McIntyre (2001b) to set out the arguments for treating h-particles as non-deictic, the systematic differences between single and double particle verbs, and the functions of reinforcement and disambiguation that h-particles can be argued to retain. Section 4.4 reviews what is known about the acquisition of double particles in child German. Section 4.5 summarises the chapter and sketches the empirical question that Chapter 5 will pursue.

4.2 Syntax of double particles

Double particles occur primarily in three syntactic configurations (Poitou 2003): (i) without an accompanying noun phrase (211a); (ii) with an accusative noun phrase, which can denote either the figure (211b) or the ground (211c); (iii) with a prepositional phrase, yielding so-called pleonastic constructions, in which the same lexical item appears both as a preposition

and as (part of) a particle within the same clause, with the double particle surfacing either immediately before or after the prepositional phrase, as in (211d).⁵⁶

- (211) a. *Er geht hinauf.*
 he goes HINAUF
 ‘He goes up.’
- b. *Er geht den Berg hinauf.*
 he goes the mountain HINAUF
 ‘He goes up the mountain.’
- c. *Er bringt den Hund heraus.*
 he takes the dog HERAUS
 ‘He takes the dog out.’
- d. *Er geht [hinauf] auf den Berg [hinauf].*
 he goes HINAUF on the mountain HINAUF
 ‘He goes up on the mountain.’

In cases where a double particle co-occurs with a prepositional phrase, the directional particle need not be lexically identical to the preposition, as in (212), which shows clearly that the prepositional phrase and the double particle fulfil distinct functions within the construction. Normally, the PP specifies the location at which the motion event terminates, as with *auf das Dach* ‘onto the roof’ in (212), whereas the particle specifies the orientation of the path, here downward motion, as encoded by *hinunter* in the same example.

- (212) *Die Schnecke ist auf das Dach hinunter geklettert.* (Noonan 2010: 169)
 the snail is on the roof HINUNTER climb.PTCP
 ‘The snail climbed down onto the roof.’

⁵⁶Although single particle verbs may also occur in pleonastic constructions, as in (i) below, pleonastic PPs are considerably more frequent with double particle verbs (Dewell 2011).

(i) *durch das französische Drahtverhau durch-kriechen* (Dewell 2011: 42)
 through the French barbed.wire DURCH-crawl.INF
 ‘to crawl through [through] the French barbed wire’

The combination of a prepositional phrase followed by a double particle whose base particle differs from the preposition is also referred to as a *circumpositional phrase* (van Riemsdijk 1990), defined as a phrase ‘introduced by a preposition but closed off by another preposition-like element’ (van Riemsdijk 1990: 233). Correspondingly, double particles themselves have also been analysed as *postpositions* (Zeller 2001a). Terminology of this kind suggests that the double particle forms part of a complex prepositional phrase, a view that appears to depart from the term double particle verb adopted in this thesis, which treats them as belonging to the verbal complex.

This terminological divergence in fact reflects a broader tendency in the literature: discussion of double particles has focused predominantly on their occurrence in pleonastic and circumpositional constructions and has therefore largely developed within the literature on prepositional phrases rather than within the literature on particle verbs. As a consequence, comparatively little attention has been paid to the relation between the double particle and the verb, or to the extent to which double particles pattern with single particles more generally. Even uses of double particles without an accompanying PP are frequently treated as partly lexicalised remnants of a larger PP structure, rather than as particles whose interpretation is closely tied to the verbal complex. This orientation has partly contributed to the divergence in the treatment of single and double particles discussed earlier: in the literature on particle verbs, single particles are generally analysed as lexical spatial elements merged in a lexical P head; whereas research on double particles has focused primarily on determining which functional heads within the extended projection of PP they realise. While the present chapter adopts McIntyre’s (2001b) view that double particle verbs constitute a subtype of particle verbs and that double particles stand in a closer structural and interpretive relation to the verb, the choice between particle verb analyses and circumpositional analyses concerns primarily the larger syntactic structure in which the double particle is embedded, and is orthogonal to the discussion that follows, which concerns the internal structure of double particles themselves. It is, however, an aim of the present chapter to bring the literature on

single and double particles into closer dialogue and to identify more precisely where the divergence between these approaches arises.

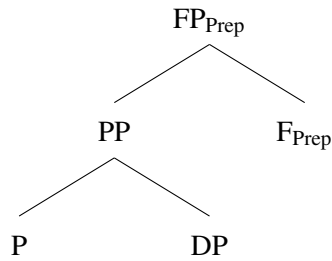
The syntactic literature on German double particles remains comparatively limited. In the following sections, I discuss the two most prominent analyses proposed in the literature. The first is Zeller (2001a), which examines double particles in direct comparison with single particles and in relation to his analysis of particle verbs discussed in Section 2.3. To the best of my knowledge, Zeller's account is the only syntactic analysis of German double particles that explicitly considers their structural relation to the verb within a broader theory of particle verbs. The second line of analysis is associated with the cartographic work of Noonan (2010, 2017), which focuses more broadly on the structure of German prepositional constructions, including pronominal adverbs and circumpositional configurations, but which extends to double particles as part of a more general account of the fine structure of PP.

4.2.1 Zeller (2001a): Double particles as semi-lexical functional heads

Zeller (2001a) analyses double particles as semi-lexical elements, defined as 'morphologically complex functional heads that are derived from a lexical node' (Zeller 2001a: 533).⁵⁷ As background, Zeller assumes that adpositions and particles in German belong uniformly to the category P, whose full structure is given in (213) (Zeller 2001a: 507), in which a lexical projection PP forms the complement of a right-headed functional head F_{Prep} . Depending on the particular use of the lexical item, the functional projection may either be phonologically null or absent altogether, which will be discussed below.

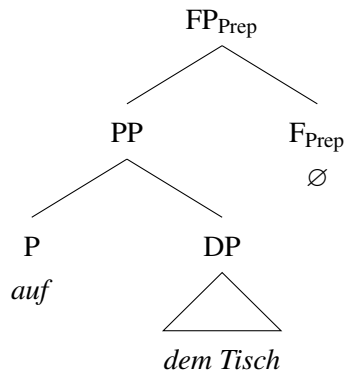
⁵⁷This therefore differs from the semi-lexical vocabulary items discussed in De Belder (2011), which are functional vocabulary items that can be used in a lexical environment with substantive semantic content (cf. Section 3.4.1).

(213) Syntactic structure of prepositional phrases



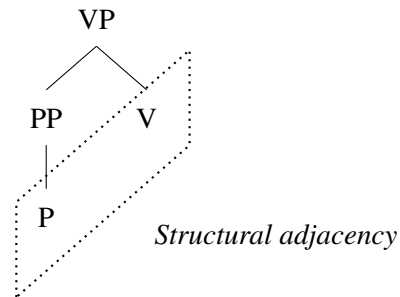
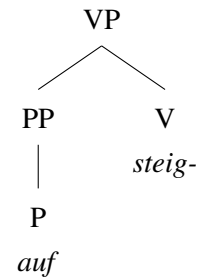
In its prepositional uses, the vocabulary item is merged in the lexical head P. The functional head F_{Prep} remains phonologically unrealised, but it is argued to be responsible for case assignment to the complement of P. Accordingly, the structure proposed for the prepositional phrase *auf dem Tisch* ‘on the table’ is given in (214).

(214) Preposition



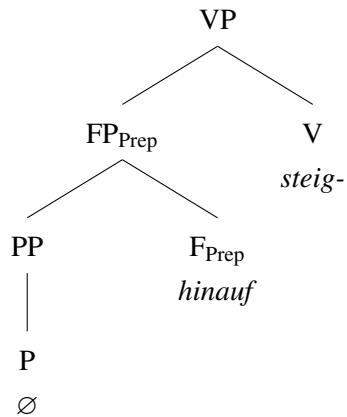
Single particles, as discussed in Section 2.3, are analysed by Zeller (2001a, 2001b) as lexical P heads projecting PP that merge directly with the verbal head without an intervening functional projection. The structure of single particle verbs is shown in (215a) and exemplified by the particle verb *aufsteigen* ‘to ascend’ in (215b). Therefore, unlike ordinary prepositional constructions, where the functional head F_{Prep} is present but phonologically null, the structure of single particle verbs lacks this functional projection altogether. The absence of F_{Prep} places the verb and the particle in a structurally adjacent relation, which, according to Zeller, accounts for a range of differences between single particles and prepositional phrases.

(215) a. Single particle verb

b. *aufsteigen* 'to ascend'

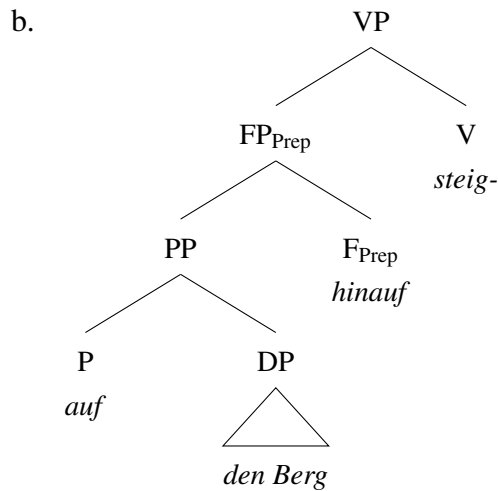
Finally, double particles are analysed as realisations of the functional head F_{Prep} , with the lexical PP being phonologically unrealised. The proposed syntactic structure for the double particle verb *hinaufsteigen* 'to climb up' is given in (216)

(216) Double particle verb



Accordingly, a construction containing both a prepositional phrase and a co-occurring double particle, as in (217a), has the syntactic structure shown in (217b).

(217) a. *auf den Berg hinauf-steigen*
 on the mountain HINAUF-climb.INF
 'to climb onto the mountain'



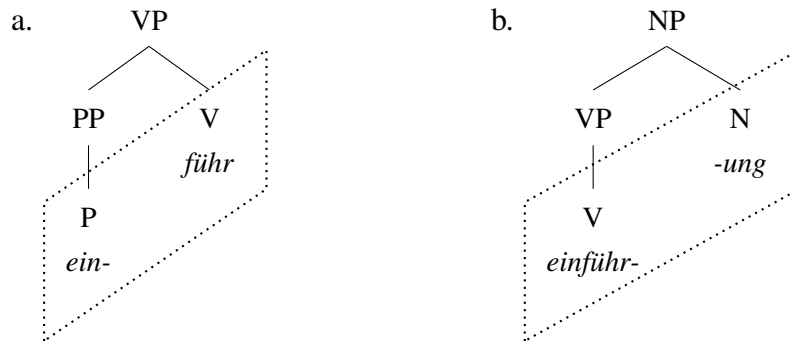
The argument for analysing double particles as functional elements derives primarily from the extent to which the presence vs. absence of a functional projection captures the similarities and differences between these two particle types, rather than from independent evidence that double particles themselves are functional.

One difference discussed in Zeller (2001a) between single and double particles concerns referentiality: double particles are argued to be inherently referential, a property that Zeller associates with the presence of a functional projection above PP, whereas single particles are claimed to be neither referential nor specific. The referentiality of double particles can be observed in (218a). The double particle *hinaus* does not merely contribute a generic outward orientation to the motion event, but refers to a contextually identifiable path, namely the trajectory leading out through the gate specified by the PP *durch das Tor* ‘through the gate’, which the speaker presupposes to be retrievable from the discourse. By contrast, the single particle *aus* in (218b) contributes only an outward directional meaning without referring to any particular path. The referentiality of these h-elements has led some authors to analyse them as prepositional proforms (McIntyre 2001b) or pronominal adverbials (Negele 2012), which function similarly to pronouns but stand for full prepositional phrases that refer to paths rather than entities.

- (218) a. *Das Wasser strömte durch das Tor hinaus.*
 the water flowed from the container HINAUS
 ‘The water flowed out through the gate.’
- b. *Das Wasser strömte plötzlich aus dem Behälter aus.*
 the water flowed suddenly from the container AUS
 ‘The water suddenly flowed out of the container.’

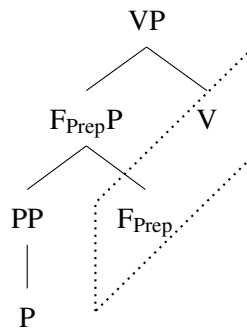
Analysing double particles as realisations of F_{Prep} is further argued by Zeller (2001a) to capture the similarities between double particles and single particles. For single particles, Zeller proposes that the particle and the verbal head stand in a structurally adjacent relation, which he takes to underlie a number of properties that distinguish particles from ordinary prepositions. One consequence of this structural adjacency is that the particle may develop meanings that are no longer transparently related to those of the corresponding preposition, including aspectual (e.g., *an* in *anrollen* ‘to start rolling’) and idiosyncratic interpretations (e.g., *auf* in *aufhören* ‘to stop’) that arise only in particle verb constructions. In addition, the adjacency relation allows the particle and the verb to be reanalysed as a single morphological unit, which may subsequently undergo further morphological operations such as nominalisation with *-ung*. Thus, in the particle verb *einführen* ‘to introduce’ (219a) and the corresponding nominalisation *Einführung* ‘introduction’ (219b), structural adjacency first holds between the particle and the verb, thereby permitting their reanalysis as the complex head **einführ-*. The derived complex head then stands in a structurally adjacent relation with the nominal suffix *-ung*, yielding the nominalised form *Einführung*.

(219)



Zeller (2001a) further argues more generally that structural adjacency holds between any head and the head of its complement. If double particles are analysed as merged in F_{Prep} , the double particle likewise stands in a structurally adjacent relation with the verbal head, just as single particles do (220). Consequently, double particles are predicted to exhibit the same two properties associated with structural adjacency: first, the development of meanings that are not compositionally derivable from the corresponding preposition, and second, the possibility of reanalysis as a complex head that can undergo further derivational morphology.

(220) Structural adjacency between a double particle and a base verb



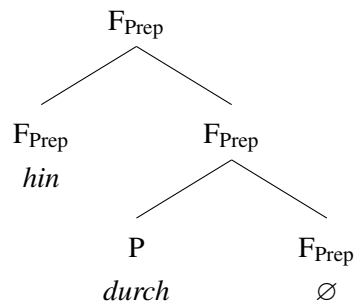
Both predictions appear to be borne out. First, double particles may develop meanings that are not straightforwardly related to those of the corresponding prepositions. For example, *herum* (lit. HER-around) may denote activity lacking a clear purpose or endpoint, as in *herumschreien* ‘to shout for no reason’ or *herumalbern* ‘to fool around’. Similarly, *herein* (lit. HER-into) need not contribute a literal directional meaning of inward motion, but may

instead convey a meaning of superficial or cursory engagement, as in *hereinriechen* ‘to have a quick smell’ or *hereinschmecken* ‘to have a quick taste’. Furthermore, double particle verbs can also undergo nominalisation with *-ung*, as illustrated in (221).

- (221) a. *herausfordern* ‘to challenge’ → *Herausforderung* ‘challenge’
 b. *hinzufügen* ‘to add’ → *Hinzufügung* ‘addition’
 c. *hervorheben* ‘to emphasise’ → *Hervorhebung* ‘emphasis’

With respect to the internal structure of double particles, Zeller argues that although they occupy the functional head F_{Prep} , they differ from canonical functional elements such as determiners and complementisers in that they form complex functional heads. Zeller calls double particles semi-lexical heads, i.e., ‘functional heads that are morphologically derived by attaching a functional suffix to a lexical node’ (Zeller 2001a: 524). Specifically for double particles, he argues that they are complex functional heads that consist of a lexical prepositional head hosting the base particle, a phonologically null functional suffix, and a further functional head hosting the h-particle. The proposed structure is exemplified with the double particle *hindurch* (lit. HIN-through) in (222). Note that (222) does not contain any phrasal projections: all nodes in the structure are heads, and the output is a single morphological unit that occupies the head of the functional projection FP_{Prep} .

- (222) Internal structure of *hindurch*



By virtue of the presence of a suffix, Zeller characterises double particles as ‘inflected’ prepositions. Although the suffix is phonologically null, Zeller (2001a) argues that its presence

is nevertheless required for both morphological and semantic reasons. Morphologically, complex words in German are generally subject to the Righthand Head Rule (RHR), originally formulated by Williams (1981) for English, according to which the head of a morphologically complex word is its rightmost element.⁵⁸ The morphological head determines, among other properties, the categorial status of the complex word. According to RHR, then, the functional status of double particles should follow from the categorial status of their rightmost element. On the surface, however, this element is the base particle, which Zeller analyses as occupying a lexical P head. If no additional structure were assumed, the complex would therefore incorrectly inherit lexical rather than functional status, in contradiction with the assumption that double particles are functional. The postulation of an additional, phonologically null functional head to the right of the base particle resolves this contradiction: the complex now has a functional rightmost head, in conformity with the RHR, and the functional status of the complex follows from the head status of the suffix

Zeller further argues that the suffix is essential to deriving the referential interpretation associated with double particles. On his analysis, the suffix functions as an operator that existentially binds an argument of the lexical preposition with which it combines and introduces a predicative argument whose role is to identify the bound argument.⁵⁹ The effect of the operator can be illustrated by the derivation of the postpositional *durch* ‘through’ in (223). The lexical preposition *durch* has the semantics in (224a), which states that the middle segment (MID) of a path traversed by an object *x* intersects with the interior region (IN) of a reference object *y*. When *durch* combines with the zero suffix, whose semantics is given in (224b), the preposition saturates the Q argument introduced by the operator, whereby the

⁵⁸Exceptions to the RHR can be found in German prefix verbs derived from non-verbal bases. For example, verbs such as *bedachen* ‘to roof’ and *bemuttern* ‘to mother’ are derived from the nouns *Dach* ‘roof’ and *Mutter* ‘mother’, but the verbal bases to which the prefix would attach, i.e., **dachen* or **muttern*, are never attested in German. The categorial status of these complex verbs therefore cannot be determined by the rightmost constituent of the complex verb alone, and such formations have consequently been analysed by some scholars as left-headed. (Donalies 2005; Eschenlohr 1999; Olsen 1986, 1990)

⁵⁹Note, however, that under the structure assumed in (222), the suffix cannot syntactically bind the argument of the preposition, since they are not in a c-command relation.

reference object y becomes existentially bound. As a consequence, the resulting postposition expresses the same path relation encoded by prepositional *durch*, but now with respect to an implicit reference object (224c). The bound argument may subsequently be identified through a PP complement of the postposition, which saturates the predicative argument P introduced by the functional head. The construction in (223) is therefore interpreted such that the middle segment of x 's path intersects with the interior region of an implicit reference object y while x is located under the bridge, where the implicit y is identified through the location expressed by the PP-complement (224c).

(223) *unter der Brücke durch*
 under the bridge through
 ‘(to go) through under the bridge’

- (224) a. preposition *durch* $\lambda y \lambda x [\text{MID}(\text{LOC}(x)) \subset \text{IN}(y)]$
 b. $\emptyset$ -F_{Prep} $\lambda Q \lambda P \lambda x \exists y [Q(y)(x) \wedge P(x)]$
 c. postposition *durch* $\lambda P \lambda x \exists y [\text{MID}(\text{LOC}(x)) \subset \text{IN}(y) \wedge P(x)]$
 d. *unter der Brücke durch* $\lambda x \exists y [\text{MID}(\text{LOC}(x)) \subset \text{IN}(y) \wedge \text{LOC}(x) \subset \text{UNDER}(\text{the-bridge})]$

The zero suffix, as Zeller conceives of it, is in this respect closely analogous to the passive operator, which is standardly taken to alter the argument structure of the verb to which it attaches by existentially binding an argument that would otherwise be projected to syntax. Since passive morphology is commonly assumed to occupy a functional head such as Infl(ection), the semantic parallel between passives and postpositions is taken to provide additional support for analysing the latter as involving a functional projection.

To summarise, Zeller (2001a) analyses double particles as morphologically complex functional heads occupying F_{Prep}, located within the extended projection of the lexical category PP. Since double particles stand in the same structurally adjacent relation to the verbal head as single particles do, both particle types are predicted to permit idiosyncratic interpretations

and further derivational morphology. With respect to their internal structure, Zeller treats double particles as semi-lexical functional heads: functional heads derived by attaching a phonologically null functional suffix to a lexical node hosting the base particle, to which the h-particle subsequently attaches. Although the suffix is unrealised on the surface, it is argued to perform two functions: it assigns functional status to double particles in conformity with the RHR, and derives their referential semantics.

Two aspects of this analysis warrant scrutiny. The principal motivation for treating double particles as functional elements derives not from properties intrinsic to double particles themselves but from their contrast with single particles, which Zeller analyses as merging directly with the verb without an intervening functional projection. The argument thus has a somewhat circular character: the functional status of double particles is invoked to explain a contrast that depends on a complementary assumption about single particles, namely that they lack such a functional projection, which is itself stipulated rather than independently established. Much of the discussion focuses on how this structural difference captures the empirical contrasts between the two classes, while direct evidence for the functional status of double particles remains relatively limited.

A second concern arises from the role assigned to the phonologically null functional suffix internal to double particles. The suffix carries the entire analytical burden of the proposal: it confers functional status on the complex in conformity with the RHR, and derives the referential semantics that distinguishes double particles from single particles. Yet the suffix has no overt morphological exponence, no phonological reflex, and no independent morphosyntactic effect; its presence is detectable only through the very properties it is invoked to derive. The result is a structural element that does substantial theoretical work without leaving any independent trace on the linguistic form. Postulating such an element is difficult to justify on grounds external to the analysis itself, particularly given that double particles in German display no morphological evidence of suffixation at all: they are surface-identical to plain h-particle + base-particle concatenations, with no agreement, no allomorphy, and no

morphophonological alternation that might betray the presence of an additional morpheme. Although Zeller characterises double particles as ‘inflected’ prepositions, they exhibit none of the morphological properties typically associated with inflection.

Despite these concerns, the broad picture proposed by Zeller (2001a) can be summarised as follows: double particles are treated as single, syntactically functional elements that occupy a functional head and, from the perspective of the verbal projection, behave as unanalysable units that resist further syntactic decomposition.

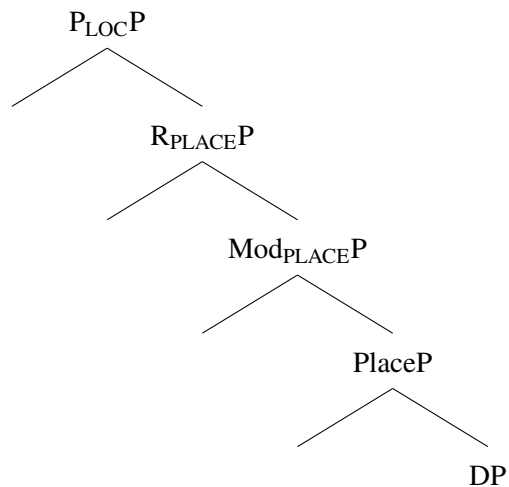
4.2.2 Noonan (2010, 2017): Double particles in cartographical approach

Noonan (2010, 2017) analyse double particles in German within a cartographic framework, according to which spatial expressions are decomposed into a fine-grained sequence of functional projections, each associated with a distinct semantic contribution. As background, Noonan assumes that there is no lexical category P. Instead, adpositions, whether morphologically simplex or complex, are analysed as realisations of functional projections built around an abstract Place noun. This silent Place head can be interpreted roughly as AREA or SPACE; it denotes the relevant spatial region and stands in a possessor-possessee relation with the ground argument introduced by the DP complement. Thus, the locative PP *auf dem Tisch* ‘on the table’ is structurally represented through the locative relation AT-TOP encoded in Place together with the DP *dem Tisch*, yielding the interpretation ‘at the top region of the table’. In German locative PPs, the Place head itself is generally phonologically unrealised.

On top of PlaceP sits a series of functional projections that modify the locative relation and together yield a fully specified locative interpretation. These projections include, from bottom to top, Mod_{PLACE}P, R_{PLACE}P, and P_{LOC}P (225). Mod_{PLACE} introduces modifiers of the silent place noun and is argued by Noonan (2010) to be where most German locative prepositions are hosted. Above this projection, R_{PLACE} functions as a determiner-like category that provides spatial deixis. In German, this head may be overtly realised by elements such as *dr-* in forms like *drin* ‘in there’. Finally, P_{LOC} constitutes a predicative head that establishes a

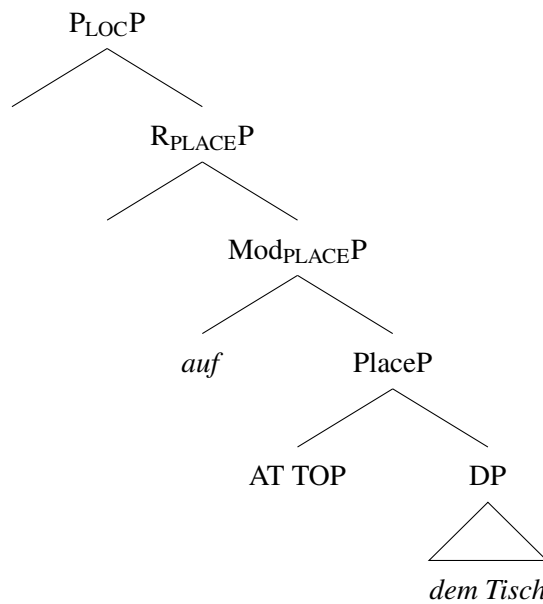
spatial relation between the figure and the region denoted lower in the structure. This head can be lexically realised as the default locative preposition of a language, which simply expresses a general locative meaning comparable to that of English *at*. According to Noonan (2010), the default preposition in German is *bei* ‘at’, as in *bei der Statue* ‘at the statue’. When a more specific spatial relation is expressed, however, the relevant preposition originates lower in $\text{Mod}_{\text{PLACE}}$, whose projection then raises to $\text{SpecP}_{\text{LOC}}$. The presence of an overt lexical element in this position licenses P_{LOC} to remain phonologically null. P_{LOC} is furthermore argued to assign dative case to the DP in its specifier through Agree.

(225) Architecture of a locative PP



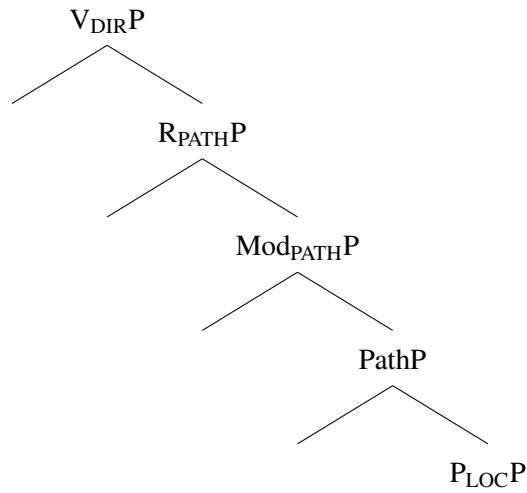
Accordingly, the underlying structure of the German PP *auf dem Tisch* ‘on the table’ is given in (226).

(226) *auf dem Tisch* ‘on the table.’

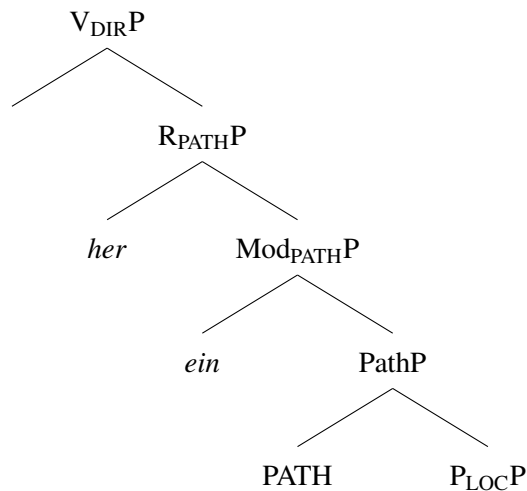


Directional PPs are assumed to contain an additional higher functional domain in which the locative structure in (225) is embedded. This directional domain likewise consists of four functional projections corresponding to those proposed for locative PPs (227). Immediately above P_{LOCP} is PathP , whose head is an abstract nominal element comparable to *Place* in the locative domain. PathP is dominated by a modifier projection, $\text{Mod}_{\text{PATHP}}$, which hosts overt directional elements in German, and by a determiner-like projection, R_{PATHP} , which introduces directional deixis. The directional counterpart of P_{LOCP} in the locative domain is V_{DIRP} , whose head instantiates an abstract motion verb *GO* and can assign accusative case to the PP complement. The syntactic structure proposed by Noonan (2010) for directional PPs is given in (227).

(227) Architecture of a directional PP

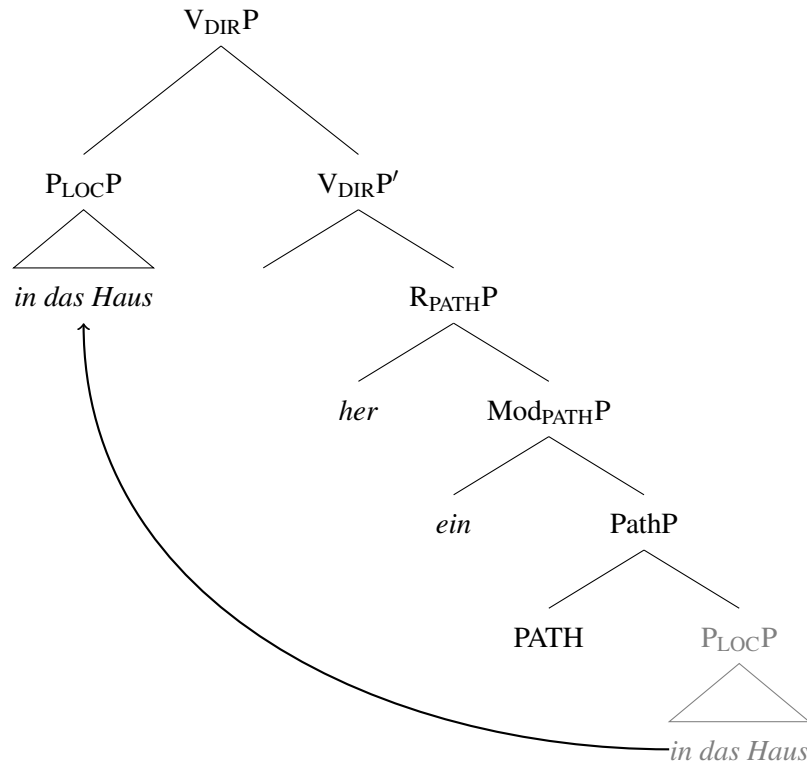


Focusing on double particles, which always denote a directional meaning, Noonan (2010, 2017) proposes that the *h*-particles, as well as the contracted *r*-form, are realisations of the R_{PATH} head, and can attach to the base particle, which is merged in Mod_{PATH} . For example, the double particle *herein* ‘into’ is proposed to exhibit the structure as in (228).

(228) *herein* ‘into’

In pleonastic constructions, where a double particle is preceded by a PP, the PP is argued to be the whole $P_{LOC}P$ moving from below to the specifier of $V_{DIR}P$, as shown in (229).

(229) *in das Haus herein* ‘into the house’



Noonan's analysis, while empirically rich and structurally detailed, is shaped, and in important respects constrained, by the cartographic framework within which it is developed. Her central concern is the fine-grained internal structure of the extended PP, and double particles enter the analysis primarily as evidence for the functional projections she posits above the lexical P head. As a result, the question that drives the account is where double particles fit within the articulated PP spine, not what their distribution and interpretation reveal about the broader syntactic context in which they occur. This framing has a notable consequence: double particles are examined in their capacity as elements of complex PPs, but their relationship to the verb is left largely unexplored.

Despite their different theoretical commitments, Zeller's (2001a) and Noonan's (2010, 2017) analyses converge on a central point: both analyse double particles as functional

elements.⁶⁰ In Zeller's account, the double particle occupies F_{Prep} and is analysed as a morphologically complex functional head. In Noonan's cartographic account, the relevant elements are distributed across functional projections in the extended PP structure. Crucially, neither analysis treats a double particle as the simple merger of an h-particle with a lexical directional particle inside P. Instead, both locate double particles in the functional domain, so that the locative and directional meanings they express are not contributed directly by what is merged in the lexical head P, but are mediated by functional structure.

This convergence is theoretically important when compared with the treatment of single particles in the literature on German particle verbs. In the latter, locative and directional meanings are typically taken to be contributed by a lexical head, so that single particles are analysed as lexical spatial elements closely related to their homophonous prepositions. Double particles, by contrast, are assigned a more functional status, even though they express locative and directional meanings of the same general kind. The difference between single and double particles therefore concerns not only morphological complexity, but also the syntactic source of spatial meaning.

Furthermore, in both analyses, the double particle forms a single syntactic constituent. Whatever its internal complexity, it does not enter the derivation as two independently merged particles that merely surface adjacent to one another. For Zeller (2001a), this unithood is built into the analysis at the level of the terminal: the double particle is a single functional head whose component morphemes are assembled below the word level and introduced into the syntax as one unit. For Noonan (2010, 2017), unithood holds in a weaker but still substantive sense. Although the deictic and directional components are associated with distinct functional projections within the extended PP, they belong to one and the same extended projection, and the surface adjacency of the two particles reflects this structural cohesion rather than an accidental linearisation of two independent elements.

⁶⁰For Noonan (2010, 2017), this in fact applies to all adpositions, not only double particles.

Taken together, these analyses yield a specific syntactic picture of double particles. They are treated as functional rather than lexical elements, in contrast to single directional particles, and as single syntactic units despite their morphological appearance. This picture already suggests that double particles cannot be analysed simply as the concatenation of two independently projected prepositional morphemes. The next section shows that the semantic literature points in a similar direction. In particular, the interpretation of the h-particle in double particles has been argued not to correspond straightforwardly to its independent deictic meaning, suggesting that the apparent compositionality of the surface form does not accurately represent their semantics.

4.3 Semantics of double particles

The most detailed semantic analysis of German double particles is provided by McIntyre (2001b), and the following discussion primarily draws on his account. In his book, McIntyre examines not only the semantics of all double particles within the framework of Conceptual Semantics (Jackendoff 1983, 1990), but also the relation between the meaning of double particles and the meanings of their component parts, with particular attention to the contribution of the h-particle. This question is important because the surface form of double particles suggests a transparent combination of a deictic element and a directional base particle. As will be shown, however, McIntyre argues that the h-particle in double particles does not straightforwardly retain its independent deictic meaning, but instead reinforces or disambiguates the spatial meaning contributed by the base particle.

4.3.1 H-particles are non-deictic in double particles

While McIntyre (2001b) observes that a context-free combination of a double particle and a verb always permits a purely directional reading where this is semantically possible, a more thorough examination leads him to conclude that h-particles, although deictic when

used as single particles, lose their deictic function within double particles. The argument rests on several pieces of evidence.

First, certain semantically conceivable combinations, namely **herdurch*, **hinum*, and **herzu*, are unattested in Standard German.⁶¹ If h-particles simply specify whether the trajectory proceeds toward or away from the deictic centre, the inventory should in principle allow all semantically coherent combinations of *hin/her* with a directional base particle. The absence of these forms therefore suggests that the distribution of h-particles in double particles is constrained by more than ordinary deictic meaning.

Furthermore, McIntyre (2001b) finds that the use of double particles with *hin* and *her* among native speakers of Standard German is heavily biased towards the latter, with *hin*-forms appearing more marked than their *her*-counterparts.⁶² This bias is reflected in cases where *her* is used to describe motion that does not, on a strict deictic reading, terminate at the speaker's location, but instead originates from the speaker, as illustrated in (230).⁶³

(230) (McIntyre 2001b: 249, citing Herberg 1968)

a. *Ich schaue nur schnell bei Ihnen herein.*

I look only quickly at you HEREIN
'I'm just dropping by to see you.'

b. *Er kann nicht mehr zu ihr herüber-finden.*

he can not more to her HERÜBER-find.INF
'He can no longer find his way over to her.'

⁶¹The form *herdurch* is already attested in Luther's time (McIntyre 2001b) and continued to be used into the 17th century (Grimm & Grimm 1877). *Herzu* and *hinum* still occur nowadays in some German varieties.

⁶²McIntyre (2001b) argues that this bias is not semantic in nature, since there are dialects that take *hin*-particles as the unmarked forms. Eichinger (1989) (cited in Behrens (2009)) reports the opposite asymmetry, finding *hin*-particles more frequent than *her*-particles in his data, and attributes this to a more general preference among speakers for encoding events oriented away from the deictic center rather than toward it.

⁶³But one might alternatively analyse these examples as instances of deictic shift, which would undermine the claim that *her*- has lost its directional meaning.

Finally, double particles can exhibit meanings that differ from those of the corresponding single particles or prepositions. The single particle *vor*, for instance, typically conveys the spatial or temporal sense ‘in front of, ahead of’ (231a), a meaning that is also available for the cognate preposition (231b). The double particle *hervor*, however, does not denote motion to a position in front of a reference object, as its compositional make-up would suggest; rather, it emphasises the emergence of a figure from a concealed location. Accordingly, (232) is judged acceptable by native speakers of German only under the interpretation that Ernst was previously concealed by the piano or the tree, even though his final position need not be in front of the reference object but may, for example, also be beside it.

- (231) a. *das Auto vorfahren* to pull the car forward
 für ein Projekt vorarbeiten to work ahead on a project
- b. *vor dem Haus* in front of the house
 vor Weihnachten before Christmas

- (232) *Ernst kam hinter dem Klavier / dem Baum hervor.* (McIntyre 2001b: 240)
 Ernst came behind the piano the tree HERVOR
 ‘Ernst came from behind the piano/the tree.’

Similarly, the single particle *um* typically denotes either a change of location (233a) or the sense ‘knock or fall over’ (233b). The double particle *herum*, however, can carry meanings that do not appear to be compositionally derivable from the deictic content of *her* together with the meaning of *um* as a single particle. In (234a–b), for instance, *herum* contributes a sense of unspecified or non-directed motion, whereas in (234c–d) it conveys that the action is performed ineptly, aimlessly, or without a satisfactory outcome.

- (233) a. *umziehen* to change house / clothes
umsteigen to transfer
umpflanzen to transplant

- b. *das Straßenschild umfahren* to knock over the street sign
die Vase umkippen to tip over the vase

(234) a. *Er schleppt immer das ganze Geld mit sich herum.*
 he lugs always the whole money with REFL HERUM
 ‘He is always lugging all that money around with him.’
 (McIntyre 2001b: 222)

- b. *Wir haben im Freundeskreis nach dem besten Kinderarzt*
 we have in.the friend.circle for the best pediatrician
herum-gefragt.
 HERUM-ask.PTCP

‘We asked around among our friends for the best pediatrician.’

- c. *Statt den Text neu zu schreiben, bessert er noch zwei Tage*
 in.stead.of the text new to write.INF improves he still two days
an ihm herum.
 with it HERUM

‘Instead of rewriting the text, he keeps messing around with it for another two days.’

(McIntyre 2001b: 229)

- d. *Wir haben lange an der Inschrift herum-gerätselt.*(McIntyre 2001b: 232)
 we have long on the inscription HERUM-puzzle.PTCP

‘We puzzled over the inscription for a long time.’

Based on these observations, McIntyre (2001b) concludes that *hin* and *her* do not serve a deictic function in double particles, and that speakers’ choice between the two forms is largely neutral with respect to whether a figure moves toward or away from the speaker. Under this neutralised use, any deictic interpretation, if relevant, is typically inferred from the broader

context rather than encoded in the particle itself.

On the basis of this argument against the deictic function of h-particles in double particles, McIntyre (2001b) further rejects analyses of double particles as the result of compositionally attaching an h-particle to a single particle or preposition, whether by compounding or by derivation. Likewise, the semantics of double particles should not be analysed as compositionally derived from the deictic meaning of h-particles and that of the base particles. Instead, he argues that double particles are complex, non-decomposable morphological units, and that the h-particle is not an immediate constituent of the double particle. Double particle verbs should accordingly be analysed not as [*h-particle*] + [*single particle verb*] but as [*double particle*] + [*verb*]. On this view, speakers choose between single and double particles rather than deciding whether to add an h-particle to a single particle.

This conclusion echoes that of Stiebels and Wunderlich (1994), who argue that the acceptable sequences of multiple particles in present-day Standard German are the result of historical reanalysis of the two elements as a single complex particle. One piece of evidence for their claim comes from the stress patterns of double particles. In German, primary stress in compounds regularly falls on the leftmost non-branching element, as in '*Buch-handlung*' (lit. book-shop) 'bookstore' and '*Hand-schuh*' (lit. hand-shoe) 'glove'. A comparable pattern is found in single particle verbs, where the particle consistently bears the main stress, as in '*aufessen*' 'to eat up' and '*abfahren*' 'to depart'. If double particles were formed by attaching an h-particle to a single particle or to a single particle verb, one would expect the stress to fall on the leftmost element, i.e., the h-particle. However, this prediction is not borne out. Instead, double particle verbs always have primary stress on the base particle rather than on the h-particle (e.g., *her'ein*, *hin'auf*, *her'unter*). This pattern is unexpected under a compositional analysis of double particles, but follows naturally if they are treated as reanalysed single units, with stress assigned word-internally.

If h-particles in double particles lack a deictic function, the question that naturally arises is what function they really serve in this context. To address this issue, it is useful to examine the semantic and syntactic differences between single and double particle verbs.

4.3.2 Distinctions between single and double particle verbs

The first difference between single and double particle verbs concerns the degree of their semantic transparency: single particle verbs exhibit non-compositional or idiosyncratic meanings far more frequently than double particle verbs do (cf. Hinderling 1982; Reining 1916). This idiosyncrasy manifests itself in several ways. First, single particle verbs may impose idiosyncratic selectional restrictions on their arguments: *ein Netz auswerfen* ‘to cast a net’ is well-formed, whereas **einen Ball auswerfen* with the intended meaning ‘to throw out a ball’ is not, despite the apparent compositional availability of the latter reading. Second, single particle verbs may forfeit their spatial meaning in favour of a metaphorical meaning, as in *davon ausgehen* ‘to assume, to proceed from the assumption that’, or an aspectual meaning, as in *ein Buch anlesen* ‘to start reading a book’ (cf. Chapter 2). Third, in certain cases the meaning of the single particle verb cannot be synchronically motivated from its parts at all, as with *aufhören* ‘to stop’, whose meaning is completely opaque relative to the contributions of the particle *auf* and the base verb *hören* ‘to hear’.

Double particle verbs, by contrast, can always denote a directional meaning whenever the semantics permits. Even in those cases introduced above where double particles appear to diverge from the meanings of their cognate single particles or prepositions, the divergence can mostly be motivated as a metaphorical extension of an underlying spatial schema. The non-directed-motion reading of *herum* (as in *etwas mit sich herumtragen* ‘to carry something around with one’), for example, can be derived metaphorically from the circular path-shape encoded by the preposition *um* (e.g., *um das Haus laufen* ‘to run around the house’), and its aimless-activity reading (as in *an etwas herumbessern* ‘to keep tinkering with something’) can in turn be understood as a further extension, in which the circularity of the path is mapped

onto the iterative, non-goal-directed character of the action. In general, the meaning of double particle verbs remains anchored in a recoverable spatial source, even where it has undergone considerable semantic shift. Idiosyncrasy of the kind illustrated above for single particle verbs is largely absent from double particle verbs.

A further difference between single and double particle verbs concerns the discourse status of the reference object, i.e., the entity relative to which the location or motion of the figure is described, corresponding to what Talmy (1975, 1991, 2000) terms the *Ground*. Specifically, the reference object of a single particle verb is typically defocused and need not correspond to any contextually salient entity, whereas the reference object of a double particle verb must generally be retrievable from the discourse context. The contrast is clearly illustrated by the example in (235), which is to be read as occurring without further context or accompanying gestures.

(235) (McIntyre 2001b: 263)

Ich habe Kopfschmerzen. Mein Nachbar schlägt nämlich schon zwei
 I have headache my neighbour hits namely already two
*Stunden Nägel ein / *rein / *hinein.*
 hours nails EIN REIN HINEIN

‘I have headaches. My neighbour has been hammering nails in for two hours already.’

The single particle verb is felicitous in this context because the communicative point of the utterance does not depend on identifying the reference object. What matters for the speaker’s complaint is that hammering is taking place and producing the noise responsible for the headache; into which surface the nails are being driven is immaterial to the message, and the hearer is under no obligation to recover it. The reference object can thus be left in the background without communicative loss, and *einschlagen* is accordingly appropriate for its communicative purpose. The double particle counterparts *reinschlagen* and *hineinschlagen*, by contrast, are degraded precisely because they impose a requirement that the reference object be contextually given, a requirement that the discourse does not fulfil. McIntyre (2001b) argues

that the use of a double particle verb actually prompts the hearer to search for a plausible reference object in the discourse and thereby foregrounds it, which further conflicts with the speaker's actual communicative priorities.

The observation that the reference object of a single particle verb need not be specific because it is communicatively peripheral, whereas that of a double particle verb must be retrievable from context, is subsumed by McIntyre (2001b) under a general principle governing the semantics of the two classes. On his view, single particle verbs are specialised for naming *concepts*, by which he means types of events in their stereotypical constitution, individuated finely enough to be memorisable as conventionalised wholes. For example, *eine Schallplatte auflegen* 'to put on a record' names the concept of placing a record on a turntable, not the more general event of placing a record on some arbitrary surface; *den Hut aufsetzen* 'to put on the hat' names the concept of putting a hat on one's head, not on a table or chair. The reference object in each case (i.e., the turntable, the head) is fixed as part of the lexicalised concept of the particle verb and hence can be naturally reconstructed without being explicitly expressed. The concept named by a single particle verb may also extend beyond the literal action denoted by its parts to include the consequences and follow-up actions that conventionally accompany it. *Eine Schallplatte auflegen*, for instance, can refer not only to the act of placing the record on the turntable but also to the subsequent steps required to make it play, such as lowering the needle into the groove, adjusting the volume, and so on. In this respect, single particle verbs function as labels for entire activity complexes, picked out by reference to the most readily describable component of the complex. McIntyre (2001b) formulates this as the *Single Particle Verb Specialisation* (SPS) principle, given in (236).

(236) Single Particle Verb Specialisation (SPS) (McIntyre 2001b: 271)

If a single particle verb has a Theme TH, and base verb V, a particle expressing a prepositional relation P, zero or more other arguments A, and if X is the reference object of P, then [V (A, TH, P (X))] is a concept. This applies where the addressee's reconstruction of the nature of X is communicatively important.

The SPS is argued by McIntyre (2001b) to govern not only single particle verbs but also other word-formation structures in German, such as A+N compounds, where well-formed compounds denote exclusively prototypical instances of their denotations. An object that does not occur with sufficient frequency to be lexicalised as a conventional concept cannot be expressed as a compound, but only as a noun phrase with a modifying adjective. The compound *Naßrasierer* ‘wet razor’, for instance, denotes a razor of a specific type, i.e., one designed to be used with water and shaving foam, and not just any razor that happens to have come into contact with water by, for example, accidentally falling into the sink. The latter, being neither frequent nor stereotypical, lacks a conventionalised concept and is therefore unavailable as a compound denotation; it can only be referred to descriptively, e.g., as *ein nasser Rasierer* ‘a wet razor’. The same holds for *Schnellzug* ‘express train’, which refers to a particular class of trains designed for high-speed travel, but not to any train that happens to be travelling quickly on a given occasion. The latter can only be expressed phrasally as *ein schneller Zug* ‘a fast train’. In general, the compound form is reserved for the conventionalised, prototypical reading, while the phrasal alternative is required for ad hoc or non-prototypical instantiations.

Double particle verbs, by contrast, are not subject to the SPS. This can already be seen in the examples in (235) above, where the infelicity of **reinschlagen*, **hineinschlagen*, and **herausschneiden* in discourse-initial contexts shows that rather than presupposing the reference object as a fixed component of the lexical semantics of a verb, double particles require it to be identified independently in the discourse context. McIntyre (2001b) hence proposes the hierarchy of P-elements given in (237), ordered with respect to their degree of anaphoricity and specificity, such that each element is less anaphoric than the one to its left:

(237) *da*+P-element > *hin*+P-element > *her*+P-element > *r*+P-element > single particle

Da-PPs sit at the top of the hierarchy and are therefore strongly anaphoric, primarily due to the pronominal *da* ‘there’, which overtly refers back to a discourse referent. Double particles containing *hin* and *her* occupy intermediate positions, with *hin*-forms the more anaphoric of the two: as mentioned earlier, *hin* is mostly perceived as the the marked member

of the *hin/her* opposition in Standard German and is reserved for more specific contexts, whereas *her* has come to be used more generally and accordingly imposes weaker contextual demands. Below these are double particles containing the reduced clitic *r-*, which typically occur in contexts where deictic specificity is not at issue. Finally, single particles are least anaphoric of all: they name concepts and accordingly impose no requirement of specificity or contextual retrievability on their reference object.

A further difference between single and double particle verbs is that the former frequently exhibit what McIntyre (2001b) terms *landmark flexibility* (corresponding to *Subjekt-/Objektumsprung* in the German tradition; cf. Hundsnurscher 1968; Kühnhold 1973): the phenomenon whereby the reference object is realised in the position that would normally be occupied by the theme. The pattern is illustrated in (238), where the (i)-variants show the canonical realisation with the theme, and the (ii)-variants show the landmark-flexibility alternative, in which the position otherwise occupied by the theme is taken by the reference object instead. Examples (238a–b) illustrate the alternation in transitive verbs, while (238c–d) illustrate it in intransitive verbs.

- | | | | |
|-------|-------|--------------------------------|-------------------------------|
| (238) | a(i) | <i>den Bettbezug abziehen</i> | ‘to take off the duvet cover’ |
| | a(ii) | <i>das Bett abziehen</i> | ‘to strip the bed’ |
| | b(i) | <i>das Wasser ausschütten</i> | ‘to pour out the water’ |
| | b(ii) | <i>den Eimer ausschütten</i> | ‘to empty the bucket’ |
| | c(i) | <i>Wasser tropft ab.</i> | ‘Water is dripping off.’ |
| | c(ii) | <i>Das Geschirr tropft ab.</i> | ‘The dishes are draining.’ |
| | d(i) | <i>Das Wasser läuft aus.</i> | ‘The water is running out.’ |
| | d(ii) | <i>Der Tank läuft aus.</i> | ‘The tank is leaking.’ |

Landmark flexibility is absent from double particle verbs. The double particle counterparts of the alternations in (238) admit only the canonical realisation in which the theme occupies

the relevant argument position; mapping the reference object onto that position, as is permitted with the corresponding single particles, yields ungrammaticality, as shown in (239).

- (239) a. *den Bettbezug* / **das Bett herunter-ziehen*
 the duvet.cover the bed HERUNTER-pull.INF
 ‘to pull down the duvet cover’
- b. *das Wasser* / **den Eimer heraus-schütten*
 the water the bucket HERAUS-pour.INF
 ‘to pour out the water’
- c. *Das Wasser* / **das Geschirr tropft herab.*
 the water the dishes drips HERAB
 ‘The water is dripping down.’
- d. *Das Wasser* / **der Tank läuft heraus.*
 the water the tank runs HERAUS
 ‘The water is running out.’

The differences between single and double particle verbs discussed so far are summarised below.

- Single particle verbs more frequently exhibit unpredictable, non-compositional meanings than double particle verbs, ranging from idiosyncratic selectional restrictions to fully opaque lexicalisations.
- The reference object of a single particle verb is typically defocused and need not be recoverable from the discourse context, whereas that of a double particle verb must generally be contextually retrievable.
- Single particle verbs are characteristically specialised for naming concepts, i.e., conventionalised event-types with stereotypical participants, a property formalised in the SPS principle, which rarely extends to double particle verbs

- Single particle verbs commonly admit the landmark-flexibility alternation, in which the reference object is realised in the position normally occupied by the theme; the same alternation is systematically unavailable to double particle verbs.

It can be seen that many of the contrasts between single and double particle verbs concern the status of the reference object: whether it is backgrounded or must be retrieved from the discourse context, and whether it is available for argument-structure alternations such as landmark flexibility. McIntyre (2001b) argues that these differences follow from a more general principle concerning the referentiality of the reference objects of the two classes of particle verbs, a principle he formulates as the *Landmark Referentiality Generalisation* (LRG), which is shown in (240).

(240) Landmark referentiality generalisation (LRG) (McIntyre 2001b: 285)

The underlying reference objects of double particle verbs are referential, specific and are tokens. Those of single particle verbs are non-referential, non-specific, generic and are types.

The LRG says that the reference object of a double particle verb is treated as a particular individual in the discourse, a specific token to which the speaker and hearer can jointly refer, and which must accordingly be identifiable in context. By contrast, the reference object of a single particle verb is not a specific individual but a type: it picks out a generic, stereotypical ground (e.g., a wall to hammer nails into, a sheet of paper to cut figures from, a turntable on which to place a record), without requiring that any particular instance of that type be present in the discourse. A direct manifestation of the token-type distinction encoded by the LRG can be seen in (241), where the choice between the single and the double particle verb yields a subtly different interpretation of the reference object.

- (241) *Opa hat schon wieder ein leeres Glas, obwohl ich fünfmal Bier
Grandpa has already again an empty glass although I five.times beer
ein-gegossen / rein-gegossen habe.*

EIN-pour.PTCP REIN-pour.PTCP have

‘Grandpa has an empty glass again, although I have poured beer (into it) five times.’

With the single particle verb *eingießen*, the LRG predicts a type-level reading of the reference object: *Glas* ‘glass’ picks out the kind of container into which beer is conventionally poured, without requiring identification of any particular instance. The sentence is accordingly compatible with a scenario in which the speaker has filled five different glasses, each subsequently emptied by the grandfather. With the double particle verb *reingießen*, by contrast, the reference object receives a token-level reading: *Glas* now refers to one specific glass that is contextually identifiable, which has been repeatedly emptied and refilled. The sentence is therefore felicitous only on the reading in which the same glass is refilled five times, and it presupposes a particular glass that both the speaker and the hearer can identify in this particular context.

The LRG brings together the various differences between single and double particle verbs under a single generalisation. The backgrounding of the reference object in single particle verbs and the contextual-retrievability requirement on the reference object of double particle verbs, introduced earlier as independent descriptive observations, can now be understood as two reflexes of the same underlying property, namely the referential status of the reference object. A type-level, non-referential ground, as found with single particles, introduces no discourse referent that could be picked up for further reference, and so remains backgrounded. By contrast, a token-level, referential ground, as found with double particles, must be anchored to a specific discourse entity. Since the particle itself does not encode which token is meant, its use prompts a search for an appropriate entity in the current discourse, much as a pronoun does. The use of a double particle verb such as *hinauflegen* (e.g., *Er legt eine Schallplatte hinauf*. ‘He puts a record on.’) thus invites the hearer to identify a contextually given reference object,

and once such an entity is identified, the double particle functions equivalently to a pronominal adverb such as *darauf* ‘on it’. On this view, a double particle is a proform for a directional PP, or more specifically, the h-particle serves as a proform for the reference object of that PP.

The pronominal nature of double particles is argued by McIntyre (2001b) to be crucial for understanding why double particle verbs do not permit landmark flexibility alternations. Since the h-particle functions as a proform for the reference object, this argument is necessarily realised in the structure. If landmark flexibility were to apply, the underlying theme would be suppressed and the reference object promoted to theme position. However, the particle would continue to encode the reference object pronominally, resulting in two competing realisations of the same argument. This conflict can be illustrated with the double particle verb *herausschütten* ‘to pour out’ in (242).

- (242) *Draußen war ein Eimer voll Wasser. *Udo schüttete den Eimer heraus.*
 outside was a basket full water Udo poured the bucket HERAUS
 ‘Outside there was a bucket full of water. *Udo poured the bucket out.’

Under a landmark-flexibility derivation of *herausschütten* ‘to pour out’, the DP *den Eimer* ‘the bucket’ is promoted to theme position while still interpreted as the reference object. At the same time, the particle *heraus-* continues to encode a reference object pronominally. The structure thus contains two distinct realisations of the reference object. For the structure to be interpretable, either these two elements would have to be coindexed, or the particle would have to refer to some third entity distinct from the promoted noun. The first option is unavailable, as the grammar provides no mechanism for coindexing a lexical DP with the pronominal content of the particle. The second yields an unintended interpretation, namely one in which the bucket is poured out of some other container. Since neither option yields the intended reading, the structure is ill formed, and landmark flexibility is therefore unavailable for double particle verbs.

Having established the differences between single and double particle verbs, I now turn to McIntyre's (2001b) proposal concerning the real functions that h-particles serve in double particles.

4.3.3 H-particles: reinforcement and disambiguation

As introduced in Section 4.3.1, McIntyre (2001b) argues that h-particles in double particles are non-deictic, and that double particles should accordingly be analysed as morphologically complex preverbs rather than as the result of compositionally attaching an h-particle to a base particle. Drawing on the semantic differences between single and double particle verbs surveyed in the preceding section, he proposes that h-particles in double particles serve primarily two functions: *reinforcement* and *disambiguation*.

The notion of reinforcement is adopted from Lehmann (1995), who uses the term to describe an element whose function is to restore the literal content of another element that has undergone semantic weakening or bleaching. In the case of double particles, reinforcement applies in those configurations where the corresponding single particle verb has acquired an idiosyncratic, non-spatial meaning that obscures the original directional sense; the addition of the h-particle re-establishes the spatial reading that the single particle has lost. A clear illustration of this function is provided by the contrast between *ausgehen* 'to go out' and *herausgehen* 'to go out of'. As a single particle verb, *ausgehen* nowadays refers less to the act of leaving one's house and more to going out to engage in social activities. By contrast, the double particle verb *herausgehen* retains the unmodified spatial reading, denoting the literal motion of exiting an enclosed space (e.g., *aus dem Haus herausgehen* 'to go out of the house'). The h-particle thus restores the compositional, directional content that has been displaced in the single particle variant. Comparable contrasts arise elsewhere: *auffliegen*, for instance, may denote the literal meaning of upward flight, or an idiosyncratic meaning 'to be uncovered'. By contrast, *hinauffliegen* preserves the transparent spatial interpretation of upward motion. Similarly, *aussteigen* is most readily understood as to 'alight (from a vehicle)'

or ‘to drop out (of an activity)’, while *heraussteigen* can be used for the literal act of climbing out of an enclosed location. In each case, the double particle anchors the verb in the spatial domain, from which the single particle has semantically drifted.

Another function of h-particles, according to McIntyre (2001b), is disambiguation. Diachronically, this function is reflected in cases where one of the competing meanings of a polysemous single particle is gradually transferred to a corresponding double particle. One example discussed by the author is *ab*, which in Middle High German was used with both the meanings ‘off’ and ‘down’, but has consequently come to primarily specialise in the ‘off’ meaning (e.g., *abschneiden* ‘to cut off’; *abwischen* ‘to wipe off’), while the ‘down’ sense is now expressed predominantly by the double particles *hinab* and *herab* (e.g., *herabfallen* / *hinabfallen* ‘to fall down’). A similar development can be observed with *ausputzen*, which historically supported two readings, ‘to clean out’ and ‘to decorate’. The decorative reading has gradually shifted to the double particle verb *herausputzen*, with the result that *ausputzen* now predominantly denotes ‘clean out’ in present-day usage.

In summary, McIntyre (2001b) argues that the two major functions of h-particles in double particles are reinforcement and disambiguation, and that double particles can correspondingly be understood as the reinforced and disambiguated counterparts of the single particles from which they are formed. He embeds this synchronic claim within a diachronic account of how the present-day functions of h-particles developed. On his account, single particles originally had two parallel uses, a literal, spatial-adverbial one and a lexicalised one, and the coexistence of these uses gave rise to extensive polysemy and ambiguity. The earliest double particles emerged as combinations of a deictic particle with a directional-adverbial simple particle, in which the deictic component contributed its canonical to-/from-the-speaker meaning. Crucially, however, deictic modification was confined to genuinely spatial contexts, with the consequence that double particles could only ever express the spatial reading of the simple particle, never its lexicalised one. This systematic restriction triggered a process of reanalysis, whereby the deictic content of the h-particle was gradually reinterpreted as a

marker of spatial vs. non-spatial disambiguation, and speakers ceased to care about whether motion was directed toward or away from the speaker. Certain double particles (e.g., **hinum* and **herdurch*) served no useful function under the new system after reanalysis, since their corresponding simple particles had not developed the kind of polysemy that would have called for disambiguation, and these forms consequently fell out of use. The surviving combinations, by contrast, became conventionalised and gradually fused into single morphological units.

4.3.4 Summary

This section has examined McIntyre's (2001b) account of the semantics of double particles in German. McIntyre argues that the h-particle in double particles does not contribute a deictic meaning, drawing on the absence of double particles with conceivable semantics, the speaker bias towards *her*-particles, and the existence of double particles whose meaning cannot be compositionally derived from the meaning of the h-particle and that of the base particle. Reviewing a series of semantic and syntactic differences between single and double particle verbs, including the greater polysemy of single particles, the requirement that the reference object of a double particle verb be contextually retrievable, and the availability of the landmark flexibility alternation for single but not double particle verbs, McIntyre argues that the h-particle in double particles serves functions of reinforcement and disambiguation, narrowing or sharpening the spatial interpretation contributed by the base particle rather than adding an independent deictic meaning of its own. Taken together, these observations lead to McIntyre's central claim: the semantics of double particles cannot be derived compositionally from the deictic meaning of an h-particle combined with the meaning of a single particle. Instead, he argues that double particles should be analysed as single semantic units, whose two component morphemes do not contribute independent meanings that combine compositionally, but together form a non-decomposable meaning associated with the double particle as a whole.

This proposal converges with the picture that emerged from the syntactic literature discussed in Section 4.2. There, syntactic analyses of double particles were seen to treat them

as single constituents rather than as configurations of two independently merged particles. The semantic evidence reviewed here points in the same direction: double particles are not the simple concatenation of two single particles, and their meaning is not the compositional product of two independent meanings. Syntactically and semantically, then, double particles are best analysed as integrated wholes, which are structurally cohesive on the one hand, semantically unified on the other. This yields an interesting mismatch between morphology and the syntax-semantics interface: double particles are morphologically complex, consisting of two morphemes that can occur independently as single particles elsewhere in the grammar, but syntactically and semantically they pattern as one. The mismatch raises an immediate question: how are these particles represented and processed by native speakers, given that their morphological form and their syntactic-semantic behaviour pull in opposite directions? One piece of empirical evidence comes from the acquisition literature, which is reviewed in the following section.

4.4 Double particles in acquisition

German-speaking children acquire particles as one of the major lexical devices for encoding motion events early in development. Children begin to build their inventory of directional particles shortly after their second birthday, and by the third year of life they produce a substantial number of both single and double particles (Behrens 2009). Children's expression of path develops through several stages. Particles and adverbs predominate in the earliest period, followed somewhat later by prefix verbs, which children begin to use as they become aware of verbal inflection (Clark 1991; Harr 2013). Full mastery of prepositional phrases comes considerably later, since these constructions require children to control case government (Harr 2013). Within the acquisition of prepositions, children first acquire those that have homophonous particle counterparts. Harr (2013) suggests that these forms may be perceptually prominent in the input because they bear stress when used as particles. Prepositions without homophonous particle counterparts are acquired subsequently. Pleonastic constructions

combining a directional particle with a prepositional phrase have been reported in child data from around age 2;0, although they are not fully mastered until roughly age 2;6 (Behrens 2009).

The acquisition literature presents a nuanced picture of how double particles are represented in early grammar. Two patterns emerge that appear to point in different directions. On the one hand, there is evidence that children store and produce double particles as unanalysed wholes. On the other hand, some findings suggest that children are sensitive to their internal structure and productively recombine their component parts. The following discussion reviews the evidence for both patterns.

Behrens (2009) is one of the few studies that examines children's use of *hin-* and *her-* particles specifically, covering both single and double particles. Drawing on approximately 870,000 words of spontaneous speech from six German-speaking children aged between 1;3 and 7;11, Behrens reports two findings that are particularly relevant for the contrast between the acquisition of these two types of particles. First, the productive contrast between *hin-* and *her-* forms is most clearly attested for single particles. Most children in the corpus contrast *hin-* and *her-* with a small set of high-frequency verbs such as *gucken* 'to look', *bringen* 'to bring', *kommen* 'to come', and *fahren* 'to drive'. Double particles, by contrast, are attested in productive contrasts in the data of only one child, Leo, whose corpus is exceptionally densely sampled. Second, Leo's data contain multiple double particles with the same verb stem, for example *hinein-*, *herein-*, *hinunter-*, *herunter-*, *hinaus-*, *heraus-*, and *hindurch-* with *fahren* 'to drive'. No comparable range is found in the other five children's corpora, leaving open whether the limited evidence reflects a genuine difference in children's productive command of double particles or instead follows from differences in corpus density and token frequency. Behrens therefore concludes cautiously that, although German children clearly acquire perspectival particles (including both single and double particles) early and use them frequently, the production data for most children do not conclusively show that they have fully mastered the underlying deictic system. Many early uses of double particles appear to draw

on highly frequent and partially lexicalised motion expressions, suggesting that children store these forms as wholes rather than actively constructing them from their components.

In the corpus that Behrens (2009) examined, however, there are data that point in the opposite direction, namely that children also produce double particle forms which could not have been stored holistically from the input. For example, Behrens reports a creative and non-standard form *hern* in Leo's corpus by the child combining properties of both *hin* and *her*, and the nonstandard *hern*-form actively participate in double particle constructions, yielding forms such as *hernunter*, *hernein*, and *hernaus*. The author interprets these blends as evidence that children actively analyse and restructure the system rather than reproducing memorised expressions, since the forms could not have been retrieved from input.

Comparable evidence comes from Harr (2013), whose study compares the encoding of voluntary and caused motion events in German across four child age groups (mean ages 4;4, 6;1, 8;5, and 10;6), with productions elicited through animated cartoons depicting motion events. Harr finds that particles are the most frequent means used by German children to encode motion events, and that the particle inventory in German is sufficiently rich and productive for children to extend it creatively. In particular, two German children, aged eight and ten, produced the novel blend *hinoch*, formed from *hinauf* 'thither-up' and *hoch* 'up'. Although the form does not exist in the adult language, it conforms to the established *hin*-X template, with *hoch* occupying the slot typically filled by an upward-directional particle. As with Leo's creative forms identified in Behrens (2009), these productions are difficult to reconcile with a purely holistic account: they require the child to have isolated the components of double particles and to treat them as productive building blocks. Furthermore, Harr observes that, unlike the children in Behrens (2009), her German child participants do, at least occasionally, differentiate double particles with distinct deictic first elements (e.g., *r-auf* 'hither-up' vs. *n-auf* 'thither-up'), which she attributes to differences in the participants' age and dialectal background.

The acquisition literature thus presents evidence on both sides of the question of how double particles are represented in early grammar. Early uses of double particles, particularly

of *hin*-forms, appear largely lexicalised and are plausibly stored as wholes. At the same time, productive contrasts and innovative non-adult forms show that children also analyse double particles into their components and construct them compositionally. These two strands of evidence need not be interpreted as reflecting successive developmental stages. Rather, the holistic and internally structured representations of double particles may coexist in child grammar. However, if the arguments advanced in Section 4.2 concerning the representation of double particles in adult grammar are correct, then the internally structured representations would ultimately have to give way to predominantly holistic representations.

4.5 Chapter summary

This chapter has examined double particles in German from three complementary perspectives: syntax, semantics, and first language acquisition.

The syntactic literature, represented by Zeller (2001a) and Noonan (2010, 2017), treats double particles as single, functional syntactic constituents rather than configurations of two independently merged particles. Zeller (2001a) locates this unithood at the level of a complex functional head, while Noonan (2010, 2017) distributes the component morphemes across functional projections within a single extended PP. Despite these differences, both analyses agree that a double particle does not arise from the simple merger of an *h*-particle with a lexical directional particle inside *P*. The locative and directional meanings expressed by double particles are accordingly not contributed by lexical *P*, but are mediated by functional structure. This places double particles in clear contrast to single particles, which are standardly analysed as lexical spatial elements closely related to their homophonous prepositions.

McIntyre (2001b) complements this syntactic picture from the semantic side. He argues that the *h*-particle in a double particle does not contribute a deictic meaning of its own, but rather functions to reinforce or disambiguate the spatial interpretation contributed by the base particle. On the basis of a range of systematic differences between single and double particle verbs, McIntyre concludes that the semantics of double particles cannot be derived

compositionally from the meaning of an h-particle and that of a single particle. Instead, he proposes that double particles should be analysed as single semantic units, whose two component morphemes do not contribute independent meanings that combine compositionally, but together form a non-decomposable meaning associated with the double particle as a whole. Syntax and semantics thus converge on treating double particles as integrated wholes, structurally cohesive on the one hand and semantically unified on the other.

This theoretical picture contrasts with the morphological transparency of double particles, which are overtly composed of two morphemes that occur independently as single particles elsewhere in the grammar. Double particles thus exhibit a mismatch between morphological form and syntactic-semantic behaviour: morphologically complex on the surface, but unitary in their structural and interpretive properties.

The acquisition literature provides evidence relevant to this mismatch, but the evidence points in both directions. On the one hand, Behrens (2009) finds no clear evidence of productive *hin/her* contrast on double particles for most children in her corpus, which seems to suggest that early uses of these forms draw on lexicalised expressions stored as wholes. On the other hand, both Behrens (2009) and Harr (2013) document innovative non-adult forms of double particles, which could not have been retrieved from input and therefore indicate that children also analyse double particles into their components and combine them productively. The acquisition data thus support both possibilities: that double particles are mentally represented as single stored forms, as suggested by the syntactic and semantic literature, or as combinations of their component morphemes, in line with their morphological make-up.

Therefore, the question of how double particles are perceived by native German speakers and how they are represented in the mental lexicon still remains empirically open. Chapter 5 approaches this question by contributing experimental evidence from adult processing, investigating whether single and double particle verbs pattern alike in real-time morphological processing through an EEG priming experiment.

5

Morphological processing of German complex verbs

Contents

5.1	Introduction	235
5.1.1	Particle and prefix verbs in German	237
5.1.2	Previous studies on the morphological processing of German complex verbs	240
5.1.3	The present study	243
5.2	Methods	246
5.2.1	Participants	246
5.2.2	Materials	246
5.2.3	Procedure	249
5.2.4	EEG recording and pre-processing	250
5.3	Data analysis	251
5.3.1	Behavioural data	251
5.3.2	EEG data	252
5.4	Results	253
5.4.1	Behavioural results	253
5.4.2	ERP results	254
5.5	Discussion	256

Abstract

Previous studies on German complex verb processing have consistently reported equivalent morphological priming for (single) particle verbs and prefix verbs, with no significant differences detected between the two verb types. The present study revisits this finding using an ERP cross-modal priming paradigm that enables a direct, planned comparison across three verb types: single-particle verbs (e.g., *aufstellen* ‘set up’), double-particle verbs (e.g., *hinéinstellen* ‘put into’), and prefix verbs (e.g., *verstéllen* ‘misplace’), all controlled for semantic transparency but systematically differing in phonological structure, morphological complexity, and morphosyntactic separability. All three verb types elicited significant priming effects, which indicates obligatory base activation in German complex verbs and is consistent with previous findings for single particle verbs and prefix verbs. Crucially, however, we found clear differences in processing patterns between particle verbs and prefix verbs in both behavioural and ERP measures: both particle verb conditions showed significantly larger RT priming effects and more sustained N400 priming than prefix verbs, while prefix verbs elicited the strongest and most sustained P600. We argue that both the N400 and P600 are modulated by the prosodic and morphosyntactic constituency of the complex verbs rather than by morphological structure alone. In particular, the morphological complexity of double particles does not influence early lexical activation of the base verb, but triggers reanalysis costs at a later stage (P600). Together, these findings support a constrained decomposition account in which the ease of morphological decomposition is modulated by the alignment of morphological boundaries with constituency at prosodic and morphosyntactic levels, while post-lexical reanalysis is sensitive to phonological, morphological, and semantic properties of the prime.

Keywords: Priming; morphology; ERP; phonology; German; derivation

5.1 Introduction

In most current models of morphological processing, it is assumed that the processing of morphologically complex words occurs in two stages, i.e., an early prelexical stage followed by a lexical stage (e.g., Rastle et al. 2000). The prelexical stage involves an orthographically driven but blind decomposition of the string into its constituent parts (morpheme or morpheme-like units), regardless of whether the parts are semantically related to the whole (e.g., *cleaner~clean*) or not (e.g., *corner~corn*). These conclusions are mainly drawn from masked priming studies, which, by minimising the prime duration (usually less than 70 ms), tap into very early stages of word processing.

Once entering the lexical processing stage, recognition is no longer conditioned by purely orthographically driven segmentation but also by semantic information of the complex word, as demonstrated in studies employing priming paradigms with longer prime displays (e.g., Feldman et al. 2004) or auditory primes (e.g., Marslen-Wilson et al. 1994). In English, when primes are consciously perceived (longer than 100 ms), complex words primed their targets only when they were morphologically and semantically related (e.g., *government~govern*), but not when they were semantically opaque (e.g., *department~depart*) (Feldman & Larabee 2001; Marslen-Wilson et al. 1994; Rastle et al. 2000). The same pattern has been reported across a range of Indo-European languages, including French (Longtin et al. 2003), Dutch (De Grauwe et al. 2019; Zwitserlood et al. 1996, 2005), and Serbian (Feldman et al. 2002), and across multiple priming paradigms, including overt visual priming (Feldman & Soltano 1999; Feldman et al. 2004; Rastle et al. 2000), cross-modal auditory-visual priming (Marslen-Wilson et al. 1994), and sentence-context priming (Zwitserlood et al. 2005).

German, however, presents a notable exception to this pattern: studies have shown that the processing of German complex verbs, including single particle verbs and prefix verbs, requires an obligatory activation of the base verb, irrespective of the semantic relationship (e.g., transparent: *aufstehen~stehen*, ‘stand up~stand’; opaque: *verstehen~stehen*, ‘understand~stand’)

between the base and the derived word at both the prelexical and lexical stages (unmasked overt priming: Smolka et al. 2009, 2014; cross-modal priming: Smolka 2019; Smolka et al. 2019; overt visual priming with EEG: Smolka et al. 2015). Smolka et al. (2019) attribute this divergence to two factors: the high productivity of German verb formation with particles and prefixes, and the verb-second (V2) property of German, whereby particles are obligatorily separated from their base verbs in finite clauses. Together, these features are argued to reinforce speakers' awareness of the morphological and syntactic separability of particle verbs, driving a morpheme-based representation that further extends to prefix verbs. In these studies, however, no reliable differences were observed in the processing patterns of particle and prefix verbs.

Beyond semantics, another question for the study of morphological processing and the mental lexicon is whether morphological representations and processes are sensitive to phonological factors. Several priming studies have addressed this question empirically. Using cross-modal priming, Marslen-Wilson et al. (1994) examined whether form overlap alone could elicit priming and found no significant facilitation for primes that were purely phonologically related to their targets (e.g., *bulletin~bullet*), arguing against a purely form-based account. Across four cross-modal priming experiments with auditory primes and visual targets, Gonnerman et al. (2007) held semantic similarity constant and varied phonological overlap, finding that pairs with no stem alternation (e.g., *acceptable~accept*) primed more than those involving a vowel alternation (e.g., *criminal~crime*), which in turn primed more than those involving both consonant and vowel changes (e.g., *introduction~introduce*). Using EEG within the same paradigm, Kielar and Joanisse (2011) reported an interaction between semantic and phonological factors on the amplitude of the N400, which is generally understood to reflect the ease of lexical activation and access (cf. Holcomb 1988). The largest priming effects emerged for pairs that were both semantically and phonologically related (e.g., *government~govern*). As semantic (e.g., *dresser~dress*) or phonological overlap (e.g., *serenity~serene*) decreased, the N400 amplitude also diminished. From a linguistic perspective, however, these studies have generally conflated different types of phonological alternations, including stress shifts

(e.g., *humidity~humid*) and vowel alternations (e.g., *serenity~serene*). As a result, the effects of individual phonological factors on morphological processing remain unclear. Moreover, they have all treated phonology as the degree of phonological overlap between prime and target. While Fritz et al. (2026) have recently shown that the type of phonological alternation (stress shift, vowel alternation, or both) between prime and target modulates morphological priming, no study has examined how the different phonological structures of primes themselves influence morphological decomposition.

The present study examines three types of German complex verbs that are controlled to be semantically transparent but differ systematically in their phonological structure, morphological complexity, and morphosyntactic separability: single particle verbs, double particle verbs, and prefix verbs. Specifically, it compares how these three verb types prime their base verbs in a cross-modal ERP (event-related potential) priming paradigm. Section 5.1.1 introduces the phonological, morphological, and morphosyntactic properties of the three verb types in detail.

5.1.1 Particle and prefix verbs in German

Particle verbs in German are constructed by combining simple verbs with a class of lexical items known as verbal particles. They can be subdivided into single particle verbs (1PartVs) which have only one particle preceding the verb (*aufstellen* ‘set up’), and double particle verbs (2PartVs) (*hineinstellen* ‘put into’), where a single particle is further prefixed by a deictic morpheme *hin-* ‘hither’ or *her-* ‘thither’. Note that both deictic morphemes can function as single particles. 2PartVs are therefore morphologically more complex than 1PartVs, with the particle consisting of two independent morphemes. Particle verbs can be semantically transparent (e.g., *mitgehen* ‘go with’ - *mit* ‘with’ + *gehen* ‘go’) or opaque (e.g., *aufhören* ‘stop’ - *auf* ‘on’ + *hören* ‘hear’). 1PartVs commonly have both transparent and opaque meanings (e.g., *einstellen*: ‘put’ and ‘employ’), while 2PartVs are generally semantically transparent.

Like particle verbs, prefix verbs (PfxVs) can also be either semantically transparent (e.g., *stellen~verstellen* ‘put~misplace’) or opaque (e.g., *scheiden~entscheiden* ‘divorce~decide’).

However, while the particle appears left-adjacent to the base verb in the infinitive form of a particle verb (e.g., *aufstellen* ‘put up’, *hineinstellen* ‘put into’), in cases where the particle verb functions as the finite verb in a simple main clause, the particle must be stranded in the clause-final position, separated from the verbal part in second position of the clause. This applies to both single particle verbs (e.g., *Er stellte ein Zelt auf*. ‘He **set up** a tent.’) as well as double particle verbs (e.g., *Er stellte den Teller hinauf*. ‘He **put** the plate **up**.’). In contrast to particle verbs, prefixes are never separable from their bases in finite forms (e.g., *Er verstellte die Vase*. ‘He **misplaced** the vase.’).

Beyond their morphosyntactic properties, particle and prefix verbs also differ phonologically. With respect to stress placement, primary stress in 1PartVs falls on the particle, with the base verb bearing secondary stress (e.g., *áufstellen*). In 2PartVs, primary stress falls on the second element of the double particle, with the first deictic element always remaining unstressed and the base verb again bearing secondary stress (e.g., *hinéinstellen*). In prefix verbs, by contrast, the prefix is always unstressed and primary stress now falls on the base verb (e.g., *verstéllen*).

Word stress is not merely emphasis on a particular syllable but involves grouping of syllables into feet which is part of the word’s metrical structure (Lahiri 2001). In German complex words with more than one foot, main stress is normally assigned to the leftmost foot. This is the case in the 1PartV condition: the particle and the base verb each constitute a foot, and since the particle foot is the leftmost one, it bears main stress while the base verb bears secondary stress. The 2PartV condition is more complex. At the underlying level, each of the two components of the double particle and the base verb constitutes its own foot, yielding three feet in total. The two feet of the double particle then merge to form a single larger foot, but this time the stress falls on the rightmost element, contrary to German’s left-headed stress pattern. This foot subsequently combines with the foot formed by the base verb in a compound-like manner. As the resulting structure again has two feet, main stress is assigned to the leftmost foot head, namely the second constituent of the double particle, with secondary

stress falling on the base verb. Prefix verbs differ from both particle verb types in their foot structure. All prefixes used in our study (e.g., *ver-* [fɛʷ]⁶⁴) have a reduced vowel and are consequently light syllables, which cannot be parsed as the head of a foot in metrical theory (Kiparsky 1979). As a result, prefix verbs consist of a single foot, with the prefix remaining unfooted. Therefore, prefix and particle verbs differ both in foot structure and stress placement: particle verbs contain two feet and have primary stress on the particle, while prefix verbs contain only one foot, with primary stress on the base verb. A summary of the phonological properties across conditions is provided in Table 5.1.

Table 5.1: Phonological differences of 1PartVs, 2PartVs and PfxVs in German. The (x) marks the head of the foot and the (X) marks the syllable carrying main stress.

	Example	Number of feet	Foot structure	Meaning
(a) 1PartV	<i>áu^hstellen</i>	two feet	X (x) (x .) 'a ^h ʊf ʃtɛ lɪ	lit. up-put 'set up'
(b) 2PartV	<i>híⁿeínstellen</i>	two feet	X (. x) (x .) (x) (x) (x .) hɪn 'a ⁱ n ʃtɛ lɪ	lit. hither-in-put 'put into'
(c) PfxV	<i>ver^hstéllen</i>	one foot	X (x .) fɛʷ 'ʃtɛ lɪ	lit. prefix-put 'misplace'

To summarise, the three verb types examined in the present study differ systematically along three dimensions. In terms of morphological complexity, 2PartVs are the most complex of the three: their double particles consist of two morphemes (a deictic morpheme and a prepositional particle), whereas the preverbal element in 1PartVs and PfxVs is monomorphemic.

⁶⁴Idealised transcriptions of prefixes are given in full vowels in Duden. However, phonologically they are not bimoraic and are metrically too light to be the head of a foot.

In terms of morphosyntactic separability, both types of particles are separable from the base verb in finite environments, while PfxVs are inseparable in all syntactic contexts. In terms of phonological structure, particle verbs and prefix verbs differ in foot structure and stress placement: particle verbs comprise two feet, with the particle heading a foot independent of that of the base verb, while prefix verbs comprise a single foot, with the prefix remaining unfooted. Accordingly, primary stress falls on the (single or double) particle in particle verbs and on the base verb in prefix verbs. These systematic differences across phonological, morphological, and morphosyntactic dimensions make the three verb types a particularly informative case for investigating how these factors shape the processing of morphologically complex words.

5.1.2 Previous studies on the morphological processing of German complex verbs

Previous psycholinguistic studies on German complex verbs have often conflated particle verbs and prefix verbs despite their distinct grammatical properties. This is particularly true of the work by Smolka and colleagues, which constitutes the most comprehensive body of research on morphological priming in German complex verbs. For example, in Smolka et al. (2014), prefix and particle verbs were treated as a single category of ‘complex verbs’, with the authors explicitly arguing against distinguishing between the two subtypes on the basis that earlier studies had reported broadly similar psycholinguistic effects across both verb classes (Drews et al. 2000; Schriefers et al. 1991; Smolka et al. 2009).

The assumption that particle verbs and prefix verbs need not be distinguished is also reflected in the experimental design itself. First, the morphologically related conditions contained a mixture of prefix verbs and particle verbs, which were balanced across conditions only at the group level, but not systematically controlled within individual target sets. For instance, the target verb *binden* ‘bind’ was paired with both particle verbs (e.g., *zubinden* ‘tie’, *zuschnüren* ‘tie’) and prefix verbs (e.g., *entbinden* ‘deliver’) as primes. Second, the study distributed five prime conditions across participants such that each participant saw each target

word only once. Consequently, any comparison between the two verb subtypes necessarily involved different participants, different lexical items, or both. As a result, it remains unknown whether the same participant processes particle verbs and prefix verbs differently compared to a control prime. Finally, the analyses reported only aggregate priming effects collapsed across particle and prefix verbs, with no subtype specific analyses.

Smolka et al. (2014) is representative of the broader literature on German complex verb processing in this respect. As a consequence, the existing empirical literature provides no direct within-subject evidence as to whether speakers process particle verbs and prefix verbs differently. To date, the only study that examined the morphological processing of German particle and prefix verbs is Smolka et al. (2019), who employed a cross-modal (audio-visual) priming paradigm. Finding no significant differences in processing patterns between the two verb types, the authors concluded that morphosyntactic and phonological (stress) differences do not influence morphological processing. However, this study was not designed to answer questions related to phonological alternations. Rather, their conclusions were drawn based on a post-hoc analysis with a limited number of items across two separate experiments and participant groups. Taken together, these limitations still leave open the question of whether German particle and prefix verbs are processed differently especially in regards to the role of phonology.

Furthermore, little is known about the online processing of these complex verbs. Most previous studies on German complex verb processing have relied primarily on behavioural measures such as lexical decision latencies. However, behavioural data alone may fail to detect temporally fine-grained processing differences between verb types. This concern is particularly relevant for the contrasts examined here: unlike behavioural responses to overt ungrammaticality, the processing differences between verb types that are morphologically related but differ in their phonological and morphosyntactic properties are expected to be subtle and risk being obscured in behavioural measures. Only Smolka et al. (2015) used EEG to test decomposition effects in particle and prefix verbs. However, similar to the behavioural

studies discussed above, the experiment employed an overt visual priming paradigm conflating prefix and particle verbs, and with visually presented primes it remains unclear to what extent phonological information is activated during processing.

A further gap in the literature concerns double particle verbs. In contrast to single particle verbs and prefix verbs whose morphological representations have received considerable attention in the literature, double particle verbs in German have not been seriously studied and remain uninvestigated from a psycholinguistic perspective. To the best of our knowledge, no empirical research has been conducted with respect to how verbs with multimorphemic affixes in German are presented and accessed in the mental lexicon, which is, however, a crucial question to be answered for a better understanding of the decomposition of morphological complexity in mind. There is now broad consensus that morphologically complex words are decomposed into their constituent morphemes during lexical access, a process that enables retrieval of the corresponding lexical representations and thereby facilitates recognition (Taft & Forster 1975). What remains less clear, however, is *how deep* this decomposition proceeds: whether it continues recursively into nested morphological structure or is constrained by factors at other linguistic levels. Double particle verbs offer a particularly informative testing ground for this question. Constituents of double particles are mostly themselves independent morphemes that can also occur independently as single particles, adverbs, or prepositions. At the same time, they behave as a single prosodic unit and are similarly treated as a single constituent in the syntactic and semantic literature (McIntyre 2001b; Zeller 2001a). Therefore, the morphological structure of double particles and the constituency observed at other linguistic levels point in different directions. The priming patterns elicited by double particle verbs provide a direct test of whether lexical access is purely driven by morphological structure or is also affected by other factors.

5.1.3 The present study

The present study addresses a fundamental question about morphological processing: do phonological and morphosyntactic properties modulate morphological decomposition during lexical access, or does decomposition proceed purely on the basis of morphological structure regardless of these factors? To address this question, the study examines three types of morphologically complex verbs in German – 1PartV, 2PartVs, and PfxVs – that differ systematically in their phonological structure, morphological complexity, and morphosyntactic separability. All verb types are controlled to be semantically transparent, allowing these dimensions to be examined while holding semantic factors constant. Furthermore, the study combines behavioural and electrophysiological measures in a cross-modal priming paradigm, which allows us to capture both overt priming effects and the time course of online processing.

Unlike most previous psycholinguistic studies on German complex verbs, where particle and prefix verbs are conflated into a single category (e.g., Smolka 2019; Smolka et al. 2009, 2014, 2019), verb type is treated as a central experimental factor and systematically manipulated within the same design. Crucially, the study employs a within-subject design in which the same participant is exposed to all three verb types. Each target verb appears twice for a given participant: once in an experimental condition and once in a corresponding control condition. This design allows for a direct comparison of priming effects elicited by the different verb types within the same participants while controlling for target specific variability across related and unrelated pairings. In contrast to previous studies, the present design therefore enables a direct, planned comparison of the processing patterns of the three verb types.

Using cross-modal priming experiments together with EEG, the present study addresses three specific research questions.

Q1: By comparing particle verbs and prefix verbs, the first question examines whether phonological structure and morphosyntactic separability modulate morphological processing: specifically, whether 1PartVs and 2PartVs, which are morphosyntactically separable and

prosodically consist of two feet, yield stronger priming than PfxVs, which are inseparable and single-footed.

Q2: By comparing 2PartVs against 1PartVs and PfxVs, the second question examines the depth of morphological decomposition: whether it operates recursively into the internal structure a double particle, or is bound to its prosodic and morphosyntactic constituency and processed as a single morphological unit.

Q3: By comparing behavioural and electrophysiological evidence, the third question examines whether the temporally fine-grained ERP signal reveals processing differences between particle verbs and prefix verbs that do not surface in behavioural data.

The EEG analyses focus on two priming-related ERP components, namely the N400 and the P600. The N400 is a negative-going component peaking around 400 ms post-target onset, and is generally taken as an index of lexical access and activation in morphological priming paradigms (Holcomb 1988; Kutas & Federmeier 2011). The P600 is a positive-going component peaking between 500 and 800 ms and is proposed to reflect post-lexical reanalysis costs: after initial lexical access, the target is mapped back onto the prime, and the relation between the two items is reanalysed (Fritz et al. 2026). In the present study, both priming effects are calculated as the difference in mean amplitude between the control and experimental conditions. For the N400, more negative values indicate a larger reduction in amplitude for the experimental condition relative to the control condition, which reflects stronger priming and greater facilitation of lexical access. For the P600, more positive values indicate reduced reanalysis costs in the experimental condition, suggesting that the prime constitutes a better match for the target compared to the control primes.

Based on previous findings that morphologically related complex verbs in German facilitate recognition of their bases regardless of semantic transparency (Smolka 2019; Smolka et al. 2009, 2014, 2019), we expect all three verb types to show priming effects on their base. Three further predictions follow from the three specific research questions.

With respect to Q1, we formulate separate predictions for the N400 and P600. For the N400, the morphosyntactic separability of particles from the base verb and their two-foot prosodic structure suggest an independent morphological and phonological status of the particle. In this respect, both particle verb conditions are expected to facilitate recognition of the base verb more readily and consequently to yield larger N400 priming effects than PfxVs. At the same time, however, primary stress falls on the base verb in both the prime and the target in the PfxV condition, such that the absence of a stress shift may itself facilitate base verb recognition. It therefore remains an open question to what extent these two factors trade off against each other in determining the N400 difference between 1PartVs and 2PartVs on the one hand and PfxVs on the other. For the P600, whether particle verbs elicit reanalysis costs is less clear; if they do, this could reflect the stress mismatch between prime and target, given that stress falls on the particle constituent in particle verb primes but shifts to the base verb in the target. For PfxVs, any P600 effects may reflect the prosodic dependence of the prefix on the base verb, or the bound morpheme status of the prefix, whose lack of independent lexical meaning may require additional reanalysis to reconcile the semantics of the full prefix verb prime with the base verb target.

With respect to Q2, if decomposition extends into the internal structure of the double particle, 2PartVs are expected to differ from 1PartVs by incurring additional processing costs from stripping off the additional morpheme. This should yield a larger or more sustained N400 priming effect relative to 1PartVs and potentially a reduced P600 effect reflecting the additional cost of resolving the mismatch between the morphological complexity of the double particle and its unified single-constituent representation. If, however, decomposition is constrained by the cohesive prosodic and morphosyntactic constituency of the double particle, 2PartVs should pattern with 1PartVs, with any differences between the two particle conditions more likely to emerge, if at all, in the later P600 time window.

With respect to Q3, while previous behavioural studies have found no reliable differences in processing patterns between 1PartVs and PfxVs (Smolka 2019; Smolka et al. 2009, 2014, 2015, 2019), we expect such differences to surface in the temporally fine-grained ERP signal.

5.2 Methods

5.2.1 Participants

37 German L1 speakers from Germany and Austria participated in the EEG study, which was run in the Language and Brain Laboratory at the University of Oxford. One participant was excluded due to technical failure, one due to bilingual language background, and five additional participants due to excessive artifacts (fewer than 18 artifact-free trials in multiple conditions). The final sample therefore consisted of 30 participants (20 female; mean age = 24.5, SD = 2.7; 28 right-handed). All participants grew up monolingually, had normal or corrected-to-normal vision and no hearing or other cognitive impairments. All participants gave written informed consent and received monetary compensation for their time. The study was approved by the Central University Research Ethics Committee at the University of Oxford (ethics approval code: R77464/RE001).

5.2.2 Materials

The target stimulus set consisted of 60 monomorphemic simple verbs in German (e.g., *stellen* ‘put’), each of which was paired with three morphologically complex verbs as primes, representing three conditions: (a) a 1PartV, (b) a 2PartV, and (c) a PfxV. Single particles used in the experiment are all mono-syllabic, including *ab-*, *an-*, *auf-*, *aus-*, *ein-*, *hin-*, *her-*, *mit-*, *nach-*, *vor-*, *zu-*; double particles included *herab-*, *heran-*, *heraus-*, *herein-*, *heraus-*, *hinaus-*, *hinein-*, *hinzu-*; prefixes included *be-*, *er-*, *ent-*, *ver-*, *zer-*. Crucially, preverbal elements *durch-*, *über-*, *unter-* and *um-*, which can function both as particles (e.g., *umfahren* ‘run something over’) and prefixes (e.g., *umfahren* ‘bypass’), were excluded.

The same set of affixes was used for the creation of experimental, control, and non-word primes. We tried to balance the number of verbs with each affix within each verb type. Across verb types, the number of 2PartVs, 1PartVs, and PfxVs was identical for experimental and control primes. As for non-words, the number of 2PartVs (10/120) was smaller than that of 1PartVs (45/120) and PfxVs (65/120), as double particles generally impose more restricted selectional requirements on the base verb. Specifically, they require the base verb to have a dynamic directional meaning.

We used the same target in all conditions to enable direct comparisons of different priming effects on target recognition. An example of stimuli for each condition is given in Table 5.2 (see Appendix A for a full list of stimuli). Taken together, 180 critical prime-target pairs were used in the experiment.

Table 5.2: Sample experimental stimuli

PRIME			TARGET
1PartV	2PartV	PfxV	Base Verb
<i>auf-stellen</i> ‘set up’	<i>hinein-stellen</i> ‘put into’	<i>ver-stellen</i> ‘misplace’	STELLEN ‘put’

All primes were morphologically related and could be considered morphological derivations of the target. Additionally, all primes were semantically transparent, with the meaning of the complex verb semantically related to the meaning of the target, to control for the effects of semantic transparency. Semantic transparency of the primes was determined following the criterion originally proposed by Hay (2001) and subsequently adopted by Smolka et al. (2019) in their study of German 1PartVs: if the lexical paraphrase of the complex verb given in the dictionary refers to the base verb, it is considered as being ‘semantically transparent’; otherwise it is ‘semantically opaque’. To that end, each prime in the 1PartV and PfxV conditions was checked for its first meaning listed in the DUDEN online dictionary (<https://www.duden.de/>), which corresponds to the primary and most frequent usage of the word. It should be noted that

although the PfxVs and 1PartVs selected for the experiment were chosen for their semantic transparency, many of them also have additional, sometimes metaphorical, meanings. In fact, German complex verbs are highly polysemous, making it nearly impossible to get a list of verbs with exclusively transparent meanings while maintaining the constraints of the experimental design. To avoid any controversy, all 2PartVs used in the experiment were also checked with respect to their semantic relatedness to the base in the same way as 1PartVs and PfxVs. The semantic transparency of all the primes was further checked with one of the authors of the paper who is a native speaker of German.

The 180 critical prime-target pairs were distributed over three lists using a Latin Square design. This yielded 60 stimulus pairs per list, with each list containing every target word with one of the three prime types. Additionally, each list contained 60 control primes and 120 filler items, all of which were morphologically complex verbs in German, including 1PartVs, 2PartVs and PfxVs.

The control primes comprised 20 1PartVs, 20 2PartVs, and 20 PfxVs. They were randomly paired with one of the 60 targets but were neither morphologically, semantically, nor formally related to the target (e.g., *zubinden*~*reden* ‘tie up~speak’). They served as control conditions against which lexical priming effects in the corresponding experimental conditions were compared.

The 120 fillers were paired with pseudoverb targets which were created by altering one or two letters in existing simple German verb stems without violating the phonotactic rules of the language. Half of the fillers were paired with pseudoverb targets differing from the base verb of the prime by only a single phoneme (e.g., *verbannen* ‘banish’~**bammen*), whereas the other half were paired with nonword targets that were neither formally nor phonologically related to the base verb of the filler (e.g., *auffrischen* ‘refresh’~**prösteln*).

Each list consisted of 240 prime-target pairs with an equal number of verb and pseudoverb targets (120 for each group). Each list was divided into two blocks, with each block containing all targets: half preceded by an experimental prime and the other half by a control prime. Thus,

each participant saw each target item twice, but the order of the blocks was counterbalanced across participants to avoid biases linked to sequence effects. Lists were pseudorandomised to ensure no more than two consecutive trials from the same condition and no more than five trials with pseudoverbs presented in a row. Across the lists, the number of items per condition was evenly distributed, while the control and filler prime-target pairs remained consistent.

All primes were recorded by a female speaker of Standard German in a sound-attenuated room using a fixed cardioid microphone (RØDE NT-USB). The speaker was instructed to read the words with flat intonation and was allowed to repeat a word in case of mispronunciations, wrong placement of the word stress, or disfluent productions. The primes were recorded in a random order to prevent the speaker from adopting a fixed intonation pattern and to ensure that word stress was correctly placed. One of the authors of the paper, a native speaker of German, selected the best recording when multiple repetitions were available and ensured that all primes were pronounced clearly, with neutral intonation and no acoustic artefacts. The verified recordings were then cut and normalised to a mean amplitude of 70 dB in Praat (Boersma & Weenink [2009](#)).

5.2.3 Procedure

Participants were tested at the Language and Brain Lab, University of Oxford. When participants arrived at the laboratory, they were first provided with an information sheet about the experiment, gave written informed consent, and completed a questionnaire on their handedness and medical history. The EEG experiment took place in a sound-attenuated, electrically shielded booth where participants were seated approximately 100 cm away from the screen. Each participant was randomly assigned to one of the three experimental lists. They were provided with oral instructions that in each trial they would first hear a word through a headphone and then see a string of letters appearing in the middle of the screen in front of them. They were required to decide as quickly and as accurately as possible whether the letter string they saw was a real German word or not. Importantly, participants were

instructed to only respond to what they saw but not to what they heard. Decisions were made by pressing the corresponding button on a game controller: the ‘yes’ response was made using the participants’ right hand, and the ‘no’ response with their left hand.

Each trial started with a fixation cross in the middle of the screen for 500 ms. After that, the auditory prime was presented via the headphone. After 250 ms following the offset of the auditory prime, the target was presented for 500 ms on the screen and participants had a total of 1500 ms to respond to the target before the next trial started. All targets were presented in the infinitive verb form, in lowercase white letters (Arial) against a black background.

The experiment started with a practice block consisting of 10 trials. After 36 trials, the screen turned blank and the participants heard a beep, which indicated a short break of five seconds to reduce fatigue during the experiment. After the first block participants could take a longer break and continue with the experiment whenever they were ready. The whole experiment, including the break, took about 20 minutes to complete.

5.2.4 EEG recording and pre-processing

Continuous electroencephalography (EEG) was recorded from 32 active electrodes (ActiCap, Brain Products, Inc., Gilching, Germany), fixed in an elastic cap. During the experiment, EEG recordings were sampled at 1000 Hz and referenced to FCz, with impedances kept at or below 25 k Ω . The EEG data were analysed using the EEGLab (Delorme & Makeig 2004) and ERPlab (Lopez-Calderon & Luck 2014). They were re-referenced to the mastoid electrodes (TP9 and TP10), filtered offline with a band-pass filter of 0.1-30 Hz, and epoched between -200ms and 800ms with respect to the target word onset. Segments were baseline-corrected between -200 and 0 ms. Eye-blinks were removed by using Independent Component Analysis (ICA), and components identified by the automatic classification process ICLabel (Pion-Tonachini et al. 2019) within EEGLab were subtracted. After this, noisy trials were identified and excluded from further analyses using an automatic artifact rejection with a 200 ms sliding window and 50 ms steps, which led to the exclusion of 68 trials comprising

0.94% of the data (including pseudoverbs). Then, the data were visually inspected, during which trials containing artifacts (e.g., high-frequency noise indicating muscular activity or enlarged alpha waves) were removed and bad channels were interpolated using the weighted average from the neighbouring channels. In the course of pre-processing, five participants were excluded from the data set due to excessive artifacts, and two individual datasets required channel interpolation, with one channel interpolated in each case (Oz and FP2, respectively). In total, the analyses included 10 participants per list, with 5 participants per block order.

5.3 Data analysis

5.3.1 Behavioural data

We analysed behavioural reaction times (RTs) by fitting linear mixed-effects models in R using the `lmer` function of the `lme4` package (Bates et al. 2015). But before that, we removed data points that were below 200ms and that differed by ± 2.5 standard deviations from a subject's mean, which affected 247 trials (i.e., 3.43%). We also excluded incorrect responses and pseudowords. For the analysis, we fitted a model with log transformed RTs as dependent variable, and *Prime* (control, experimental) and verb *Type* (1PartV, 2PartV, PfxV) plus their interaction as fixed factors. In the model, we treated *subject* and *item* as random effects. The factors *Prime* and *Type* were included as random slope for *Subject*. This random-effects structure was driven by our experimental design rather than determined via likelihood ratio tests and thus selected prior to our analyses (cf. Barr et al. 2013). We report model summaries where p-values are derived from the t-values in the `lmer` output by using the Satterthwaite approximation which is implemented in the `lmerTest` package (Kuznetsova et al. 2017). The advantage of this method is the option of statistically assess if a priming effect in one condition is significantly stronger compared to another condition. (cf. Luke 2017 for evaluating significance in linear mixed-effects models). Finally, we examined whether each verb type elicited a significant priming effect by comparing RTs for experimental and

control items within each condition. For that, Tukey post-hoc tests were conducted using the *emmeans* package (Lenth 2024).

5.3.2 EEG data

In our analyses, we focused on two components with well-attested topographical distributions, the N400 and the P600. The N400 is characterised as a large negativity with a broad topographical distribution (cf. Kutas & Federmeier 2011); in priming studies, it has been found to be strongest over centro-parietal electrode sites (cf. Smolka et al. 2015). The P600, reported in both word-recognition studies (e.g., Peeters et al. 2013) and priming studies (e.g., Fritz et al. 2026), shows a similar posterior distribution that can extend to occipital sites (Schuster & Lahiri 2019).

Given previous studies, and to reduce the number of tests, we analysed only one region of interest with nine electrodes covering centro-parietal(occipital) electrodes (i.e., Cz, C3, C4, CP5, CP6, P3, P4, Pz, Oz). We averaged the EEG signal across these electrodes into 100 ms bins covering 300–800 ms after target-word onset. These bins constitute our dependent variable, yielding five time windows for statistical analysis. Based on previous results, these time-windows capture both N400 and P600 effects. We fitted the same linear mixed-effects models as for our behavioural data, except in the random-slope structure: here we included only a by-subject random slope for *Prime*, owing to convergence problems and in order to maintain a consistent random-effects structure across all time windows (cf. Tsang & Zou 2022).

Our dependent variable was the mean voltage across the nine electrodes in each time window. Topographical maps and waveforms were computed from the grand-average ERPs (across subjects), separately for each verb type and prime condition (experimental vs. control).

5.4 Results

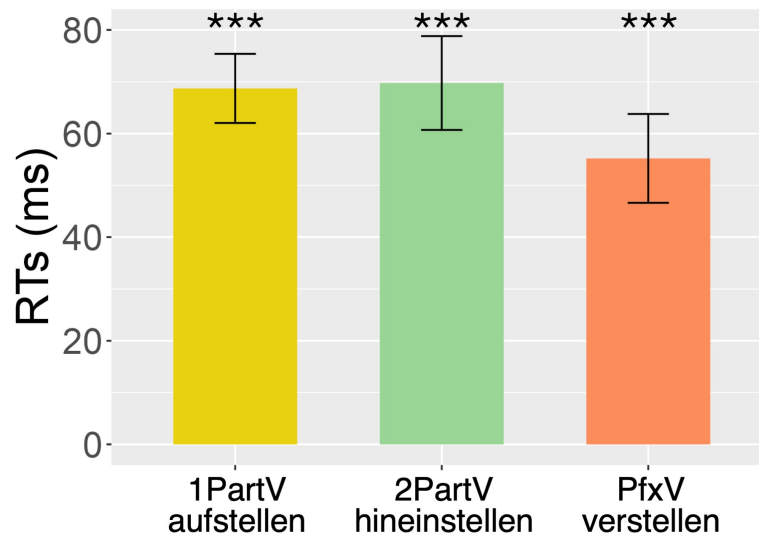
5.4.1 Behavioural results

The accuracy and the RT data are summarised in Table 5.3, and the extent of the priming effect (in ms) across the three verb types is illustrated in Figure 5.1. It can be seen that participants' responses demonstrated very high accuracy across all conditions, with the lowest mean accuracy (1PartV) at 93.2%. Accuracy for pseudowords also remained high at 92.3%, indicating that participants performed the lexical decision task reliably overall. Given that accuracies in the word conditions were near ceiling for most participants, no statistical tests were conducted on the accuracy data.

Table 5.3: Top: Accuracies (%) and standard deviations across verb types for experimental and control items plus pseudowords. Bottom: Priming effects for the three verb conditions (control – experimental, in ms). Statistics show the planned pair-wise comparisons of experimental vs. control items.

Condition	Accuracy (SD) Control	Experimental			
1PARTV	93.2 (7.2)	98.5 (3.0)			
2PARTV	93.3 (7.0)	99.2 (1.9)			
PFXV	94.0 (6.5)	98.7 (3.2)			
PSEUDOWORDS	92.3 (4.8)				
Condition	RTs (SD) Control	Experimental	Priming effect (ms)	z-score	p-value
1PARTV	575 (84)	506 (74)	69	10.12	<.001 ***
2PARTV	579 (92)	509 (78)	70	10.15	<.001 ***
PFXV	571 (92)	516 (78)	55	7.98	<.001 ***
PSEUDOWORDS	645 (125)				

RTs revealed clear priming effects across all three verb types: experimental items were responded to faster than their control counterparts. Planned pair-wise comparisons (control vs. experimental) confirmed that the priming effect was statistically significant for all three verb types (1PartV: $z = 10.12$, $p < .001$; 2PartV: $z = 10.15$, $p < .001$; PfxV: $z = 7.98$, $p < .001$). These results indicate that all three types of German complex verbs involve compulsory

Figure 5.1: Magnitude of the Priming Effect (control – experimental)

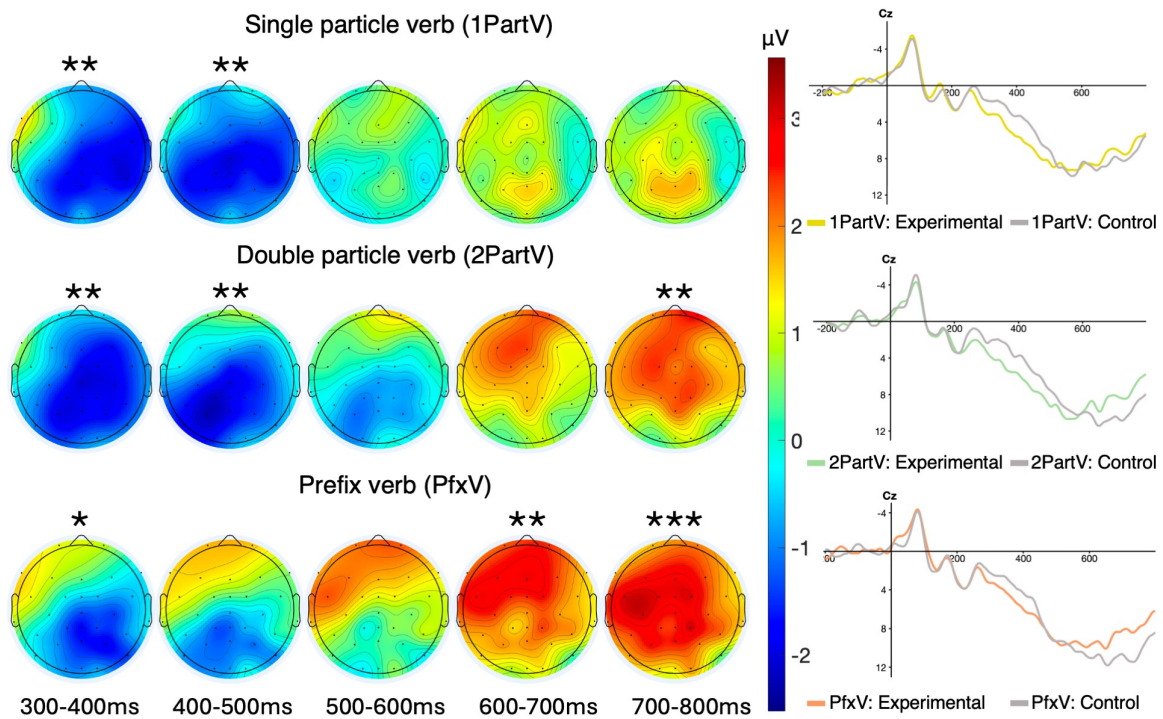
activation of the base verb, which are consistent with previous findings for 1PartVs and PfxVs (Smolka 2019; Smolka et al. 2009, 2014, 2019). However, in contrast to previous studies that report no difference in priming between 1PartVs and PfxVs (Drews et al. 2000; Smolka et al. 2009, 2019), we found that the magnitude of the priming effect did differ across verb types: PfxVs showed a significantly smaller priming effect than both 1PartVs ($\beta = 0.03$, $p = .046$) and 2PartVs ($\beta = 0.03$; $p = .046$), while no difference was observed between the two particle verb types ($\beta = 0.00$, $p = 1.000$). A model summary can be found in Appendix B.

5.4.2 ERP results

Topographic plots of the priming effect across time-windows and grand-average ERP waveforms at the Cz electrode are shown in Figure 5.2 for each verb type. Starting with the 300-400 ms time window, planned pair-wise comparisons revealed significant differences between control and experimental items for all three verb types, with control items showing a more negative deflection (N400) (1PartV: $\beta = -1.47$, $z = -2.98$, $p = .003$; 2PartV: $\beta = -1.61$, $z = -3.27$, $p = .001$; PfxV: $\beta = -1.01$, $z = -2.04$, $p = .041$). In the following time window

(400-500 ms), the N400 effect was retained for both particle verb conditions (1PartV: $\beta = -1.61$, $z = -2.98$, $p = .003$; 2PartV: $\beta = -1.60$, $z = -2.96$, $p = .003$) but no longer reached significance for PfxVs ($\beta = -0.59$, $z = -1.09$, $p = .247$).

Figure 5.2: Left: Topographic plots of the priming effect (control - experimental) across five time-windows (300-800 ms) for each verb type. Asterisks (*) indicate significant pair-wise comparisons. Right: Grand-average ERP waveforms at the Cz electrode for experimental and control items for each verb type.



The 500–600 ms time window did not elicit any significant effects across conditions (1PartV: $\beta = -0.04$, $z = -0.07$, $p = .944$; 2PartV: $\beta = -0.69$, $z = -1.21$, $p = .225$; PfxV: $\beta = 0.54$, $z = 0.94$, $p = .346$). For the last two time-windows (600–800 ms), the polarity of the effect switched, with control items being more positive (P600). In the 600–700 ms time window, planned pair-wise comparisons reached significance only for the PfxV condition ($\beta = 1.81$, $z = 3.10$, $p = .002$); neither 1PartV nor 2PartV showed a significant effect (1PartV: $\beta = 0.75$, $z = 1.30$, $p = .195$; 2PartV: $\beta = 1.12$, $z = 1.93$, $p = .053$). In the final 700–800 ms time window, the

P600 effect for PfxVs strengthened further ($\beta = 2.33$, $z = 3.91$, $p < .001$) and was joined by a significant late positivity for 2PartV ($\beta = 1.65$, $z = 2.79$, $p = .005$), while 1PartV continued to show no significant late effect ($\beta = 0.97$, $z = 1.64$, $p = .102$). The results of all planned pair-wise comparisons are listed in Appendix C. Full model outputs can be found in Appendix D.

5.5 Discussion

The present study examined how phonological and morphosyntactic properties of complex verbs in German influence their processing patterns. To that end, it compared how three types of German complex verbs, i.e., 1PartVs, 2PartVs, and PfxVs, prime their base verb in a cross-modal (auditory-visual) priming paradigm combined with EEG. The three verb types were matched for semantic transparency and shared the same morphological base, but differed systematically in their phonological structure, morphological complexity, and morphosyntactic separability.

The behavioural results showed that the magnitude of the priming effect differed across verb types: PfxVs showed a significantly smaller priming effect than both 1PartVs and 2PartVs, while the two particle verb types did not differ from each other. The ERP data revealed a more fine-grained picture. Both particle verb conditions elicited a sustained N400 priming effects across the full 300–500 ms window, whereas the N400 for PfxVs was confined to the earliest time window (300–400 ms). The pattern reversed for the P600: PfxVs elicited the longest and strongest late positivity, spanning both the 600–700 and 700–800 ms windows, while 2PartVs showed a late positivity only in the 700–800 ms window, and 1PartVs showed no significant late positivity at all.

Taken together, the findings reveal processing differences between particle and prefix verbs in both the behavioural and the ERP data, which stands in contrast to previous reports of no reliable differences between 1PartVs and PfxVs in morphological processing (Drews et al. 2000; Smolka et al. 2009, 2019). These differences were potentially made visible by the more carefully controlled within-subject design and the temporal resolution of the

ERP signal. This directly addresses Q3: both the behavioural and EEG data in the present study reveal processing differences between particle and prefix verbs. In what follows, we discuss the results relating to Q1 and Q2.

The N400 is a negative-going ERP component peaking around 400 ms after target onset, usually most pronounced over centro-parietal sites (Kutas & Hillyard 1980), and is generally viewed as an index of lexical activation and access (Holcomb 1988). N400 amplitude is inversely related to the degree of compatibility between a word and its context: the better a target word fits the previously established context, the smaller its N400 amplitude, whereas violations of semantic expectancy elicit larger amplitudes (Kutas & Federmeier 2000, 2011; Kutas & Hillyard 1980; Lau et al. 2008). Importantly, the relevant context need not be a sentence (Kutas & Hillyard 1980), but may also consist of a single preceding word, as in lexical priming paradigms (Holcomb 1988). In such paradigms, unrelated targets typically elicit more negative-going waveforms than related targets. The amplitude difference between unrelated and related conditions is commonly referred to as the *N400 priming effect*. In the present study, the priming effect was calculated as the difference between the control and experimental conditions, such that more negative values indicate a larger reduction in N400 amplitude in the experimental condition. This reduction is taken to reflect stronger priming and, consequently, greater facilitation of lexical access to the target.

In our data, both particle verb conditions show a sustained N400 priming effect across the 300–500 ms window, whereas the PfxV condition shows only a transient priming effect confined to the earliest window (300–400 ms). We interpret this temporal difference as reflecting differences in the efficiency of lexical access across the three verb types. More specifically, the prolonged N400 observed for both particle verb conditions suggests more robust and sustained facilitation of target processing, whereas the brief effect observed for PfxVs points to weaker or less stable pre-activation of the target.

We argue that these differences arise from the distinct prosodic and morphosyntactic properties of particle verbs relative to prefix verbs, which give rise to different lexical

representations of 1PartVs and 2PartVs on the one hand and PfxVs on the other in the mental lexicon. Phonologically, as shown in Table 5.1, the particle in both 1PartVs (e.g., *aufstellen*) and 2PartVs (e.g., *hinéinstellen*) constitutes its own foot and accordingly forms an independent prosodic word, phonologically separate from the base verb. That is, the particle and the base verb each occupy distinct prosodic domains, with a clearly marked foot and prosodic word boundary between them. This clear boundary provides a direct cue for morpheme segmentation: the parser can readily identify the particle as a separate phonological unit and isolate the base verb as an autonomous form, which facilitates decomposition. In PfxVs (e.g., *verstéllen*), by contrast, the prefix is attached to the foot domain of the stem without forming a prosodic word of its own. Crucially, this means that the prosodic boundary between the prefix and the base verb is blurred, which further obscures the morpheme boundary and makes it harder for the parser to isolate the stem as an independent unit. We propose that these prosodic differences directly influence the degree to which the base verb is activated during word recognition: in both 1PartVs and 2PartVs, the prosodic autonomy of the particle and the clear boundary with the base verb facilitate decomposition and promote stronger, more sustained activation of the base verb, yielding the robust and sustained N400 priming effect observed for particle verbs; in PfxVs, by contrast, the blurred prosodic boundary limits this activation, consequently yielding a temporally more restricted N400 observed in the PfxV condition.

Morphosyntactically, German is a V2 language, which requires finite verb forms to occupy the second constituent position in main clauses. When a particle verb occurs as a finite main verb, the verbal stem raises to the V2 position while the particle remains stranded clause-finally, yielding a discontinuous realisation of these verbs (e.g., *Sie stellt das Regal auf*. ‘She sets up the shelf.’). This syntactic separation occurs regardless of semantic transparency, applying equally to both semantically transparent and opaque forms across sentence types. Smolka et al. (2019) argue that this strengthens German speakers’ awareness of the morphological and syntactic separability of particle verbs, and hence drives them to generalise a morphological representation of these verbs in terms of their constituent elements, which decisively influences

how these morphologically complex verbs are processed.⁶⁵ In contrast, this separability does not extend to prefix verbs: the prefix remains morphosyntactically bound to the verbal stem in all syntactic contexts and never surfaces as an independent morpheme. We propose that these morphosyntactic differences also shape the lexical representation of the two verb types. Because particles frequently occur independently from the verbal stem in surface syntax, particle verbs are more likely to be represented in a decomposed manner, with the particle and the base verb maintaining a relatively high degree of lexical autonomy. Hearing a particle verb prime activates not only the complex verb as a whole but also the embedded base verb as an independent lexical representation. Consequently, when the base verb subsequently appears as a visual target, lexical access is facilitated through direct pre-activation of the stem representation, resulting in a robust and sustained N400 priming effect. Prefix verbs, by contrast, exhibit a tighter prefix-stem bound by virtue of their morphosyntactic inseparability. When hearing a PfxV prime, although decomposition still occurs and activation spreads to the base, which Smolka et al. (2019) describe as a ‘spill-over effect’ from particle verbs, this activation is more limited and less sustained. This explains the brief and temporally restricted N400 priming effect observed in the PfxV condition.

The present data do not allow us to disentangle the relative contributions of prosodic and morphosyntactic structure to the observed processing differences. In fact, it is highly likely that the distinct lexical representations of particle verbs and prefix verbs emerge from the interaction of both factors. The parallelism between the two particle verb conditions, 1PartV and 2PartV, lends further support to this view: they share both morphosyntactic separability and prosodic two-foot structure, and both elicited comparable N400 priming effects. Crucially, this parallelism holds despite the greater morphological complexity of 2PartVs, which contain an additional deictic morpheme that constitutes an independent foot at the underlying level, and are correspondingly longer in syllable count. The highly similar processing patterns

⁶⁵Smolka et al. (2019) examined only 1PartVs and PfxVs. Their account was therefore intended to apply only to these two verb types. In the present study, however, we argue that the same reasoning extends to 2PartVs, given that they share the morphosyntactic separability of 1PartVs.

observed for the two particle verb conditions with respect to N400 therefore suggest that the ease of affix stripping is determined more by the overall prosodic and morphosyntactic profile of the complex verb, and less by morphological complexity or word length.

The three verb types also differ markedly in the post-N400 time-windows: PfxVs elicited the most robust P600 priming effect, with significant positivities spanning both the 600–700 ms and 700–800 ms windows. 2PartVs showed a late-emerging P600 priming effect, reaching significance only in the latest window (700–800 ms). 1PartVs, in contrast, showed no significant P600 priming effect at all. The ordering of conditions on the P600 therefore reverses the pattern observed for the N400: whereas PfxVs showed only a brief and temporally restricted N400 priming effect, they elicited the strongest and most sustained P600 effect. Conversely, 1PartVs, which produced robust and sustained N400 priming, showed no reliable P600 effect. The 2PartV condition occupied an intermediate position: it patterned with 1PartVs in the N400 time window, but additionally elicited a late P600 effect similar to that observed for PfxVs.

The P600 is a positive-going ERP component peaking between 500 and 800 ms following target onset. In the domain of morphological processing, it has been associated with post-lexical reanalysis effects that arise after initial decomposition, when the target is evaluated again against the prime (Fritz et al. 2026). In the present study, the P600 priming effect was calculated as the difference between the control and experimental conditions. If the experimental prime constitutes a good match for the target, fewer mapping and reanalysis costs are required relative to unrelated control primes. Consequently, the experimental condition elicits a more negative waveform than the control condition, yielding a larger P600 effect. By contrast, if the experimental prime is a less good match for the target, the experimental and control conditions pattern more similarly. In such cases, increased reanalysis difficulty results in a reduced or absent P600 effect.

The PfxV condition shows the largest P600 priming effect, suggesting that PfxV primes are evaluated as the closest match to the base verb target at the post-lexical reanalysis stage. We argue that this is driven primarily by phonological factors. In PfxV primes, primary stress

falls on the base verb, as the prefix is phonetically reduced and hence prosodically unfooted. The stress pattern of the prime therefore aligns directly with that of the stand-alone base verb target, with no stress shift occurring between the two. Notably, this shared stress placement could, in principle, also have facilitated early lexical access, and hence enhanced the N400 priming of PfxVs. The fact that PfxVs nevertheless showed a weaker and more transient N400 than 1PartVs and 2PartVs suggests that prosodic and morphosyntactic independency is more influential during early decomposition than stress alignment, with the effect of stress congruence emerging only at the later reanalysis stage.

By contrast, in both particle verb conditions, primary stress falls on the particle in the prime but shifts to the base verb in the target, introducing a stress mismatch that may increase the effort required to map the prime back onto the target. This stress mismatch could account for the reduced or absent P600 observed in the particle verb conditions, reflecting higher reanalysis costs relative to PfxVs despite their stronger early decomposition as reflected in the N400. A comparable pattern is reported by Fritz et al. (2026). In their study, primes and targets that showed no phonological (i.e., stress or vowel) alternation (e.g., *attáchment~attách*) elicited the strongest and most sustained P600 effects, whereas pairs involving a stress shift between prime and target (e.g., *humídity~húmid*) showed no significant P600. The authors argue that these alternations reduce the phonological predictability of the target and introduce greater variability into the mapping relation between prime and target, thereby increasing post-lexical reanalysis costs. The present findings suggest that a similar mechanism may underlie the contrast between PfxVs and particle verbs.

The 2PartV condition showed a P600 priming effect only in the latest time window (700–800 ms), indicating higher reanalysis costs than in the PfxV condition. We tentatively suggest that this is driven by two factors. First, as mentioned above, primary stress falls on the verbal stem in PfxVs, which aligns directly with the stress pattern of the bare verbal target, but on the particle in 2PartVs, where a stress mismatch between prime and target arises that may increase reanalysis costs. The deictic morpheme in 2PartVs may itself introduce additional reanalysis

demands. Although the double particle appears to be treated as a unified single constituent during early decomposition, as reflected in the similar N400 effects observed for 1PartVs and 2PartVs, the deictic element nevertheless retains several properties associated with structural independence. Phonologically, it forms its own prosodic foot in the underlying representation; morphologically, it constitutes an independent free morpheme; and semantically, it contributes its own directional meaning. At the reanalysis stage, these properties may become more salient, requiring the processor to reconcile the independently meaningful deictic element with the unified representation of the double particle established during early decomposition. The delayed P600 effect in the 2PartV condition may therefore reflect the additional effort associated with integrating these competing aspects of the representation.

Finally, the 1PartV condition did not elicit a significant P600 priming effect, suggesting that their reanalysis costs were the highest of the three conditions. We suggest that this could reflect cumulative effects of several factors. First, like 2PartVs, 1PartV primes carry primary stress on the particle and hence introduces a stress mismatch with the base verb target that increases the effort required for reanalysis. Second, although all items in the present study were carefully controlled for semantic transparency (see Section 5.2.2), following the norming procedure that is adopted in Smolka et al. (2019), single particles as a class are highly productive and combine with a large number of base verbs to produce a wide range of meanings, many of which are only weakly related or entirely unrelated to the meaning of the base verb. This polysemy is not an artefact of stimulus selection, but an inherent property of 1PartVs in German, and is therefore difficult to eliminate entirely even through careful item selection. As a result, the dominant interpretation associated with a given 1PartV may nevertheless have corresponded, for some participants, to a semantically opaque rather than transparent reading, thereby increasing the probability that the relationship between prime and target requires substantial reconstruction at the reanalysis stage. 2PartVs, by contrast, are more constrained in their semantics: the combination of a deictic and a prepositional morpheme consistently expresses a transparent directional meaning, leaving less room for opaque or idiomatic interpretations.

This greater semantic predictability may contribute to a more reliable prime-target mapping during reanalysis, resulting in lower reanalysis costs in 2PartVs than in 1PartVs, which in turn accounts for the delayed P600 observed for 2PartVs but absent in 1PartVs.

Although PfxVs are also polysemous, the favourable phonological mapping between the prime and the target, i.e., the same stress assignment in PfxV primes and base verb targets, appears to largely offset the reanalysis costs that would otherwise arise from semantic polysemy, whereas in 1PartVs polysemy compounds with the stress mismatch between prime and target. Furthermore, German has a substantially larger inventory of single particles than prefixes: at least 15 prepositional particles (Zeller 2001b) compared to 8 prefixes, and this asymmetry is reflected in the stimulus set, which included 11 distinct particles and 5 prefixes after excluding disyllabic forms and items ambiguous between the two categories. The greater variety of single particles means that the mapping between a 1PartV prime and its base verb target is overall less predictable and less systematic than for PfxVs, which further reduces the likelihood of a coherent prime-target match at the reanalysis stage. Together, the stress mismatch between prime and target, the high polysemy of 1PartVs, and the greater inventory of single particles relative to prefixes in German may collectively account for the absence of a P600 priming effect in the 1PartV condition, reflecting the highest reanalysis costs of the three verb types. Given both the design of the present study and the properties of the German particle system itself, it is not possible to isolate the precise contribution of each factor independently. Future studies could address this by, for example, using resynthesised or artificially constructed primes that differ only in phonological properties such as stress placement, while keeping other factors including semantic transparency as constant as possible.

Now we can give full answers to the first two research questions. With respect to Q1, the present findings confirm that phonological structure and morphosyntactic properties modulate morphological processing in German. Both 1PartVs and 2PartVs elicited stronger and more sustained N400 priming than PfxVs, which reflects more efficient early access to the base verb. We argued that this is attributable to the prosodic independence of both

single and double particles, each forming its own foot and prosodic word, combined with their morphosyntactic separability, which together establish a clear boundary with the base and facilitate decomposition. PfxVs, by contrast, showed a more transient N400 but the strongest and most sustained P600, indicating the lowest reanalysis costs of the three conditions. We argued that this is driven primarily by stress alignment between PfxV primes and base verb targets, which renders the prime a close phonological match for the target at the reanalysis stage. The particle verb conditions (1PartVs and 2PartVs), by contrast, both carry primary stress on the particle in the prime, introducing a stress mismatch with the base verb target that increases reanalysis costs relative to PfxVs. For 2PartVs, a delayed P600 was observed in the 700-800 ms time window, which indicates more costly reanalysis than PfxVs. We attributed this to a partial prime-target match that is however complicated by the additional integration cost of the deictic morpheme. For 1PartVs, no P600 was observed at all, which indicated the highest reanalysis costs of the three conditions. Beyond stress mismatch, we argued that this reflects the high polysemy of 1PartVs and the greater inventory of single particles than prefixes in German, both of which reduce the predictability of the prime-target mapping and increase the demands of reanalysis.

With respect to Q2, the similar N400 patterns and behavioural priming effects for 1PartVs and 2PartVs suggest that double particles are parsed as a single preverbal constituent, analogously to a single particle, rather than being further decomposed into their deictic and directional components. This suggests that morphological decomposition does not proceed obligatorily through all levels of morphological structure, but is instead bounded by the prosodic and morphosyntactic constituency of the double particle. These two particle verb types, however, diverge in the P600: 2PartVs showed a late P600 that is absent in 1PartVs, indicating lower reanalysis costs for 2PartVs. We argue that this advantage for 2PartVs, despite their greater morphological complexity, is driven by their greater semantic transparency relative to 1PartVs. The combination of a deictic and a prepositional morpheme in 2PartVs consistently expresses a directional meaning, leaving little room for opaque or idiomatic interpretations.

In 1PartVs, by contrast, the high polysemy of single particles means that participants are more likely to associate a semantically opaque meaning with the particle verb prime, which increases the mismatch with the base verb target thus raises reanalysis costs.

The findings in the present study have broader implications for models of morphological processing. Concerning the N400, the results provide evidence against the strongest version of fully compositional accounts, which predict that decomposition proceeds exhaustively through all levels of morphological structure: our data from the 2PartV condition show that decomposition does not necessarily extend into the internal structure of morphologically complex units but can be constrained by constituency at prosodic and morphosyntactic levels. At the same time, the priming effects observed for PfxVs rule out purely holistic accounts: even though prefixes are bound morphemes that are never realised separately from the base verb, the base verb can still be activated during processing, though the priming effect is brief and limited. The late P600 in the 2PartV condition further shows that morphological complexity is not entirely invisible to the processing system: when a morphologically complex unit is treated as a single constituent during early access, its internal morphological complexity can still trigger reanalysis costs at a later processing stage. Together, our findings are best captured by a *constrained* decomposition account, in which the extent of decomposition is not determined by morphological structure alone but is modulated by the degree to which morphological boundaries align with constituency at other levels of representation, particularly at prosodic and morphosyntactic levels.

6

Conclusion

Contents

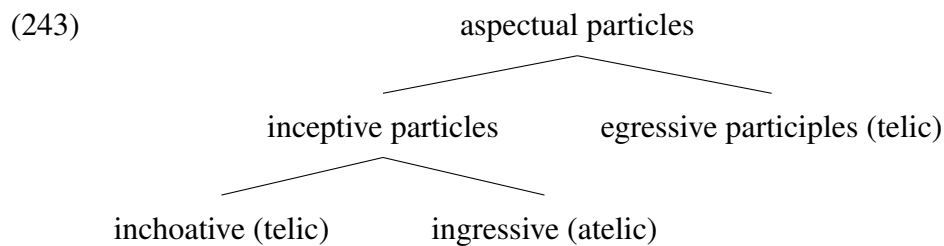
6.1	Summary of contributions	267
6.2	Future work	274
6.3	Concluding remarks	275

This thesis investigates German verbal particles through two of their least understood subclasses: aspectual particles and double particles. Each of these two subclasses exhibits a mismatch between morphological form and representation at other linguistic levels. Aspectual particles associate a single morphological form with a range of distinct semantic interpretations, while double particles present a morphologically complex form that behaves as a single unit across the phonological, syntactic, and semantic levels. The major contributions of this thesis to the analysis of these two particle types and, through them, to the German verbal particle system more generally, are summarised in Section 6.1. Section 6.2 then identifies the questions that remain open and outlines directions for future research.

6.1 Summary of contributions

Aspectual particles are the focus of Chapters 2 and 3, which make both descriptive and theoretical contributions to their analysis.

On the descriptive side, which is addressed in Chapter 2, the thesis establishes aspectual particles as a distinct subclass of German verbal particles, systematically separable from resultative particles and capable of marking telicity independently of the quantisation property of the internal argument. It further proposes a novel internal classification of aspectual particles: rather than adopting the conventional division into telic and non-telic particles, aspectual particles are classified in this thesis by the event boundary they target, distinguishing inceptive particles, which mark the initial boundary of an event, from egressive particles, which mark its terminal boundary. Inceptive particles are further subdivided into inchoative (telic) and ingressive (atelic) types. The proposed classification of German aspectual particles is presented again in (243).

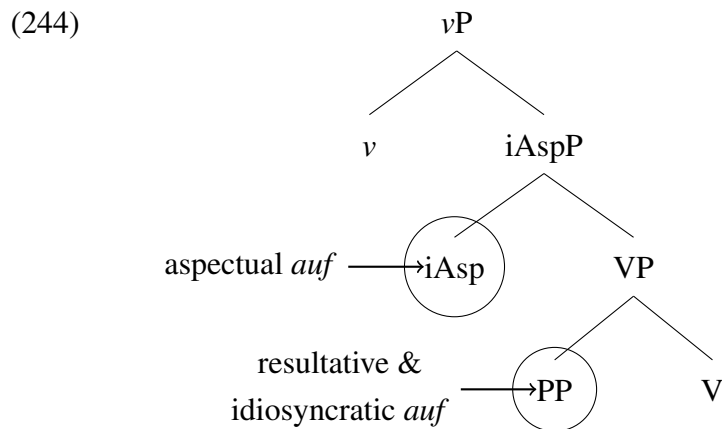


I argue that a classification along these lines is both conceptually and empirically superior to the traditional telic vs. non-telic distinction. Crucially, the traditional category of telic particles is internally heterogeneous, grouping together particles that encode different event boundaries, namely event initiation and event termination. The proposed classification captures this distinction directly and therefore provides a structurally and semantically more coherent typology of aspectual particles.

Theoretically, the thesis develops in Chapter 3 a syntactic account on which the polysemy of a particle follows from the distinct syntactic positions in which it is realised rather than

being stipulated in the lexicon. The point of departure is the observation that a single particle typically displays a range of interpretations that previous syntactic work has collapsed into a single structural configuration, recognising the semantic diversity at the level of interpretation while leaving it unexpressed in the syntax. The present account resolves this mismatch by associating each use with a distinct structural position, so that the interpretive variation of a particle is derived directly from the configuration in which it appears.

Substantiated through a detailed case study of *auf*, the account locates aspectual readings in the head of a functional inner aspect projection, iAsp, and resultative and idiosyncratic readings in the head of a PP in the complement of V (244).



Within the aspectual uses, it develops a feature-based treatment of the inceptive-egressive contrast that extends the feature inventory of inner aspect beyond [telic], introducing a second event feature, [init], that targets the initial boundary of the event. This feature system allows the inceptive and egressive readings of a single particle to be derived from distinct feature specifications on iAsp: egressive *auf* realises [telic] alone, while inceptive *auf* realises both [init] and [telic], whose joint realisation on a single head captures the punctual semantics of *auf* as the coincidence of the initial and terminal boundaries.

The proposal accounts for a number of empirical properties associated with aspectual particle verbs. Their incompatibility with secondary resultative predicates is argued to follow from the early merger of the resultative phrase in the complement of the verb, which introduces

[telic] into the structure and thereby blocks a further specification of the same feature on the higher iAsp head. The obligatory quantisation of the object in egressive uses follows from the c-command relation between [telic] on iAsp and the object in SpecVP: [telic] imposes a quantisation requirement on any DP within its domain, so that overtly realised internal arguments must be compatible with the bounded interpretation it encodes. Under this account, the telicity of predicates with egressive *auf* is determined entirely by the feature specification of iAsp, while object quantisation is treated not as the source of telicity but as a consequence of telic structure.

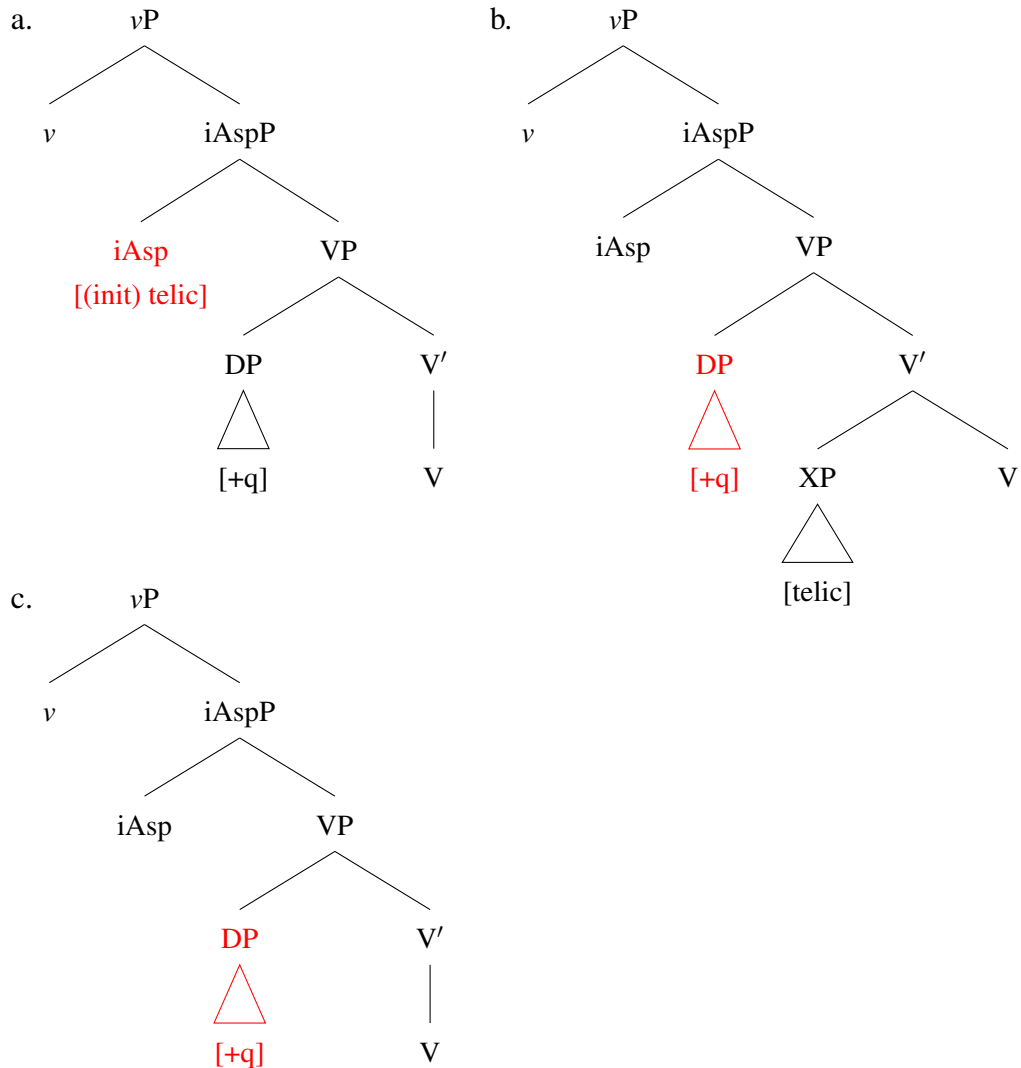
The analysis makes three broader contributions to the study of single particle verbs. The first contribution is a general structural account of single particle polysemy, according to which the well-known polysemy of German particles is a systematic reflex of syntactic structure rather than a lexical accident: the various uses of a particle need not be listed as separate lexical entries but follow from the limited set of positions in which a single lexical item can be merged. This shifts the burden of explanation from the lexicon to the syntax and yields a more economical account of particle polysemy than approaches that multiply homophonous entries. Since the analysis derives interpretive variation from independently motivated structural distinctions, its core logic is, in principle, extendable to other Germanic languages with comparable particle systems.

The second contribution concerns the theory of inner aspect. By demonstrating that German aspectual particles can encode inceptive as well as telic meanings, the thesis argues for a feature inventory of inner aspect that includes an inceptivity feature, [init], alongside the standardly assumed [telic]. This captures the inceptive readings that a [telic]-only system must either ignore or misanalyse as instances of telicity. More broadly, the analysis establishes inceptivity as a grammatically encoded aspectual category in its own right, rather than a peripheral or purely lexical phenomenon.

The third contribution is a structural typology of telicity encoding. The analysis distinguishes three telic configurations according to whether and where [telic] is realised, and how

it interacts with the object. In (245), the element crucial for the computation of telicity in each configuration is highlighted in red. In the first configuration (245a), [telic] is realised on iAsp, where it directly enforces a telic interpretation independently of the quantisation properties of the object, as in particle verbs with aspectual uses of *auf*. In the second (245b), [telic] is realised lower in the complement of the verb, as in resultative uses of *auf*, where telicity arises through the interaction between the feature and a quantised object. The presence of [telic] guarantees that a telic interpretation arises whenever the object is quantised. In the third configuration (245c), [telic] is absent altogether, and a quantised object merely licenses, rather than enforces, a telic interpretation. The role of [telic] thus diminishes systematically across the three configurations: from directly enforcing telicity, to interacting with the object to yield it, to playing no role in its computation at all. In the proposed analysis, telicity does not originate from a single dedicated locus, but emerges from the interaction between feature specification, structural position, and object quantisation. The resulting typology demonstrates that, in German, the presence of a [telic] feature neither guarantees nor is required for a telic interpretation. The analysis therefore favours a compositional view, on which telicity is the product of these interacting factors rather than of any single source.

(245) Telic constructions



Chapters 4 and 5 focus on double particle verbs and approach them from two complementary directions: a synthesis of the existing theoretical and acquisitional literature, and an experimental investigation of their processing.

Chapter 4 brings together the syntactic, semantic, and acquisition literature on double particles. It shows that, despite the morphological transparency of double particles, which decompose overtly into a deictic h-particle and a base particle, both the syntactic and semantic literature converge on analyses that treat them as relatively integrated units with reduced

compositional transparency. In the syntactic literature, double particles have been argued to occupy a single functional head (Zeller 2001a) or to realise functional heads within the extended projection of the PP (Noonan 2010, 2017), rather than projecting as two independent lexical heads. In the semantic literature, the h-particle has been argued to undergo semantic bleaching, losing much of its original deictic content and instead serving functions of reinforcement and disambiguation (McIntyre 2001b). The acquisition literature provides evidence on both sides of the representational question: while some findings suggest that early uses of double particles are stored as wholes, others indicate that children analyse them into their components and recombine them productively. The question of how double particles are represented and processed by adult native speakers therefore remains empirically open.

Chapter 5 addresses this question through an ERP cross-modal priming experiment comparing single particle verbs, double particle verbs, and prefix verbs, which differ systematically in their phonological structure, morphological complexity, and morphosyntactic separability. Importantly, the results reveal clear processing differences between particle verbs and prefix verbs in both behavioural and ERP data. The findings are interpreted as evidence that the lexical representation and processing of morphologically complex verbs in German are shaped not by morphological structure alone, but by the interaction of morphology with prosodic and morphosyntactic constituency. In particular, the prosodic independence and morphosyntactic separability of both single and double particles facilitate decomposition and promote stronger activation of the embedded verbal base during lexical access. Prefix verbs, by contrast, show weaker and temporally more restricted priming effects, which are argued to follow from the tighter prosodic and morphosyntactic integration between prefix and stem. Morphological processing is therefore argued to be sensitive to the alignment between morphological boundaries and constituency at other levels of representation, especially prosodic and morphosyntactic structure. The findings consequently support a constrained decomposition account of morphological processing, according to

which decomposition is neither fully obligatory nor fully holistic, but is bounded by prosodic and morphosyntactic constituency.

When the two types of particle verbs are compared, double particle verbs patterned closely with single particle verbs, despite their greater morphological complexity, in both behavioural priming and the N400 time window. This suggests that double particles are processed as unified preverbal constituents rather than being obligatorily decomposed into their deictic and directional components during early lexical access. At the same time, double particle verbs differed from single particle verbs in the late P600 window, where they elicited a delayed positivity not seen for single particle verbs. This pattern suggests that the internal complexity of double particles is not entirely invisible to the processing system, but becomes relevant only at later stages of morphological processing, where it gives rise to additional reanalysis costs. This post-lexical reanalysis appears to be sensitive not only to morphological complexity but also to the phonological similarity and semantic relatedness between prime and target.

An important contribution of these findings to the study of German double particles is that they introduce direct processing evidence into an area of research that has so far been addressed primarily on theoretical grounds. The syntactic and semantic literature has generally converged on the view that double particles are not simple concatenations of two independent particles, but form relatively integrated units with reduced compositional transparency. This conclusion, however, is largely reached on theory-internal grounds, without direct evidence as to how speakers represent and process these forms. The finding that double particles are stripped off from the base verb as unified units during early lexical access provides precisely such evidence and lends empirical support to these unitary analyses: at the stage of lexical access, the double particle behaves as a single constituent rather than as two independently represented morphemes.

In supplying this evidence, the experiment also brings into closer relation theoretical traditions on single and double particles that have largely developed independently of one another. Single particles, especially in their resultative uses, have standardly been analysed as

lexical elements closely related to their homophonous prepositions, whereas double particles have typically been treated as a structurally distinct class involving functional structure and abstract semantic functions. Little in either tradition has connected the two directly. The processing evidence, however, reveals a commonality that cuts across this divide: single and double particles behave alike in their relationship to the base verb, each being stripped off as a single unit during lexical access. This parallelism suggests that, whatever their internal structural differences, single and double particles share a common status as separable units standing in the same relation to the verb stem, a generalisation that the largely separate theoretical traditions have not fully captured (but see Zeller 2001a). The empirical data thereby motivate a closer connection between the two analyses, suggesting that the structure of double particles is most fruitfully investigated in dialogue with, rather than in isolation from, the structure of single particles.

6.2 Future work

Several directions for future work follow from the analyses developed here. Two were already noted in Chapter 3. The first is the extension of the structural account beyond *auf* to the broader inventory of German aspectual particles. Although the analysis was extended in outline to *aus*, *an*, and *ein*, a full treatment of each particle remains to be carried out. The second is the integration of the analysis into a root-based framework such as DM, in which the status of verbal particles as functional or lexical vocabulary items could be made precise. Both extensions would test the generality of the structural account of particle polysemy proposed here.

A further direction is cross-linguistic comparison. Particle verbs are pervasive across the Germanic languages, several of which, including Dutch and the Scandinavian languages, exhibit both aspectual particles and complex particle formations comparable to German double particles. Applying the structural account of polysemy and the inceptive-egressive classification to these languages would establish whether the patterns identified for German

reflect language-particular properties or more general features of Germanic particle systems. The same question arises on the processing side: whether the dissociation between early decomposition and later reanalysis observed for German complex verbs recurs in languages with different prosodic and morphosyntactic profiles.

Further research could also target the processing of the internal structure of double particles. The priming design used in Chapter 5 was sensitive to the boundary between the particle complex and the verbal base, but did not directly probe the internal boundary between the deictic *h*-particle and the base particle itself. Consequently, while the findings suggest that double particles are processed as unified constituents during early lexical access, they leave open the question of whether the two component morphemes are nevertheless activated or separated at some stage of processing. Experimental designs specifically targeting this internal boundary could determine whether it plays any role during lexical access and whether the late reanalysis costs observed in the present study arise specifically from integrating the two morphemes of the double particle. Such work would bring direct processing evidence to bear on the compositional analyses of double particles that the theoretical literature has largely rejected.

6.3 Concluding remarks

In conclusion, this thesis set out from the observation that German verbal particles, for all the attention they have received, conceal systematic mismatches between their morphological form and their representation at other linguistic levels. Through two of their least understood subclasses, it has shown that these mismatches are not incidental but reflect a general property of the verbal particle system: a single morphological form may correspond to a structured range of syntactic positions and interpretations, as in the case of aspectual particles, while a morphologically complex form may behave as a single unit, as in the case of double particles. The recurring theme is that understanding what a particle is and what it does requires attention to its representation across the phonological, syntactic, and semantic levels and,

as the processing study has shown, to how that representation is engaged in real time. It is by bringing these levels, and the theoretical and experimental perspectives they invite, into contact that this thesis has sought to advance our understanding of a familiar yet imperfectly understood part of the German verbal system.

Statement of Authorship

Statement of Authorship for joint/multi-authored papers for PGR thesis

To appear at the end of each thesis chapter submitted as an article/paper

The statement shall describe the candidate's and co-authors' independent research contributions in the thesis publications. For each publication there should exist a complete statement that is to be filled out and signed by the candidate and supervisor (**only required where there isn't already a statement of contribution within the paper itself**).

Title of Paper	Morphological decomposition: the role of phonology and morphosyntax
Publication Status	☐ Published ☐ Submitted for Publication ☐ Accepted for Publication ☒ Unpublished and unsubmitted work written in a manuscript style
Publication Details	

Student Confirmation

Student Name:	Yiwei Si
Contribution to the Paper	I am the first author of this paper. I developed the initial idea of investigating the morphological processing of double particle verbs in German, and the experimental design was refined through a series of discussions with Dr. Isabella Fritz. I conducted most of the experiments and carried out the preprocessing of the experimental data. Dr. Isabella Fritz conducted the statistical analysis. I wrote the original draft of the manuscript, which was subsequently revised jointly by Dr. Isabella Fritz and me.
Signature 	Date 28/05/2026

Supervisor Confirmation

By signing the Statement of Authorship, you are certifying that the candidate made a substantial contribution to the publication, and that the description described above is accurate.

Supervisor name and title: Dr. Isabella Fritz		
Supervisor comments The description of the contributions is accurate.		
Signature 	Date 28/05/2026	

This completed form should be included in the thesis, at the end of the relevant chapter.

Appendices



Stimuli List

Targets	Primes		
	2PartV	1PartV	PfxV
bauen	herumbauen	abbauen	erbauen
beißen	herausbeißen	abbeißen	zerbeißen
biegen	herumbiegen	abbiegen	verbiegen
drehen	herumdrehen	aufdrehen	verdrehen
drücken	herumdrücken	eindrücken	erdrücken
fahren	herumfahren	anfahren	befahren
fallen	hereinfallen	abfallen	entfallen
fliegen	herumfliegen	abfliegen	befliegen
forschen	herumforschen	mitforschen	erforschen
füllen	hineinflüllen	ausfüllen	befüllen
gehen	hineingehen	mitgehen	begehen
greifen	hineingreifen	aufgreifen	ergreifen
hacken	herumhacken	abhacken	zerhacken
halten	heraushalten	anhalten	behalten

hängen	herabhängen	aufhängen	behängen
helfen	hineinhelfen	aushelfen	behelfen
kleben	hineinkleben	ankleben	bekleben
kommen	hinauskommen	mitkommen	entkommen
kratzen	herumkratzen	ankratzen	zerkratzen
laden	hineinladen	aufladen	entladen
lassen	hinauslassen	einlassen	belassen
laufen	hinauslaufen	nachlaufen	entlaufen
legen	hereinlegen	auflegen	verlegen
mischen	hineinmischen	einmischen	vermischen
nehmen	herausnehmen	mitnehmen	entnehmen
packen	hineinpacken	auspacken	bepacken
pflanzen	hineinpflanzen	anpflanzen	verpflanzen
räumen	herausräumen	ausräumen	verräumen
rechnen	herausrechnen	nachrechnen	berechnen
reden	herumreden	nachreden	verreden
reichen	hinaufreichen	zureichen	erreichen
reisen	herumreisen	nachreisen	verreisen
reißen	hineinreißen	einreißen	zerreißen
reiten	hinausreiten	ausreiten	bereiten
rennen	herumrennen	einrennen	verrennen
rücken	heranrücken	aufrücken	verrücken
sagen	heraussagen	nachsagen	besagen
schalten	hinaufschalten	einschalten	verschalten
schicken	herausschicken	abschicken	verschicken
schieben	hineinschieben	einschieben	verschieben
schießen	herumschießen	anschießen	erschießen

schlagen	hineinschlagen	zuschlagen	zerschlagen
schleichen	heranschleichen	einschleichen	beschleichen
schneiden	hineinschneiden	anschneiden	zerschneiden
schreiben	hineinschreiben	aufschreiben	verschreiben
senken	herabsenken	absenken	versenken
sinken	hineinsinken	absinken	versinken
sprechen	herumsprechen	mitsprechen	besprechen
springen	hinaufspringen	abspringen	entspringen
spülen	hineinspülen	abspülen	bespülen
stechen	hineinstechen	anstechen	erstechen
stecken	hineinstecken	anstecken	bestecken
steigen	hinaufsteigen	aussteigen	besteigen
stellen	hineinstellen	aufstellen	verstellen
stoßen	hineinstoßen	anstoßen	zerstoßen
treten	herantreten	austreten	betreten
wählen	herumwählen	vorwählen	erwählen
werfen	hinauswerfen	abwerfen	bewerfen
ziehen	heranziehen	anziehen	beziehen
zwingen	hineinzwingen	aufzwingen	erzwingen

B

Behavioural Data Model Outputs

Table B.1. Full model of the RT behavioural data using the `summary()` function allowing to test for differences in the priming strength. Square brackets indicate comparison level. For *Prime* the reference level was set to *control*.

	RTsLog			
<i>Predictors</i>	<i>Estimates</i>	<i>CI</i>	<i>Statistic</i>	<i>p-value</i>
(Intercept)	6.33	6.28 – 6.38	240.54	< 0.001 ***
Type [2PartV]	0.00	-0.02 – 0.02	0.43	0.669
Type [PfxV]	-0.01	-0.03 – 0.01	-0.87	0.384
Prime [Experimental]	-0.13	-0.15 – -0.10	-10.12	< 0.001 ***
<i>Baseline: 1PartV</i> Type [2PartV] × Prime [Experimental]	0.00	-0.03 – 0.03	0.00	1.000
Type [PfxV] × Prime [Experimental]	0.03	0.00 – 0.06	2.00	0.046 *
<i>Baseline: 2PartV</i> Type [PfxV] × Prime [Experimental]	0.03	0.00 – 0.05	2.00	0.046 *

Random Effects

σ^2	0.03
τ_{00} target	0.00
τ_{00} subject	0.02
τ_{11} subject.type2PartV	0.00
τ_{11} subject.typePfxV	0.00
τ_{11} subject.primeExperimental	0.00
ρ_{01} subject.type2PartV	0.49
ρ_{01} subject.typePfxV	0.51
ρ_{01} subject.primeExperimental	-0.22
N_{subject}	30
N_{target}	60
Observations	3428
Marginal R^2 / Conditional R^2	0.118 / NA

C

Pairwise Comparisons

Table C.1. Planned pair-wise comparisons of control-experimental items across the three types for the ERP data (Tukey test). * <.05, ** <.01, *** <.001

Time-window: 300-400ms

Type	Estimates	SE	DF	z-ratio	p-value	ERP effect
1PartV	-1.47	0.49	Inf	-2.98	.003 **	N400
2PartV	-1.61	0.49	Inf	-3.27	.001 **	N400
PfxV	-1.01	0.50	Inf	-2.04	.041 *	N400

Table C.2. Planned pair-wise comparisons of control-experimental items across the three types for the ERP data (Tukey test).

Time-window: 400-500ms

Type	Estimates	SE	DF	z-ratio	p-value	ERP effect
1PartV	-1.61	0.54	Inf	-2.98	.003 **	N400
2PartV	-1.60	0.54	Inf	-2.96	.003 **	N400
PfxV	-0.59	0.54	Inf	-1.09	.247	-

Table C.3. Planned pair-wise comparisons of control-experimental items across the three types for the ERP data (Tukey test).**Time-window: 500-600ms**

Type	Estimates	SE	DF	z-ratio	p-value	ERP effect
1PartV	-0.04	0.57	Inf	-0.07	.944	-
2PartV	-0.69	0.57	Inf	-1.21	.225	-
PfxV	0.54	0.57	Inf	0.94	.346	-

Table C.4. Planned pair-wise comparisons of control-experimental items across the three types for the ERP data (Tukey test).**Time-window: 600-700ms**

Type	Estimates	SE	DF	z-ratio	p-value	ERP effect
1PartV	0.75	0.58	Inf	1.30	.195	-
2PartV	1.12	0.58	Inf	1.93	.053	-
PfxV	1.81	0.58	Inf	3.10	.002 **	P600

Table C.5. Planned pair-wise comparisons of control-experimental items across the three types for the ERP data (Tukey test).**Time-window: 700-800ms**

Type	Estimates	SE	DF	z-ratio	p-value	ERP effect
1PartV	0.97	0.59	Inf	1.64	.102	-
2PartV	1.65	0.59	Inf	2.79	.005 **	P600
PfxV	2.33	0.60	Inf	3.91	.000 ***	P600

D

ERP Data Model Outputs

Table D.1. Full model of the by-item ERP data for the 300–400ms time-window using the `summary()` function allowing to test for differences in the priming strength. Square brackets indicate comparison level. For *Prime Type* the reference level was set to *Control*.

	EEG		
<i>Predictors</i>	<i>Estimates</i>	<i>CI</i>	<i>p-value</i>
(Intercept)	2.57	1.03 – 4.11	0.001 **
Type [PfxV]	0.73	-0.24 – 1.70	0.142
Type [2PartV]	0.30	-0.66 – 1.27	0.539
Prime Type [Experimental]	1.47	0.50 – 2.44	0.003 **
<i>Baseline: 1PartV</i> Type [PfxV] × Prime Type [Experimental]	-0.46	-1.83 – 0.91	0.511
Type [2PartV] × Prime Type [Experimental]	0.14	-1.23 – 1.51	0.842
<i>Baseline: 2PartV</i> Type [PfxV] × Prime Type [Experimental]	-0.14	-1.51 – 1.23	0.842

Random Effects

σ^2	72.27
τ_{00} target	0.00
τ_{00} subject	14.77
N_{subject}	30
N_{target}	60
Observations	3551
Marginal R^2 / Conditional R^2	0.007 / NA

Table D.2. Full model of the by-item ERP data for the 400–500ms time-window using the `summary()` function allowing to test for differences in the priming strength. Square brackets indicate comparison level. For *Prime Type* the reference level was set to *Control*.

	EEG		
<i>Predictors</i>	<i>Estimates</i>	<i>CI</i>	<i>p-value</i>
(Intercept)	4.56	2.85 – 6.27	<0.001 ***
Type [PfxV]	1.27	0.20 – 2.33	0.020 *
Type [2PartV]	0.41	-0.65 – 1.46	0.452
Prime Type [Experimental]	1.61	0.55 – 2.67	0.003 **
<i>Baseline: 1PartV</i> Type [PfxV] $\times$ Prime Type [Experimental]	-1.02	-2.52 – 0.49	0.185
Type [2PartV] $\times$ Prime Type [Experimental]	-0.01	-1.51 – 1.49	0.988
<i>Baseline: 2PartV</i> Type [PfxV] $\times$ Prime Type [Experimental]	-1.00	-2.50 – 0.50	0.190

Random Effects

σ^2	86.61
τ_{00} target	0.11
τ_{00} subject	18.43

ICC	0.18
N _{subject}	30
N _{target}	60
Observations	3551
Marginal R ² / Conditional R ²	0.005 / 0.181

Table D.3. Full model of the by-item ERP data for the 500–600ms time-window using the `summary()` function allowing to test for differences in the priming strength. Square brackets indicate comparison level. For *Prime Type* the reference level was set to *Control*.

	EEG		
<i>Predictors</i>	<i>Estimates</i>	<i>CI</i>	<i>p-value</i>
(Intercept)	6.55	4.80 – 8.29	<0.001 ***
Type [PfxV]	0.97	-0.14 – 2.09	0.088
Type [2PartV]	0.38	-0.73 – 1.49	0.501
Prime Type [Experimental]	0.04	-1.07 – 1.15	0.944
<i>Baseline: 1PartV</i> Type [PfxV] × Prime Type [Experimental]	-0.58	-2.16 – 1.00	0.473
Type [2PartV] × Prime Type [Experimental]	0.65	-0.93 – 2.22	0.420
<i>Baseline: 2PartV</i> Type [PfxV] × Prime Type [Experimental]	-1.22	-2.8 – 0.35	0.128

Random Effects

σ^2	95.54
τ_{00} target	0.54
τ_{00} subject	18.73
ICC	0.17

N_{subject}	30
N_{target}	60
Observations	3551
Marginal R^2 / Conditional R^2	0.001 / 0.169

Table D.4. Full model of the by-item ERP data for the 600–700ms time-window using the `summary()` function allowing to test for differences in the priming strength. Square brackets indicate comparison level. For *Prime Type* the reference level was set to *Control*.

	EEG		
<i>Predictors</i>	<i>Estimates</i>	<i>CI</i>	<i>p-value</i>
(Intercept)	5.27	3.71 – 6.84	<0.001 ***
Type [PfxV]	1.68	0.54 – 2.83	0.004 **
Type [2PartV]	1.27	0.14 – 2.41	0.028 *
Prime Type [Experimental]	-0.75	-1.89 – 0.39	0.195
<i>Baseline: 1PartV</i> Type [PfxV] × Prime Type [Experimental]	-1.06	-2.67 – 0.56	0.199
Type [2PartV] × Prime Type [Experimental]	-0.37	-1.98 – 1.24	0.654
<i>Baseline: 2PartV</i> Type [PfxV] × Prime Type [Experimental]	-0.69	-2.30 – 0.92	0.402

Random Effects

σ^2	99.88
τ_{00} target	0.29
τ_{00} subject	13.96
ICC	0.12
N_{subject}	30

N_{target}	60
Observations	3551
Marginal R^2 / Conditional R^2	0.006 / 0.129

Table D.5. Full model of the by-item ERP data for the 700–800ms time-window using the `summary()` function allowing to test for differences in the priming strength. Square brackets indicate comparison level. For *Prime Type* the reference level was set to *Control*.

	EEG		
<i>Predictors</i>	<i>Estimates</i>	<i>CI</i>	<i>p-value</i>
(Intercept)	4.73	3.34 – 6.12	<0.001 ***
Type [PfxV]	1.91	0.74 – 3.07	0.001 **
Type [2PartV]	1.49	0.33 – 2.65	0.012 *
Prime Type [Experimental]	-0.97	-2.41 – 0.19	0.102
<i>Baseline: 1PartV</i> Type [PfxV] × Prime Type [Experimental]	-1.36	-3.01 – 0.29	0.106
Type [2PartV] × Prime Type [Experimental]	-0.68	-2.33 – 0.96	0.417
<i>Baseline: 2PartV</i> Type [PfxV] × Prime Type [Experimental]	-0.68	-2.33 – 0.97	0.419

Random Effects

σ^2	104.62
τ_{00} target	0.56
τ_{00} subject	9.49
ICC	0.09
N_{subject}	30
N_{target}	60

Observations	3551
Marginal R^2 / Conditional R^2	0.009 / 0.096

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