

**Word order variability and change in
German infinitival complements.
A multi-causal approach.**

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List of Abbreviations

CP	complementiser phrase
DAT	dative
ENHG	Early New High German
EXPL	expletive
F	verbal field
GSC	Gradient Symbolic Computation
INF	infinitive
LF	Logic Form
ME	Middle English
MHG	Middle High German
NEG	negation
NOM	nominative
OE	Old English
OHG	Old High German
OT	Optimality Theory
OV	object verb
OV/VO	mixed type object verb/verb object
PDG	Present-day German
PF	Phonetic Form
PL	plural
POS	part of speech
PP	prepositional phrase
PRA	Principle of Rhythmic Alternation
Prtkl	separable verb particle
PST	past

PTCP	participle
SG	singular
TP	tense phrase
UG	Universal Grammar
V1	verb-initial
V2	verb-second
VEnd	verb-final
VNC	Variability-based Neighbour Clustering
VO	verb object
VP	verb phrase
VPR	verb projection raising

1

Introduction

It is a well documented observation that older German exhibits greater variability in word order than the present-day language. Infinitival complements represent no exception in this regard. However, while in variation contexts one pattern often ends up replacing the other over time, infinitival complements in present-day German (PDG) still exhibit variability in the linearisation patterns. Crucially, as far as infinitival complements are concerned, what distinguishes PDG from historical stages is that today some word order patterns are excluded in combination with specific matrix verbs, while this was not the case for older German, at least not until the 16th century. Up until this stage of the language, for example, infinitival complements of raising verbs such as the habitual *pfliegen* ‘to be in the habit of’ are attested in different positions with respect to the matrix verb: they can precede it, in what is usually referred to as intraposition pattern (1-a), they can appear in post-verbal position as in (1-b), a pattern typically called extraposition, or they can appear as a discontinuous constituent, partly preceding and partly following the verb, in what has been named the third construction (1-c).

- (1) a. da die Fischer [auf dem Fischfang zu ligen]
where the fishermen at the fishing to moor
pfliegen
are.in.the.habit.of
‘where fishermen are in the habit of mooring for fishing’

(1599, Am 3.1.28)

- b. damit man pflegt, [die Layb brots an boeden
there.with one is.in.the.habit.of, the loaves of.bread at bottom
zu saubern]
to clean
'with which they usually clean the bottom of bread'

(1582, Rauw s120)

- c. da sie zuvorn [10. oder 12. Weiber] pflegten [zu haben]
that they before 10 or 12 wives used to have
'that before they used to have 10 or 12 wives'

(1599, Am 1.39.13)

In contrast, in PDG the verb *pflegen* 'be in the habit of' only admits an intraposed infinitival complement, while extraposition of the infinitive or third construction are excluded (2). Unlike *pflegen* 'be in the habit of', however, verbs like *versuchen* 'try' still allow all three word order patterns in PDG (3).

- (2) a. dass Fred [Romane zu schreiben] pflegte
that Fred novels to write used
- b. *dass Fred pflegte, [Romane zu schreiben]
that Fred used novels to write
- c. *dass Fred [Romane] pflegte [zu schreiben]
that Fred novels used to write
'that Fred used to write novels'
- (3) a. dass Lisa [den Artikel zu schreiben] versucht
that Lisa the article to write tries
- b. dass Lisa versucht, [den Artikel zu schreiben]
that Lisa tries the article to write
- c. dass Lisa [den Artikel] versucht [zu schreiben]
that Lisa the article tries to write
'that Lisa tried to write the article'

This asymmetry in the distribution of different word order patterns in PDG has been widely discussed in the literature and is traditionally ascribed to the existence of different types of infinitival complements, which in turn are determined by the selecting verb. While some verbs embed infinitives showing clausal properties, thus building a separate clausal domain and giving rise to

a bi-clausal structure, others yield a mono-clausal structure, with the infinitive belonging to the matrix clausal domain. It is in the latter case that intraposition is required in PDG. In light of the historical data presented so far in the literature, and briefly exemplified above for the verb *pflügen* 'be in the habit of', this type of constraint on word order does not seem to apply in older stages of German, which raises the question of why this is the case. A possible answer to this question is that the selection properties of the matrix verbs have undergone change in the history of German, i.e. allowing them to combine with more types of infinitival complements than in PDG. Another possible solution that has been proposed in the literature is that word order change in the linearisation of infinitival complements and the emergence of the present-day restrictions reflect major changes affecting German base word order. The present work aims at shedding light on these questions by investigating the diachronic distribution of different word order patterns in German infinitival complements and the emergence of word order regularities that led to a reduced, yet still existing, variability. The study focuses on two groups of matrix verbs that show opposite syntactic behaviour in PDG, raising and control verbs, and aims to find out firstly, when these word order restrictions originated, an aspect that has not been definitely resolved in the literature yet, and secondly what the causes and mechanisms that led to this change are. I discuss hypotheses that have been previously posed in the literature against evidence drawing from diachronic corpus data and finally propose a new approach, that takes into account the role of different language-internal and language-external factors to explain the synchronic and diachronic variation in the linearisation of infinitival complements in German.

2

Preliminaries

Before proceeding with the discussion of infinitival complements in the history of German, some necessary background is provided in this chapter. In the spirit of Jäger et al. (2018), the present work aims at providing a “solid empirical basis and valid descriptive generalizations” (Ibid.: 2) for the word order development of infinitival complements in the history of German and integrates these descriptive observations in the theoretical discussion of the generative framework. Reflecting this research program the first part of the present chapter presents the topological field model and some fundamental empirical facts about the position of the verbal elements in (the history of) German, with a focus on the right periphery of the clause, while the second part outlines the theoretical assumptions about the model of grammar and German clause structure, against which the historical data will be discussed.

2.1 The topological field model and verb placement in PDG

In PDG there are three positions that a finite verb can take: it can appear in first position in a sentence (V1) as in (1-a), it can take the second position (V2) as in (1-b) or it can occur at the end of a sentence (VEnd) as in (1-c).

- (1) a. Schreibt Anja einen Roman?
writes Anja a novel?
- b. Anja schreibt einen Roman
Anja writes a novel
- c. ..., dass Anja einen Roman schreibt
..., that Anja a novel writes

V1 is usually found in interrogative, imperative and conditional clauses, V2 is typical of declarative main clauses, while VEnd characterises embedded clauses introduced by a complementiser. When considering complex predicate as in (2), i.e. a periphrastic verb form consisting of a finite auxiliary (*hat* 'has') and a non-finite verb (the participle *geschrieben* 'written') or particle verbs such as in (3), the two verbal elements are linearised discontinuously in V1 and V2 orders, while they remain adjacent in VEnd sentences.

- (2) a. Hat Anja einen Roman geschrieben?
has Anja a novel written?
- b. Anja hat einen Roman geschrieben
Anja has a novel written
- c. ..., dass Anja einen Roman geschrieben hat
..., that Anja a novel written has
- (3) a. Liest Anja eine Geschichte vor?
reads Anja a story out
- b. Anja liest eine Geschichte vor
Anja reads a story out
- c. ..., dass Anja eine Geschichte vorliest
..., that Anja a story out.reads

Traditionally, these word order properties of German are described by means of the topological field model. In this model, discontinuous verbal elements constitute the so-called sentence bracket. The finite verb occupies the left bracket, while the non-finite verb forms or stranded particles are accommodated in the right bracket. In subordinate clauses introduced by a subordinative conjunction, this occupies the left bracket while the two verbal elements share the right bracket. If the predicate consists of only one verbal element, this occupies the left bracket in V1 and V2 orders, while the right bracket remains empty. The rest of the model is built around the sentence bracket and consists of a pre-field, a middle-field and a post-field (cf. (4)).

(4)

Pre-field	Left Bracket	Middle-field	Right Bracket	Post-field
a.	Hat	<i>Anja einen Roman</i>	geschrieben?	
b.	Liest	<i>Anja eine Geschichte</i>	vor?	
c. <i>Anja</i>	hat	<i>einen Roman</i>	geschrieben.	
d. <i>Anja</i>	liest	<i>eine Geschichte</i>	vor.	
e.	dass	<i>Anja einen Roman</i>	geschrieben hat.	
f.	dass	<i>Anja eine Geschichte</i>	vorliest.	
g.	Schreibt	<i>Anja einen Roman?</i>		
h. <i>Anja</i>	schreibt	<i>einen Roman.</i>		
i. <i>Anja</i>	hat	<i>Max</i>	versprochen,	<i>dass sie [...] schreibt.</i>
j. <i>Anja</i>	hat		geschrieben	<i>*einen Roman</i>

The pre-field is the position preceding the left bracket and is dedicated to exactly one constituent – usually, but not necessarily, the subject; The middle-field is the position between the left and the right sentence bracket and can in turn accommodate any number and type of constituents, with few exceptions (see e.g. Grewendorf, 1988, Wöllstein, 2014); As to the post-field, the position following the right bracket, this is usually reserved to heavy or clausal constituents. Non-clausal objects are excluded from the post-field position in PDG, but PPs can occur in this position (Grewendorf, 1988). Relative clauses and infinitival complements are also optionally found in the post-field, while for some researchers finite complement clauses obligatorily occur in this position. According to Grewendorf (1988) and Eisenberg (2013), for example, finite complement clauses in the middle-field are ungrammatical, while Wöllstein (2014) considers them in principle possible from a grammatical perspective, but as a dispreferred option. The occurrence of constituents in the post-field is also referred to as exbraciation, or to use the more common term, extraposition, a term that was introduced above to describe the post-verbal position of infinitival complements¹. Intraposition, on the other hand, refers to elements

¹When not explicitly noted otherwise, in the present work the term extraposition is not intended to denote a movement analysis but is used descriptively to refer to patterns in which arguments of the finite verb are found at its right.

that are found within the sentence bracket.

2.2 Verb placement in older German

After having briefly outlined the main word order properties of PDG in section 2.1, we now turn to older German and to the question of whether and how the linearisation of constituents differs from the PDG. Particular attention will be given to the right periphery of the clause.

According to previous scholarship, the verb occurs in all three positions described above already in Old High German (OHG) – the earliest attested stage of the German language dated from around 750 to 1050 – that is, it can occupy the first, the second or the final position in the clause (Lenerz, 1984, Axel, 2007). Also, the association between clause type and verb position seems to already be present in OHG, as the clause final position is mainly attested in subordinate clauses, as in (5-b), V2 is usually found in main declarative clauses (5-a) and V1 in imperatives (5-c) and interrogatives (Lenerz, 1984, Axel, 2007).

- (5) a. Druhtin suor dauite in uuaarnissu
Lord swore David-DAT in truth
'the Lord swore to David in truth'
Iuravit dominus dauid in ueritate

(I 610; Axel, 2007: 4, (1a))

- b. /tho her thisiu quad/
when he these said
'when he had said these things'
/Et cum haec dicer&/

(T 343,28; Axel, 2007: 6, (4b))

- c. /tuot riuua .../
do-2.PL.IMP repentance
'repent!'
pænitentiam agite

(T 103,1; Axel, 2007: 8, (7b))

Thus the asymmetry between V2 and VEnd clauses and the sentence bracket

principle can be found already in OHG. However, OHG also differs from PDG in that it allows for further word order patterns that are not possible in the present-day language. In what follows, I will focus on those deviations concerning the right periphery that will still be present beyond the OHG period². Although VEnd is already attested in OHG subordinate clauses, the finite verb is often not found in the absolute final position, but can precede the non-finite verb form in the right sentence bracket, as illustrated in (6).

- (6) dher fona uuerodheoda druhtine uuard **chisendit**
 who from Hosts' Lord became sent
 'who was sent by the Lord of Hosts'
qui a domino executuum mittitur

(I 216; Axel, 2007: 9, (9b))

Also, non-verbal material can follow the finite verb together with the non-finite verb, as in (7). In addition, non-clausal constituents can also appear in the post-field, a position they are excluded from in PDG (8).

- (7) Inti thiethár uolle **mit thír uuehslon**
 and who-REL.PARTCL want with you exchange
 'and those who would want to exchange with you'
/& uolenti mutuaire a té/

(T 145,12; Axel, 2007: 9, (10b))

- (8) /thaz in mir habet sibba/
 that in me have peace
 'that in me you might have peace'
ut In me pacem habeatis

(T 145,12; Axel, 2007: 9, (11b))

Although these patterns become less frequent over time, Early New High German (ENHG) – the stage of the language spoken in the period from 1350 to 1650 in the High German geographic area and from the 16th century also in chanceries and printers of the Low German area that adopted High German

²For an extensive discussion of the left periphery see Axel (2007).

(cf. Ebert et al., 1993)³ – still shows a considerable degree of variability with respect to the order of verbs in the right sentence bracket, as well as the occupation of the post-field (Lenerz, 1984: 131, von Polenz, 2000: 191). As it was shown in section 2.1, this position is restricted to clausal constituents and PPs in PDG, but ENHG, as OHG, makes use of the post-field more often and with less restrictions: In addition to clausal constituents and PPs, ENHG also still allows subjects and nominal objects in post-verbal position (von Polenz, 2000: 191, see also Sapp, 2014 and Bies, 1996). These observations have led some researchers to assume that German has not always been an OV language but also showed VO characteristics in previous stages. I will come back to this aspect in the next chapters after having introduced the phenomenon under investigation more in detail.

At the same time, researchers have noted that in the course of ENHG an increasing conformity to the sentence bracket principles can be observed, that often led to the formation of complex nested sentences (von Polenz, 2000: 191, Demske, 2016). This is especially the case in scholarly or administrative writing (Lenerz, 1984, von Polenz, 2000). This is another aspect that will be relevant for the discussion in the following chapters.

2.3 Theoretical assumptions

In the present section I outline what the basic theoretical assumptions I am following in the present work are. I will start with a brief sketch of the architecture of grammar, then present the clause structure I assume for (modern) German.

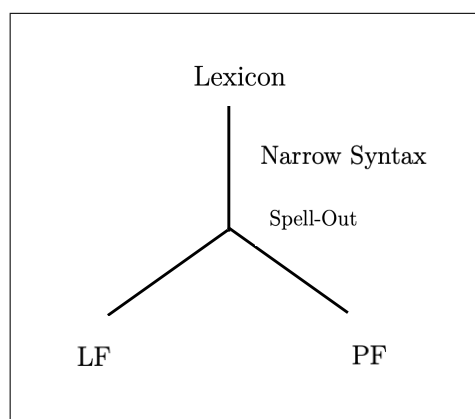
2.3.1 The architecture of grammar

The theoretical reflections at the base of this work are mainly inspired by the guiding principles of the Minimalist Program (Chomsky, 1995) and in particular by the assumptions in Chomsky (2005) and the idea that language, intended as the faculty of language or I-language, is shaped by the interaction of three

³Note that at this stage, as previously was also the case for OHG, the term ENHG does not denote one standard language but is rather a cover term for the dialects spoken in those areas.

factors, that is (i) the genetic endowment or UG, (ii) experience, or the Primary Linguistic Data, to which speakers are exposed and (iii) a third factor that is not specific to the faculty of language, but is intended as a general cognitive principle favouring efficient computation. The latter principle has received particular importance, thus reducing considerably the role of UG that had been central in previous versions of generative grammar. Under the present account, the derivation of a linguistic expression starts with the selection of items from the Lexicon. Then the items are computed into larger units through the operation Merge in the computational module, also referred to as Narrow Syntax. Merge can be external, which is when the items to be merged are selected from the lexicon, or internal, which is when items that already entered the computation are moved (cf. van Gelderen, 2013). Once the computation is completed the output of the derivation is sent to the Conceptual-Intentional and the Sensorimotor system through the interfaces, respectively Logical Form (LF) and Phonetic Form (PF). The step at which the derivation is sent to the interfaces is also referred to as Spell-Out. This model of grammar is illustrated in (9).

(9)



Traditionally, these modules of language have been considered to work independently from each other such that, for example, once the derivation has been sent to Spell-Out, syntactic operations are not visible in the output. However, under the assumption that language is subject to general cognitive principles that are not specific to the faculty of language itself, what “approximates language to an optimal solution” is according to Chomsky (2005) that it must sat-

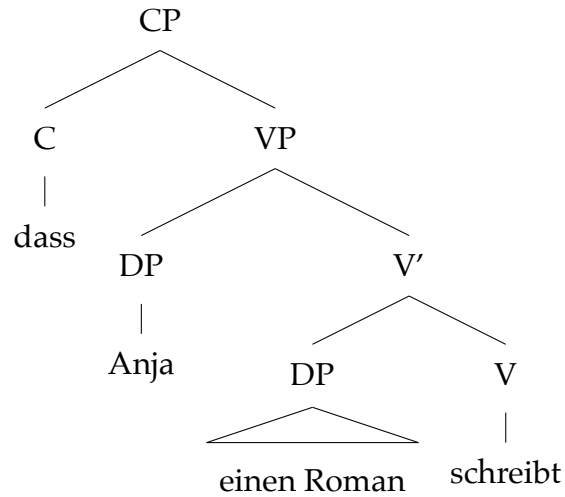
isfy the conditions imposed by the interfaces. This has generated increasing interest in the investigation of such conditions, shifting the attention from narrow syntax to its interaction with the interfaces. Although the focus of the present work is strongly empirical, as it will become clear from the next chapters, investigating changes affecting performance patterns as transmitted by historical corpus data can offer a key to investigating the nature of the (I-)language and in particular of the locus of variation, that is whether it can be ascribed to principles of narrow syntax alone or whether the interfaces, in particular PF are involved to some degree.

2.3.2 German clause structure

It is commonly assumed that the minimal structure of a clause consists of a VP and at least two functional projections, a TP and a CP. Contrary to this common belief, I here follow the assumption that German lacks a T projection. This is based on Haider's (1997) principle of projective economy, which states that empirically unfounded projections must be dispensed with, and is also in line with the growing importance that is given to the second and third factor in the sense of Chomsky (2005), cf. section 2.3.1. The lack of evidence for a T projection (and further expansions thereof) in German has been discussed at length in Haider (1997), Haider (2010a), Sternefeld (2009) and will not be repeated here. Following Haider (2010a) and Sternefeld (2009), I thus assume that German clause structure consists of a head-final VP and one functional projection, i.e. a CP. This structure is all it is needed to account for German word order properties. In what follows I will briefly sketch how the main word order properties of main and embedded clauses illustrated in (1) above (section 2.1) are captured by this structure and outline some open issues. I hereby mainly follow Sternefeld (2008), Sternefeld (2009).

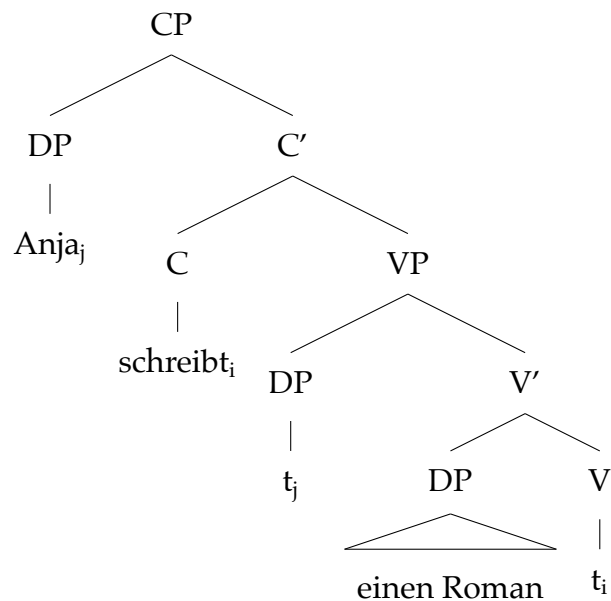
The word order of subordinate clauses is considered to reflect the basic word order in German. Here, the finite verb remains in situ, i.e. in the head of the VP, while the head of the CP accommodates the complementiser as in (10).

(10)



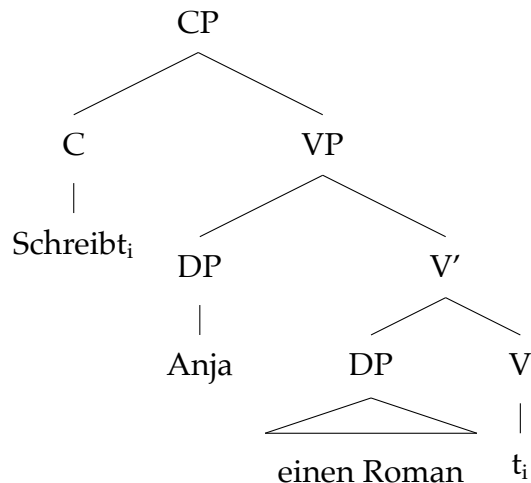
As we have seen above, in main declaratives the finite verb is not found in final but in second position in the clause. This is accounted for by postulating that the verb moves from the head of the VP to the head of the CP, and that the subject moves to the specifier of C (or SpecCP), that is the position preceding C, as illustrated in (11).

(11)



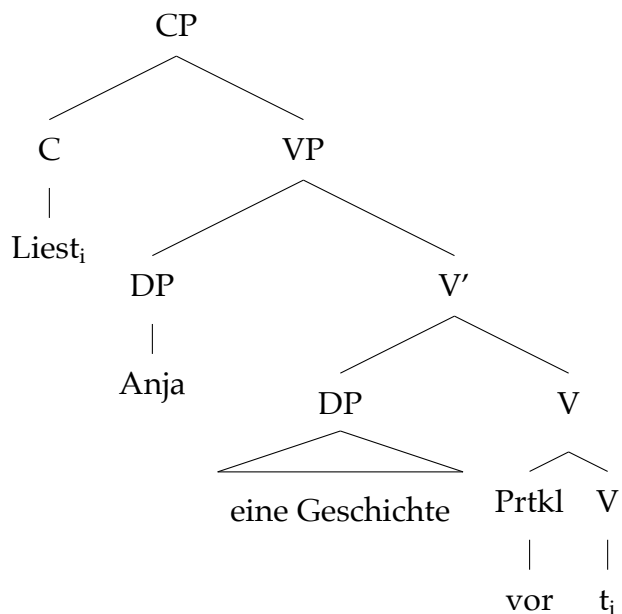
Similarly, V1 sentences are derived by moving the finite verb to C, while the subject stays in its base position, cf. (12). Relating this clause structure to the topological field model, SpecC and C corresponds respectively to the pre-field and the left sentence bracket, and V to the right bracket.

(12)



The cases illustrated in (11) and (12) correspond to those in which the right bracket remains empty, that is when there is only one verbal element, the finite verb, which is moved to C. However, when more than one verbal element is present, i.e. a finite and a non-finite verb, or the verb has a separable prefix, the latter remain in the right bracket, or V, while the finite verb moves to C, (13). Since the focus of the present work is on the right periphery of the clause, I will not discuss properties of the CP or the conditions for movement to C any further, but focus on the VP instead.

(13)

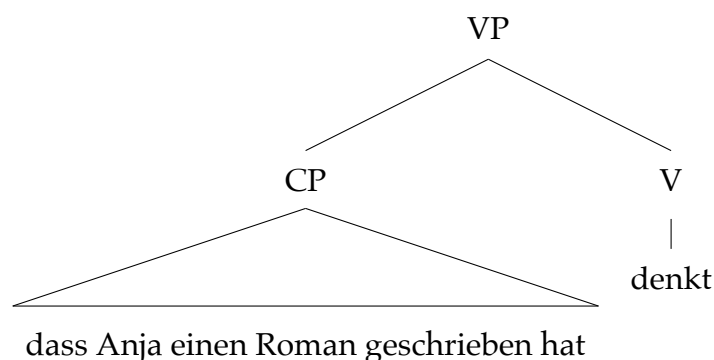


A more detailed discussion of how non-finite verbs are integrated in this clause structure is provided in the next chapter. Here I want to move on with the com-

parison between formal clause structure and the regularities captured by the topological field model. Under the assumption of a head-final VP, the complement position is at the left of the verb, cf. (10)–(13). This therefore implies that complement clauses also occupy the position at the left of the verb as their base position, as in (14).

(14) a. weil Max [dass Anja einen Roman geschrieben hat] denkt

b.



As captured by the topological generalisations illustrated in section 2.1, however, finite complement clauses represent a marked option in this position and rather occupy the post-field. As briefly illustrated in the previous chapter, and as I will show more in detail in the next chapter, this is the case for some infinitives as well. Different proposals have been put forward to account for the position of complement clauses to the right of the finite verb. The main accounts can be summarised under movement accounts and base-generated accounts. In movement accounts it is assumed that the base position of complement clauses is to the left of the verb and that these are successively moved to the right, i.e. adjoined higher in the clause (e.g. Büring and Hartmann, 1995). Evidence presented in support of the movement account often comes from binding data, which show that binding relations are established in the base position, i.e. in the complement position. However, the fact that complement clauses are rarely found in clause internal position, and in fact are highly marked, raises doubts about the adequacy of such an account. Haider (1994) thus proposes that complement clauses are base-generated as right sisters of V, thus in a structural lower position than previous base-generated accounts had proposed (e.g. Culicover and Rochemont, 1990). In order to avoid arbitrary base generation of

elements in the post-field Frey (2015) extends Haider's (1994) proposal by postulating a licensing condition such that only arguments whose inflection is not determined by the verb can be positioned in the post-field. Thus, this condition rules out that NPs, whose case is licensed by the verb, appear post-verbally. However, to my understanding, this condition would also rule out the post-verbal position of infinitives, as they are also in a licensing relation with the verb, since this determines its morphological form, or status, as we will see in the next chapter, thus it also does not offer an optimal solution to the question of how extraposition can be accounted for.

In view of a lack of a satisfying explanation to extraposition from a syntactic perspective only, Féry (2015) proposes an account based on the interaction of syntax and prosody. In her system syntax delivers possible candidate outputs, but the decision as to which output is pronounced is made by evaluating a set of syntactic and prosodic constraints in an optimality-theoretic fashion. Based on the assumption that syntactic constituents of different sizes are matched to different prosodic constituents and that a clause corresponds to the highest prosodic constituent, that is an intonation phrase (ι -phrase), she shows that a complement clause in its base position is infelicitous from a prosodic perspective because it violates multiple prosodic constraints and creates what she calls a prosodic monster, that is an ill-formed prosodic structure in which an ι -phrase is embedded into and dominated by a lower prosodic constituent namely a prosodic phrase (Φ -phrase), or a prosodic word (ω -word), cf. (15).

- (15) *?[[((Sie hat niemandem) $_{\Phi}$, [dass sie spät nach Hause kam] $_{\iota}$,
 she has nobody that she late to home came
 erzählt $_{\omega}$)] $_{\Phi}$] $_{\iota}$.
 told
 'She didn't tell anybody that she came home late on that day'

(Féry, 2015: 17, (3b))

On the other hand, by extraposing the complement clause, the main clause is not interrupted by the embedded ι -phrase and can form its own ι -phrase, resulting in a well-formed, larger recursive ι -phrase (Féry, 2015: 17).

- (16) [(Sie hat niemandem t_i erzählt)_φ]_L [dass sie an dem Tag spät nach
she has nobody told that she on that day late to
Hause kam]_L.
home came
'She didn't tell anybody that she came home late on that day'

(Féry, 2015: 17, (3a))

The model proposed by Féry (2015) represents a step towards a better understanding of syntax-prosody interaction and the role of the interface conditions in shaping language. As it will be shown in the rest of the present work, Féry's (2015) model can be extended to explain in part the variation in the linearisation of infinitives as well. Prosodic effects have in fact been claimed to play an important role in the linearisation of infinitives as well, both in PDG and in older stages of the language. In the next chapters, the role of prosodic factors will be reviewed next to other fundamental properties of infinitival complementation and after having described the diachronic variation in the distribution of infinitives' word order pattern, I will address the question of whether the observed changes can be ascribed to structural change in the architecture of the German clause or whether they are rather a reflection of changes in the interaction of syntax with the interfaces, in the spirit of the research program outlined in Biberauer and Walkden (2015).

3

Infinitives in German: synchronic and diachronic

As introduced above, word order variation in infinitival complementation is usually ascribed to the existence of different types of infinitives in PDG. The aim of the present chapter is to illustrate these different infinitive types and how they are claimed to restrict variability in word order in PDG. A central aspect in this classification is the notion of (in)coherence, which has been introduced in the German tradition by Gunnar Bech in 1955 and has meanwhile been adopted in generative works on the topic. The second part of the chapter is dedicated to the diachrony of infinitival complements in German. It presents the relevant literature that has addressed the relation between infinitive types and word order in older stages of the language and outlines the differences to PDG, as well as the research program of the present thesis.

3.1 Infinitive types classification and word order in PDG

3.1.1 Bech and the coherence rule

Pioneer work in describing the correlation between word order variation and different non-finite verb forms was carried out by Bech (1955). He observed that according to different morphological as well as syntactic properties of the non-finite verb forms, respectively their status and their orientation, these behaved topologically differently. He captures these word order regularities in the so-called coherence rule, which will be illustrated in the next sections, after

having introduced the notions of status and orientation.

3.1.1.1 Status selection

Bech (1955) distinguishes three German non-finite verb forms he calls first status, second status and third status, which correspond respectively to a bare infinitive, a *zu*-infinitive and a past participle (1).¹

(1) Bech's classification of non-finite verb forms in German:

1. status		<i>lieben</i> 'love.INF'
2. status		<i>zu lieben</i> 'to love'
3. status		<i>geliebt</i> 'love.PTCP.PST'

(Bech, 1955: 12)

Similarly to case government, status is determined by another element in the sentence, which can be a verb (2-a), a noun (2-b), an adjective (2-c) or a subordinative conjunction (2-d). In what follows I will focus only on infinitives selected by another verb.

- (2)
- a. Frieda geht Blumen kaufen
Frieda goes flowers buy.INF
 - b. Wir haben die Entscheidung getroffen, früher zu gehen
We have the decision made earlier to go
 - c. Es ist nicht möglich, die Unterlagen rechtzeitig einzureichen
It is not possible the documents on.time to.submit
 - d. Sie hat zurückgeschrieben, ohne ihn zu fragen
She has written.back without him to ask

Within a verb chain the highest verb in the hierarchy (V_1), usually the finite verb, determines the status of its dependent verb (V_2), which in turn can govern another verb (V_3) and consequently its status and so on. For example, in (3) the

¹In his system, Bech (1955) classifies German non-finite verb forms in two classes he calls *supinum* and *partizipium*. For each class he then distinguishes three status (cf. Bech, 1955: 12). For the purposes of this work the illustration of the first class will suffice.

finite verb *habe* 'have' selects the third status *versprochen* 'promised', which in turn selects the second status *zu gehen* 'to go'

- (3) Ich habe₁ versprochen₂ zu gehen₃
I have promised to go

In PDG verbs embedding the first status, i.e. a bare infinitive, are modals (4-a), perception verbs (4-b), causative verbs (4-c) and motion verbs (4-d). Auxiliaries can select all three status (5), whereas all other verbs select the second status (6).

- (4) a. Frieda kann schwimmen
Frieda can swim
b. Max sieht seinen Son rauchen
Max sees his son smoke
c. Lisa lässt ihn fallen
Lisa let him fall
d. Er geht schwimmen
He goes swim
- (5) a. Frieda ist arbeiten
Frieda is work
'Frieda is at work'
b. Das Buch ist zu lesen
the book is to read
c. Fred ist gegangen
Fred is gone
- (6) Max verspricht Lisa, Blumen zu kaufen
Max promises Lisa, flowers to buy

3.1.1.2 Orientation

Infinitives do not have an overtly realised subject, still we usually intuitively identify what the logical subject of the non-finite verb is. Bech (1955) formalises its identification under the notion of *Orientierung* 'orientation' of the infinitive. Orientation is again dependent on the matrix verb. For example, with the verb *beschließen* 'decide', the subject of the embedded infinitive (N'') will be identical to the matrix subject (N'), as in (7), where the logical subject of the infinitive *zu*

gehen 'to go' is the first person singular *ich* 'I'. This is due, according to Bech (1955), to the coefficient of the verb, which in the case of *beschließen* 'decide' is $N' : N''$.

- (7) Ich beschließe zu gehen $N' = N''$
 I decide to go

The subject of the infinitive can also be identical to the accusative object of the matrix verb (A'), as it is the case with the verb *bitten* 'ask' in (8-a) or to the dative object, as with *befehlen* 'command' (8-b), which respectively have the coefficients $A' : N''$ and $D' : N''$.

- (8) a. Paul bittet sie, den Hund zu füttern $A' = N''$
 Paul asks her.ACC the dog to feed
- b. Ich befehle ihm, den Hund zu füttern $D' = N''$
 I command him.DAT the dog to feed

3.1.1.3 Coherence

Two further central notions in Bech's (1955) system are that of verbal field and coherence field. Each verb with its (non-verbal) arguments constitutes a verbal field. In (9), Bech (1955) identifies two verbal fields: [F' *Ich bitte ihn*] 'I asked him' and [F'' *morgen zu kommen*] 'tomorrow to come'. F' contains the verb *bitten* 'ask' and its dependent nominal arguments, the subject *Ich* 'I', and the accusative object *ihn* 'him'. The non-finite verb *zu kommen* 'to come', which is selected by the finite verb *bitten* 'ask' forms a separate verb field, which also comprises the dependent adverb *morgen* 'tomorrow'.

- (9) Ich bitte ihn morgen zu kommen
 I ask him tomorrow to come

(Bech, 1955: 43)

A coherence field is a closed unit in topological sense. It consists of two parts, an end field, which is reserved for the sentence final verb(s) and a rest field, which contains all remaining elements of the sentence. When the sentence consists of more than one verbal field, as it is the case in verb chains connected by status selection, these verbal fields can be either part of the same coherence

field, or enter two separate coherence fields. Indicative of the presence of only one coherence field is the fact that elements of different verbal fields can be intertwined. For example, (10) consists of the two verbal fields [F' *ich nicht konnte*] 'I NEG can' and [F'' *ihm helfen*] 'help him', and an element of F'', the dative object *ihm* 'him' appears between two elements of F', the subject *ich* 'I' and the negation. Two (or more) verbal fields that are part of one coherence field are called coherent.

- (10) weil ich ihm nicht helfen konnte
because I him not help could

(Bech, 1955: 61)

Two or more verbal fields that belong to separate coherence fields are called incoherent. This is the case when the dependent verbal field follows the verbal field containing the hierarchical highest verb, as in (11). Here, the verbal field [F'' *ihn zu stören*] 'him to disturb' entirely follows the verbal field [F' *sie nicht wagt*] 'she NEG dares', and gives rise to a separate coherence field, with its own end field, containing the infinitive in second status *zu stören* 'to disturb', and a separate rest field, containing the object *ihn* 'him'. Unlike in (10), the negation and the embedded object belong to two separate rest fields which are separated by the first end field. Furthermore, a coherence field constitutes a prosodic unit, while two distinct coherence fields are separated by a pause (as indicated by |).

- (11) dass sie nicht (wagt), | ihn (zu stören)
that she NEG dares him to disturb

(Bech, 1955: 71)

Based on the distributions he observes in German, Bech (1955) formulates the so-called coherence rule, stating that verbs that govern the first and the third status are always found in a coherent structure, whereas verbs governing the second status can construe both coherently and incoherently (Ibid.: 68). For example, the verb *wagen* 'dare' selects the second status and allows both a coherent (12-a) and an incoherent (13-a) structure. The verbs *dürfen* 'can' and *haben* 'have' select the first and the third status respectively and only allow a coherent structure, as the grammaticality contrast in (12) and (13) shows.

- (12) a. dass sie ihn nicht (zu stören wagt)
that she him NEG to disturb dares
- b. dass sie ihn nicht (stören darf)
that she him NEG disturb can
- c. dass sie ihn nicht (gestört hat)
that she him NEG disturbed has

(Bech, 1955: 73)

- (13) a. dass sie nicht (wagt), | ihn (zu stören)
that she NEG dares him to disturb
- b. *dass sie nicht (darf), | ihn (stören)
that she NEG can him disturb
- c. *dass sie nicht (hat), | ihn (gestört)
that she NEG has him disturbed

(Bech, 1955: 73)

Not all verbs selecting the second status allow free alternation between coherent and incoherent structures, however. For example, Bech (1955) points out that *brauchen* 'need' and *pflügen* 'be in the habit of' always require a coherent construction, despite selecting the second status, cf. (14) and (15).

- (14) a. dass er nicht zu kommen braucht
that he NEG to come needs
- b. dass er mir zu helfen pflegt
that he me to help is.in.the.habit.of

(Bech, 1955: 84)

- (15) a. *dass er nicht braucht, zu kommen
that he NEG need to come
- b. *dass er pflegt, mir zu helfen
that he is.in.the.habit.of me to help

(Bech, 1955: 84)

On the contrary, verbs with the coefficient A':N'', like *zwingen* 'force' or D':N'', like *erlauben* 'allow' are predominantly found in incoherent constructions (16). Patterns like those in (17) are rather rare. He notes however, that for these verbs, this is no absolute rule but more a tendency reflected in the prevalence of the incoherent construction (Bech, 1955: 84).

- (16) a. dass ich ihn zwingen, hier zu bleiben
 that I him.ACC force here to stay
- b. dass ich ihm erlaube, hier zu bleiben
 that I him.DAT allow here to stay

(Bech, 1955: 84)

- (17) a. dass ich ihn hier zu bleiben zwingen
 that I him here to stay force
- b. dass ich ihm hier zu bleiben erlaube
 that I him here to stay allow

(Bech, 1955: 84)

Essentially, Bech's (1955) coherence rule captures on the one hand, word order regularities associated with different forms of non-finite verbs, since in Bech's (1955) terminology coherent structures equal intraposed infinitives, whereas incoherence always denotes the extraposition of the infinitival complement. On the other hand, by introducing the notion of coherence field and the possibility for multiple verbs to be either part of the same field or enter two separate fields, Bech's (1955) coherence-incoherence opposition goes beyond a mere word order opposition and points to a difference in "tightness" between verbal fields.

More recently this difference in "tightness", i.e. the coherence-incoherence opposition, has been modelled in the generative framework by ascribing different phrase types to infinitival complements, from which the different word order properties follow. Some of these formal accounts will be discussed in the rest of the chapter, after having introduced a crucial distinction between predicate types, namely that between raising and control verbs.

3.1.2 Two types of predicates: raising vs. control

In the previous section, I showed how criteria such as status and orientation of an infinitive determine its coherent or incoherent behaviour, thus which word order patterns are allowed. As Bech (1955) observes, some verbs selecting the second status only allow coherent constructions, while others allow in principle both coherent and incoherent constructions. Moving forward, a further

distinction needs to be made as to how the subject of these infinitives is identified, that is relevant for the coherence-incoherence opposition, as I will discuss later. The matrix verb and its relationship to the arguments play a role here. In fact, while some verbs assign a theta role to each of their arguments, others have no semantic relation to their subject (cf. Colomo, 2011). Verbs of the first type are the so-called control verbs, whereas verbs of the second type are referred to as raising verbs.

In control constructions the subject of the infinitive is assumed to be an obligatory PRO which is co-referent with an argument of the matrix clause, in other words PRO is controlled by an argument of the matrix verb, hence the name control verbs. Depending on what argument controls PRO, it can be distinguished between at least two types of control: subject control, when PRO is co-referent with the matrix subject (18-a), and object control, when PRO is co-referent with the object of the matrix verb. In the latter case, we can further distinguish accusative object control (18-b) and dative object control (18-c), according to which object controls PRO. This is essentially reminiscent of Bech's (1955) notion of orientation.

- (18) a. Ich_i beschlieÙe [PRO_i zu gehen]
 I decide to go
- b. Paul bittet sie_j, [PRO_j den Hund zu füttern]
 Paul asks her.ACC the dog to feed
- c. Ich befehle ihm_j, [PRO_j den Hund zu füttern]
 I command him.DAT the dog to feed

Raising verbs take their name from the assumption that the subject of the infinitive is raised from its original position to the structurally higher position of the subject of the finite verb. Insofar, the subject is assigned its theta role in the embedded domain, while the matrix verb only shows agreement with its subject, but does not theta mark it. This analysis is commonly assumed for English constructions as in (19-a). As its paraphrase in (19-b) shows, *John* is the semantic subject of the embedded predicate *is sleeping*, but is raised to the matrix subject position and as such agrees with the matrix verb (20), cf. Sternefeld (2009): 581. This operation is also referred to as subject-to-subject raising.

Although it is in fact the subject that undergoes raising, verbs that yield this kind of constructions are typically referred to as raising verbs.

- (19) a. John seems to be sleeping
 b. It seems that John is sleeping

(Sternefeld, 2009: 581, (29))

- (20) [_{IP} John_i INFL [_{VP} seem [_{IP} [_{I'} to [_{VP} be sleeping]]]]]

(Sternefeld, 2009: 581, (30b))

This type of construction is possible in German as well, see (21). As in its English counterpart, the matrix verb *scheinen* 'seem' does not assign a theta role to the subject *Max* but is in an agreement relation with it.

- (21) Max scheint zu schlafen
 Max seems to sleep

Whether a raising operation is indeed needed in German is still a matter of debate (see Sternefeld, 2009: 581ff.). In the present work the term raising is merely used as a label to indicate verbs that embed a *zu*-infinitive but do not theta mark their subject, and is not intended to imply a subject-to-subject movement operation. Next to *scheinen* 'seem', typical raising verbs in German are *pflügen* 'be in the habit of', *drohen* 'threaten' and *versprechen* 'promise' in their epistemic/temporal-aspectual reading (see 5.1 for a further discussion of their semantics). Given that in raising verb constructions the matrix subject undergoes restrictions from the embedded verb, raising verbs allow a number of phenomena that are not possible in control constructions (cf. Gunkel, 2000). First, only raising constructions but not control constructions allow expletive (22) or inanimate (23) subjects as well as constructions without a subject (24).

- (22) a. Es scheint zu regnen.
 EXPL seems to rain
 b. *Es hofft zu regnen
 EXPL hopes to rain

(Gunkel, 2000: 112, (7))

- (23) a. Der Wind scheint die Tür zu öffnen
 the wind seems the door to open
 b. *Der Wind hofft die Tür zu öffnen
 the wind hopes the door to open

(Gunkel, 2000: 112, (9))

- (24) a. weil gearbeitet zu werden scheint
 because worked to be seems
 b. *weil gearbeitet zu werden hofft
 because worked to be hopes

(Gunkel, 2000: 112, (8))

Furthermore, passivisation of the infinitive results in a paraphrase in raising construction (25), whereas there is a change in meaning in control constructions (26). While in the raising construction in (25) both (25-a) and (25-b) denote a situation in which *Karl* is the agent and are thus synonyms, in (26-a) and (26-b) the matrix verb *hoffen* 'hope' has different semantic subjects. In (26-a) it is *Karl* who is the agent/experiencer, in (26-b) *Paul*. This again indicates that control verbs assign theta roles to their subjects while the subject of raising verbs is not thematically related to them.

- (25) a. Karl scheint Paul zu rasieren
 Karl seems Paul to shave
 'Karl seems to shave Paul'
 b. Paul scheint von Karl rasiert zu werden
 Paul seems by Karl shaved to become
 'Paul seem to be shaved by Karl'

(Gunkel, 2000: 113, (10))

- (26) a. Karl hofft Paul zu rasieren
 Karl hopes Paul to shave
 'Karl hopes to shave Paul'
 b. Paul hofft von Karl rasiert zu werden
 Paul hopes by Karl shaved to become
 'Paul hopes to be shaved by Karl'

(Gunkel, 2000: 113, (11))

The distinction between raising and control verbs is a crucial one when it comes

to the syntax of infinitival complementation, as it will become clear in the next sections.

3.1.3 (In)coherence in the generative framework

Since the seminal work of Bech (1955), infinitival constructions have received considerable attention in linguistic research. In particular, in formal approaches to grammar, most of the work has been focusing on accounting for the variability in syntactic behaviour of superficially identical infinitive constructions. It has namely been observed that while some infinitives show clausal behaviour, others are transparent for clause-bound phenomena. These differences have been observed not only in German, but are found cross-linguistically, e.g. in English, Italian, Spanish, Japanese (see Wurmbrand, 2001 for an overview) and are usually accounted for by ascribing different phrase types to infinitival complements: while some infinitives project a full clausal domain (CP), giving rise to what is usually referred to as a bi-clausal structure, others yield a mono-clausal structure, with the infinitive belonging to the matrix clausal domain and projecting a VP.

In early transformational accounts, pioneer work in this respect is Evers (1975), who first proposes that mono-clausal structures are derived from bi-clausal ones as a result of verb raising, a transformation that moves the V-constituent of a sentential object to the matrix clause. Since what remains of the sentential complement is a headless structure, this is deleted, giving rise to a mono-clausal structure. A similar line of thinking is that of Rizzi (1976), who, in his analysis of Italian infinitives, proposes that some verbs (modal, aspectual and motion verbs) undergo a rule of restructuring (it. *ristrutturazione*), according to which the predicate of a subordinate clause is incorporated in the main predicate generating a simple clause with a complex predicate. He shows that these predicates behave differently from other infinitive embedding verbs with respect to three phenomena, all suggesting the lack of clausal boundaries. First, restructuring predicates but not others allow a clitic to be raised from the embedded predicate to the main clause domain, cf. (27). This operation is pos-

sible with the motion verb *andare* 'go', as shown in (27-b), but not with the verb *pensare* 'think', for example.

- (27) a. Vado ad incontrar-lo
go.1SG to meet-him
- b. Lo vado ad incontrare
him go.1SG to meet
- c. Penso di incontrar-lo
think.1SG to meet-him
- d. *Lo penso di incontrare
him think.1SG to meet

(Rizzi, 1976: 1, (1))

Second, in clauses with an impersonal *si* 'one', restructuring verbs allow long NP-movement, that is, the NP object of the embedded verb is moved to the subject position of the matrix verb, which will show agreement with the new subject (28). Again this is possible when the infinitive is embedded under a modal, *volere* 'want' in (28-b), but not under the lexical verb *pretendere* 'demand', (28-d).

- (28) a. Si vuole terminare quei lavori entro un anno
one want3SG finish those works within a year
- b. Quei lavori si vogliono terminare entro un anno
Those works one want.3PL finish within a year
- c. Si pretende di terminare quei lavori entro un anno
one demand.3SG to finish those works within a year
- d. *Quei lavori si pretendono di terminare entro un anno
Those works one want.3PL to finish within a year

(Rizzi, 1976: 1, (2))

Further, restructuring predicates show variation in auxiliary selection, such that verbs building the past form with the auxiliary *avere* 'have', optionally show the auxiliary *essere* 'be', from the embedded predicate. In (29) the main predicate *cominciare* 'begin' requires the auxiliary *avere* 'have' to build the past form. On the other hand, the embedded intransitive verb *arrivare* 'arrive' would need the auxiliary *essere* 'be' to form the past form. Since aspectuals allow restructuring in Italian, *cominciare* 'begin' can optionally build the past form with *essere* 'be' instead of *avere* 'have', cf. (29-a) and (29-b). With the verb *promettere*

'promise', however, only *avere* 'have' is possible cf. (29-c) and (29-d).

- (29) a. Gli invitati hanno cominciato ad arrivare alle cinque
The guests have started to arrive at five
- b. Gli invitati sono cominciati ad arrivare alle cinque
The guests are started.PL to arrive at five
- c. Gli invitati hanno promesso di arrivare alle cinque
The guests have promised to arrive at five
- d. *Gli invitati sono promessi di arrivare alle cinque
The guests are promised to arrive at five

(Rizzi, 1976: 2, (3))

What these first accounts have in common is that they derive the mono-clausal structure from the bi-clausal one. More recent accounts on the contrary, assume a base-generated mono-clausal structure, hence that the two structures are different from the beginning (see Wurmbrand, 2001 for an extensive review of the different approaches within these two strains of research). In what follows, I will concentrate on a few selected approaches of the second type, namely assuming that mono- and bi-clausal structures are not derivationally related, that have dealt with the structure of infinitives in German and that are currently the most commonly adopted by researchers working on German.

3.1.3.1 Formalising the (in)coherence opposition in German

As it was introduced above, some infinitives show clausal behaviour, while others do not. In German, one of the key indicators of the phrasal type of the infinitive is considered to be the possibility of extraposition. Traditionally, it is assumed that only clausal constituents can appear at the right of the matrix clause (cf. also section 2.1), thus if an infinitival complement can be extraposed, it is considered to be a clausal constituent, i.e. to project a CP (Sternefeld, 2008, Reis, 2001). If, on the other hand, the infinitive cannot be extraposed, it is non-clausal, that is, it does not project a full clausal domain. Under the assumption that German lacks a T projection, infinitives smaller than CPs are considered to

be VPs (Sternefeld, 2008)². CP-infinitives are also referred to as incoherent infinitives, while non-clausal infinitives are also called coherent infinitives, building on Bech's (1955) original terminology³. Crucially, what differs between formal accounts of infinitival complementation and Bech's (1955) classification in coherent and incoherent verbal fields is that in the former extraposition of the infinitive is an indication of the presence of a separate clausal domain but not a necessary condition for it. A clausal infinitive can also appear in the middle-field of the clause, i.e. in intraposed position, while in Bech (1955) an intraposed infinitive is always coherent.

Clausal infinitives are thus considered to be an embedded clause (CP) with a non-finite main verb and with an obligatory silent subject, PRO, whose interpretation depends from the control relation (Sternefeld, 2008, Haider, 2010a). A first assumption can be drawn up here: verbs entering in a control relation with their embedded infinitival complement, i.e. control verbs, embed clausal infinitives in German. The notions of control and control verbs were introduced in section 3.1.2, in (30-a) we see again an example of subject control, i.e. PRO is co-referent with the matrix subject, (30-b) shows an example of dative object control, while accusative object control is represented in (30-c). Furthermore, as Haider (2010a) points out, control relations for a given verb and its infinitival complement can change in order to accommodate semantic compatibility be-

²The properties of *zu* provide no evidence that it projects its own phrase, but rather behaves like an affix (i) and has to be considered morphologically bound to the verb.

- (i) a. anfangen – begin (lit. on-catch)
 b. angefangen – begun
 c. anzufangen – to begin (Haider, 2010a)

This is different in English: for English, Haider (2010a) argues that next to VP complements headed by bare infinitives (selected by modals, auxiliaries, causatives and perception verbs) subject-raising verbs select a functional projection of the category IP headed by *to*, which itself selects the infinitival VP.

³Cross-linguistically the term (non-)restructuring is used instead, following the original analysis by Rizzi (1976), see above, although the term is nowadays commonly used also in non-derivational approaches, e.g. Wurmbrand, 2001.

tween the matrix clause and the embedded infinitive, cf. (30-c,d). In (30-c) the verb *bitten* ‘ask’ instantiates accusative object control, but in (30-d) the control relation is subject control.

- (30) a. Sie_i haben ihm versprochen [_{CP} PRO_i Alkohol zu meiden]
 they have him promised alcohol to avoid
- b. Sie haben ihm_i empfohlen [_{CP} PRO_i Alkohol zu meiden]
 they have him recommended alcohol to avoid
- c. Sie haben ihn_i gebeten [_{CP} PRO_i den Raum zu verlassen]
 they have him asked the room to leave
 ‘They have asked him to be willing to leave the room’
- d. Sie_i haben ihn gebeten [_{CP} PRO_i den Raum verlassen zu
 they have him asked the room leave to
 dürfen]
 be-allowed-to
 ‘They have asked him to be allowed to leave the room’

(Haider, 2010a: 292, (1))

Concerning word order, as it was pointed out above, clausal infinitives can be extraposed, as in the examples in (30), or intraposed. Crucially, when they are in intraposed position, any non-verbal material can appear between the matrix verb and the verb of the embedded clause. In (31), for example, the adverbial *keinesweges* ‘by no means’ intervenes between the matrix verb *leugnet* ‘denies’ and the infinitival clause *sie bestohlen zu haben* ‘to have robbed her’.

- (31) dass er [_{CP} PRO sie bestohlen zu haben] keinesweges leugnet
 that he her robbed to have by.no.means denies
 ‘that he by no means denies to have robbed her’

(Sternefeld, 2008: 203, (23a))

In addition to the widespread opposition between clausal (CP) and non-clausal (VP) infinitives Haider (2003), Haider (2010a) introduces a further distinction between two types of mono-clausal complements available in German. Next to VP infinitival complements he postulates the existence of cluster constructions. The existence of cluster constructions is based on the asymmetry observed between English (and other VO languages) and German verb sequences in mono-clausal configurations. In German, when verb sequences are not part

of two separate clausal domains, which is when the infinitive is non-clausal, they must be compact, i.e. they cannot be separated by non-verbal material and are strictly adjacent. This is not the case in English, where mono-clausal infinitives are assumed to be VPs. As exemplified in (32-b), adverbs may intervene.

- (32) a. ... [_{VP1} V1 [_{VP2} V2...]]
 b. will [_{VP1} have [*completely* [_{VP2} finished ...]]]

(Haider, 2010a: 275, (1))

Haider (2010a) takes these facts as indicative of the presence of a different configuration in German, one that blocks non-verbal material from intervening between the two verbs. This is represented by a clustering configuration, that is, a complex head construction, which is considered to be base-generated by head-to-head merger and not derivationally produced, as previous accounts to cluster formation have proposed (e.g. Evers, 1975 above, but see Haider, 2010a for a review of these accounts). A cluster construction thus looks like (33), where both arguments of the matrix verb (X) and of the non-finite verb (Z) must appear before the cluster, and Y can only be a verb belonging to the cluster, that is, the cluster must be compact.

- (33) [... . . X ... Z ... [V^o zu-V^o (*Y[-V^o]) V^o]]

(Haider, 2010a: 311, Table 7.3)

- (34) dass ihr schlecht [_{VC} zu werden (*dabei) schien]
 that her.DAT sick to become (thereby) seemed
 'that she seemed to become sick'

(adapted from Haider, 2010a: 277, (7))

In his chapter on non-finite complementation in German, Haider (2010a) presents an extensive list of diagnostic properties that distinguish between the infinitival clauses and the mono-clausal clustering constructions, as well as identifying different classes of matrix verbs showing different selectional restrictions as regards the type of infinitival complement.

Taking compactness as a first criterion for clustering, he identifies a series of verb sequences that are obligatorily clustering in German. These are illustrated in (35) and correspond to the verbs indicated in Bech's (1955) coherence rule: verbs selecting the first status (35-c-g), verbs selecting the third status (35-a-b) and some verbs selecting the second status (35-h-k).

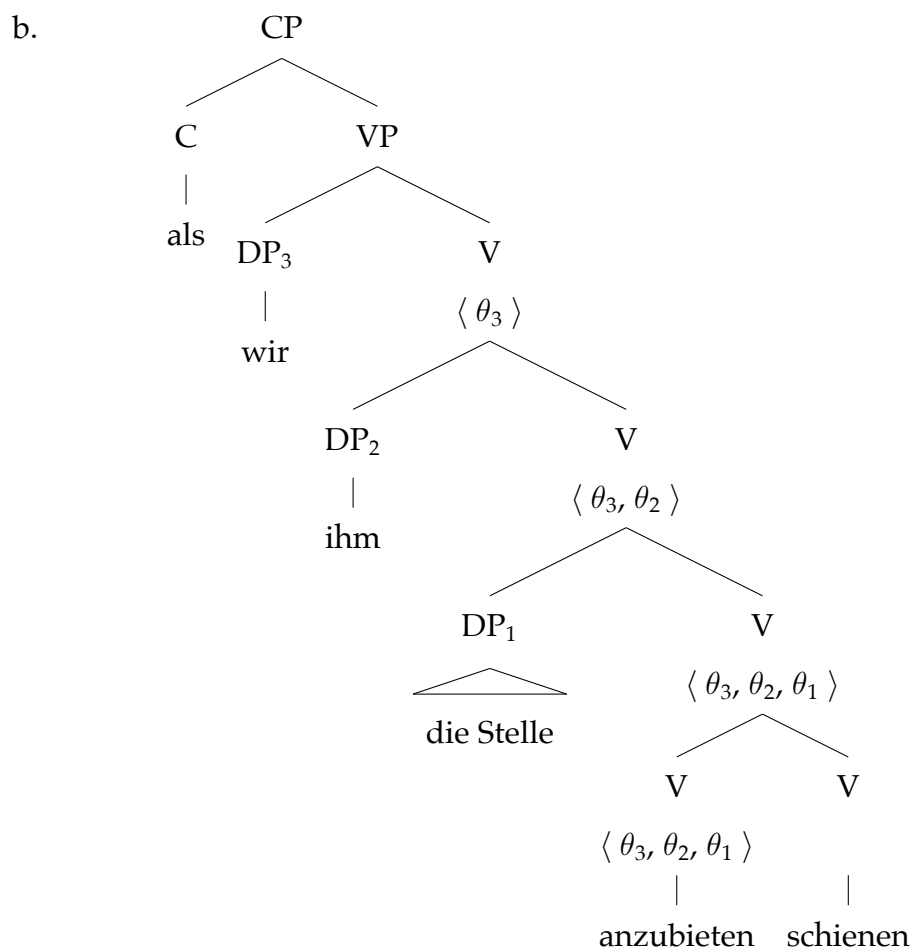
(35)	<i>Dependent verb</i>	<i>Selecting verb</i>	<i>Examples of selecting verbs</i>
a.	participle	auxiliary	<i>haben</i> 'have', <i>sein</i> 'be' (PERFECT)
b.	participle	auxiliary	<i>werden</i> 'be' (PASSIVE)
c.	infinitive	auxiliary	<i>werden</i> 'will' (FUTURE TENSE)
d.	infinitive	modals	<i>können</i> 'can'
e.	infinitive	causative	<i>lassen</i> 'let, make'
f.	infinitive	perception verbs	<i>sehen</i> 'see', <i>hören</i> 'hear'
g.	infinitive	copula	<i>sein</i> 'be', <i>bleiben</i> 'remain'
h.	zu-infinitive	modal	<i>brauchen</i> 'need'
i.	zu-infinitive	auxiliary	<i>haben</i> 'have', <i>sein</i> 'be'
j.	zu-infinitive	epistemic verbs	<i>scheinen</i> 'seem'
k.	zu-infinitive	aspectual verbs	<i>beginnen</i> 'begin', <i>anfangen</i> 'start'

(Haider, 2010a: 275, (3))

Among the latter, Haider (2010a) counts those verbs that were identified as raising verbs in section 3.1.2. As introduced above, the syntactic subject of these verbs is claimed to originate in the embedded infinitival phrase and to have raised to the matrix subject position, hence it is the non-finite verb that theta mark the subject, not the matrix verb. Under the assumption that these verbs obligatorily enter a clustering construction, no raising operation needs to be assumed, rather the clause behaves as a simple clause, with a *zu*-infinitive in a verbal cluster (Haider, 2010a: 301). Still, for convenience, I will continue to refer to these verbs as raising verbs, even when assuming the cluster construction. As Haider (2010a) and Sternefeld (2009) note, there is no syntactic difference between so-called raising verbs and auxiliaries or modals, since the latter two also lack a theta grid. Concerning theta management, since there is only one

lexical verb in the cluster, hence only one verb that assigns theta roles to its arguments, the theta grid of the cluster corresponds to that of the lexical verb. Following the notation from Sternefeld (2009), also adopted in Haider (2010a) the structure in question is represented in (36-b).

- (36) a. als wir ihm die Stelle anzubieten schienen
 when we him the position to.offer seemed
 'when we seemed to offer him the position'



As stated above, control verbs select clausal infinitives, however, some are also compatible with a clustering construction, that is they are optionally clustering. Whenever the infinitival complement is intraposed, these constructions are ambiguous between a clausal infinitival and a clustering configuration (37). However, if non-verbal material breaks up the verb chain, then only the CP option is possible (38-a). If, on the other hand the verb chain can be topicalised, this is only compatible with a cluster construction (38-b).

- (37) a. dass er [_{CP} PRO niemanden zu stören] beabsichtigt hat
 that he [nobody to disturb] intended has
- b. dass er niemanden [[zu stören beabsichtigt]_{VC} hat]_{VC}
 that he nobody [[to disturb intended] has]
- (Haider, 2010a: 279, (9))

- (38) a. dass er [_{CP} niemanden zu stören] *wirklich* beabsichtigt hat
 that he [nobody to disturb] truly intended has
 ‘that he truly intended to disturb nobody’ topicalisation
- b. [Zu stören beabsichtigt]_{VC} hat er wirklich niemanden
 [to disturb intended] has he truly nobody
 ‘He truly did not intend to disturb anybody’
- (Haider, 2010a: 278, (8b,c))

The clausal infinitive and the cluster construction differ also with respect to the scope of quantifiers. With optionally clustering verbs in ambiguous configurations, the scope of quantifiers is ambiguous between the embedded clause and the cluster. However, when a CP construction is forced, the quantifier can only take scope on the embedded CP, as the paraphrase of (38-a) in (39-a) shows, while in clustering construction it can take scope on the matrix clause, as in (39-b).

- (39) a. He intended to *not* disturb anyone
- b. He did *not* intend to disturb anyone
- (Haider, 2010a: 279, (10))

Similarly, these verbs show different behaviour as regards the so-called long distance passive, depending on whether the construction is ambiguous or not. In a context where the infinitival complement is clearly clausal, i.e. in case it is extraposed, the direct object of the infinitive is assigned accusative case (40-b). However, when a clustering construction is forced, the object obligatorily requires nominative case (40-c), as a result of the fact that the theta grids of the two verbs are pooled. When the structure is ambiguous both options are possible (40-a).

- (40) a. dass den/der Wagen zu reparieren versucht wurde
 that the.ACC/NOM car to repair tried was

- b. dass versucht wurde, den/*der Wagen zu reparieren
 that tried was the.ACC/NOM car to repair
- c. [zu reparieren versucht] wurde *den/der Wagen nicht
 to repair tried was the.ACC/NOM car not

(Haider, 2003: 97, (8a-c))

When entering the clustering configuration, hence a mono-clausal structure, optionally clustering verbs are also compatible with pronoun scrambling or pronoun fronting as illustrated in (41), where the object of the infinitival verb is scrambled across the matrix subject. Since scrambling is clause bound, this operation is not possible with an infinitival clause (42).

- (41) dass *ihm* alle sofort [_{VC} zu konfrontieren
 that him.ACC everyone.NOM immediately to confront
 empfohlen haben]
 recommended have

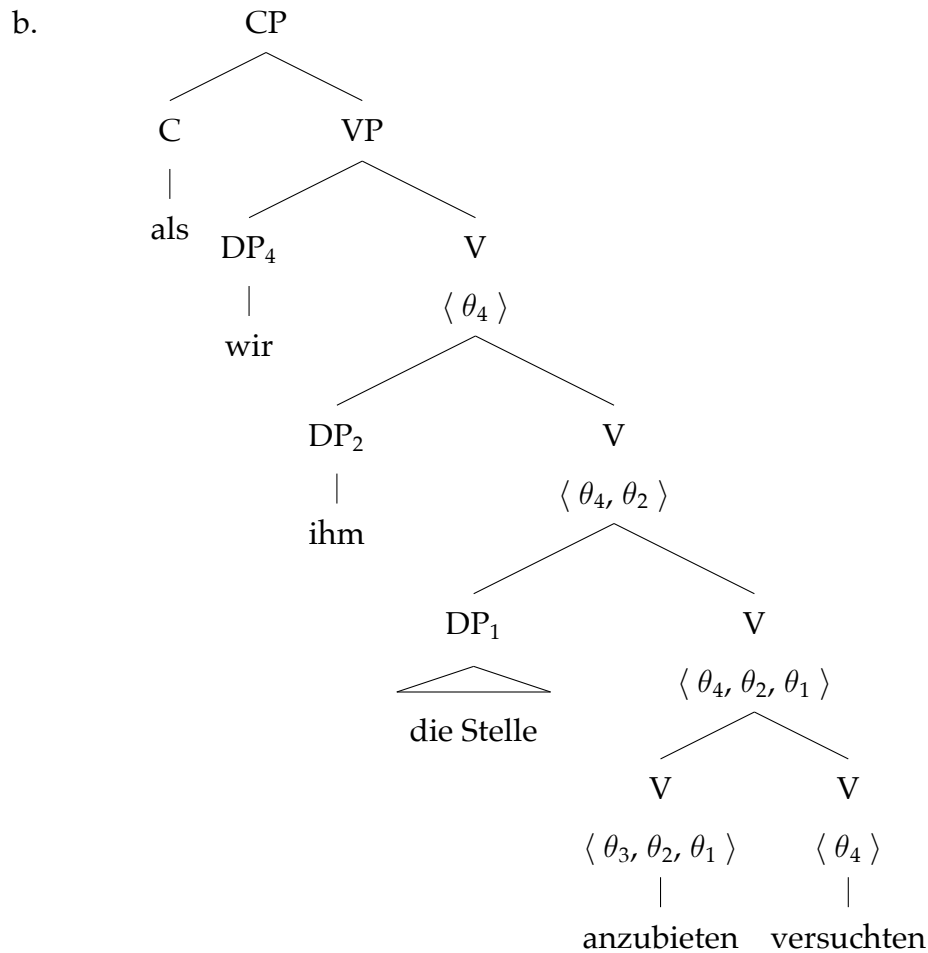
(Haider, 2010a: 311, (b))

- (42) *daß *es_i* den Experten [_{e_i} zu entziffern] *nicht/oft* gelang
 that it the expertsDAT [to decipher] not/often succeeded

(Haider, 2003: 101, (13c))

Unlike obligatorily clustering verbs, control verbs have a specified theta grid. When entering a cluster construction both the embedded infinitive and the matrix control verb project an argument structure, thus the theta grid of the cluster must result from the pooling of the two. According to Haider's (2010) proposal, this works as follows: first, the direct object slot of the matrix verb is satisfied and replaced by the theta grid of the embedded verb; second, the thematic role of the controlled argument is identified with the controller and replaced by it (43-b).

- (43) a. als wir ihm die Stelle anzubieten versuchten
 when we him the position to.offer tried
 'when we tried to offer him the position'



Next to the optionally clustering verbs, some control verbs only select infinitival clauses. These block cluster formation, thus, for example, cluster topicalisation is ungrammatical for these verbs (44). According to Haider (2010a), the crucial property that distinguishes between control verbs that allow clustering and those that do not is argument structure of the matrix verb. That is, a verb is optionally clustering if it selects the infinitive as unmarked object, i.e. its direct object. Thus, if a control verb selects the infinitive as e.g. a prepositional object, as it is the case for the verb *drängen* 'urge' in (44), clustering is not possible. Moreover, semantics of the matrix verb also seems to play a role, since factive verbs like *bedauern* 'regret', resist clustering too (45), although the infinitive represents the direct object (cf. also Haider, 1993).

- (44) *[Zu helfen gedrängt] hat sie ihm ihr
[to help urged] has she him her

(Haider, 2010a: 281, (13c))

- (45) *[Geheiratet zu haben bedauert] hat sie Max noch nie
 married to have regretted has her Max never

(Haider, 1993: 251, (58a))

These verbs are also not compatible with wide scope, long distance passive and pronoun fronting, properties which, as we have seen above, are indicative of a mono-clausal construal.

In addition to the cluster construction and the clausal infinitive, a third type of infinitival complement is acknowledged in Haider's (2010) classification that is characteristic of third construction patterns. These partially look like infinitival clauses, as part of the infinitival complement is extraposed, whereas other elements of it are intraposed. In (46-a) the infinitival complement is extraposed but its direct object is not; in (46-b) only the non-finite verb is extraposed, while both its objects are intraposed.

- (46) a. Da habe ich *mich* angefangen, damit zu beschäftigen
 there have I myself begun, it-with to keep-busy
 'There, I began to keep myself busy with it'
- b. dass *uns ein Staubsauger* versucht wurde
 that us-DAT a vacuum-cleaner-NOM tried was
 aufzuschwätzen
 to-talk-into-buying
 'that there was an attempt to talk us into buying a vacuum cleaner'

(Haider, 2010a: 284, (1b,c))

Traditionally, third construction patterns have been analysed as extraposed infinitival clauses with long-distance scrambling into the matrix clause (see e.g. den Besten and Rutten, 1989, who first observed this kind of construction). However, Haider (2010a) makes a point for a different type of analysis. First, scrambling is usually clause-bound, so it is not clear how scrambling out of a CP would be possible. Second, the class of verbs allowing for the third construction corresponds to the optionally clustering control verbs according to Wöllstein-Leisten (2001). Third, third construction patterns are compatible with

long distance passive (47) and pronoun fronting (48).

- (47) a. dass der Hund beschlossen wurde zu verkaufen
that the.NOM dog decided was to sell
'that it was decided to sell the dog'
- b. ??dass den Hund beschlossen wurde zu verkaufen
that the.ACC dog decided was to sell
'that it was decided to sell the dog'

(Haider, 2010a: 285, (2))

- (48) weil [sich] der Hans vergisst [zu rasieren]
because REFL the.NOM Hans forgot to shave
'because Hans forgot to shave'

(Wöllstein-Leisten, 2001: 16, (14b))

All these observations rather point to a mono-clausal construal. Haider (2010a) and Wöllstein-Leisten (2001) therefore propose that third construction patterns involve post-verbal VP rather than CP extraposition, thus defining third construction as a mono-clausal but non-clustering construction.

This latter point also reveals another important difference between Haider's (2010) account of clustering infinitives from the early accounts such as Evers (1975) and Rizzi (1976). Not only cluster constructions are based-generated and not derived but, crucially, the formation of the cluster construction is not a necessary condition for the presence of a mono-clausal construal, rather only one possible configuration among those involving a non-clausal infinitive. In particular, Haider (2010a) argues that the clustering construction is typical of OV languages, while in VO languages non-clausal infinitives project a separate VP. In his view, this is due to the processing difficulty that a left-branching structure with stacked VPs would otherwise pose. A left-branching structure with stacked VPs, as in (49-b), is more difficult to parse than a right-branching structure, as the first creates a centre-embedded structure, which is known to be a parser unfriendly structure. Thus, in order to avoid centre-embedding, OV languages prefer a clustering organisation rather than a left-branching structure with stacked VPs.

- (49) a. $*[VP [VP [VP \dots V_3] V_2] V_1]$ OV languages
 b. $[VP V_1 [VP V_2 [VP V_3 \dots]]]$ VO languages
 c. $[VP \dots [V [V V_3 V_2] V_1]]$ OV languages

(Haider, 2010a: 341, (4))

Crucially, clustering configurations do not preclude the reordering of the verbs at the right periphery of the clause. Dutch, for example, although being an OV language and thus building verb clusters, requires the reordering of verbal heads when the cluster contains a bare infinitive (Haider, 2003). According to Haider (2003) and Haider (2010a), reordering of the verbs in Dutch clusters is obtained via left-adjunction of the hierarchical highest verb, thus still maintaining the cluster structure. This operation is not available in standard PDG, where the hierarchical highest verb is always found in clause-final position in two-verb clusters, including both auxiliaries or modals with bare infinitives and raising verb constructions with *zu*-infinitives⁴. Permutated orders are attested in older stages of the language, however, thus leaving open the question as to whether such operation was possible then. I will come back to this question in the next chapters.

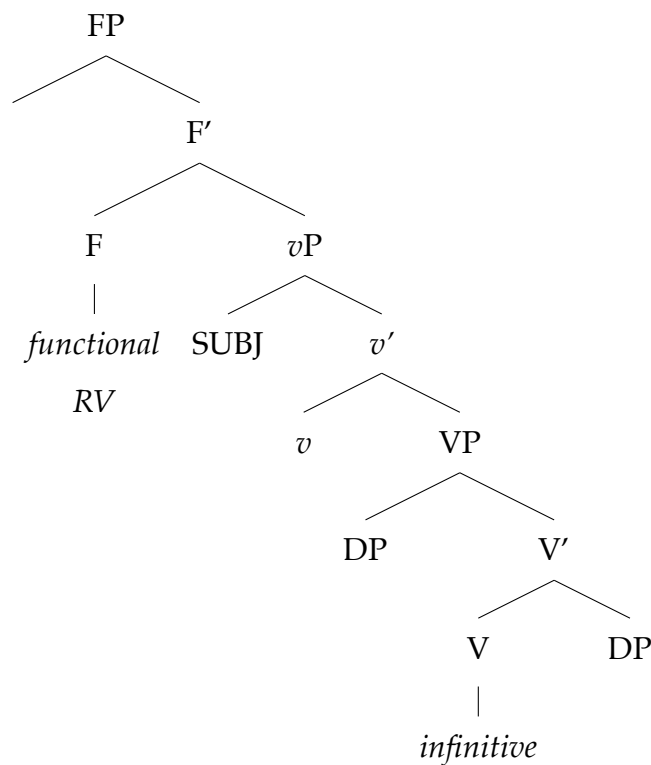
3.1.3.2 A gradient approach to (in)coherence

A different account of infinitival complementation in German is proposed by Wurmbrand (2001) and subsequent work. Her proposal is more gradient in that it distinguishes between four types of infinitival complements to account for the distribution of different coherence properties, or, using the term she adopts, restructuring properties. In fact, she claims that not all coherence properties equally apply to all restructuring infinitives, but rather one has to differentiate between these properties and the degree of restructuring they point at. First, she argues for the distinction between control verbs such as *versuchen* 'try' that are also compatible with the coherence phenomena reviewed above (op-

⁴Reordering of the verbs takes place in standard PDG in three-verbs complexes with IPP, but since adjacency of the verbs is not obligatory in those cases, Haider (2003) assumes a different derivation for those orders, involving a fronted VP-shell.

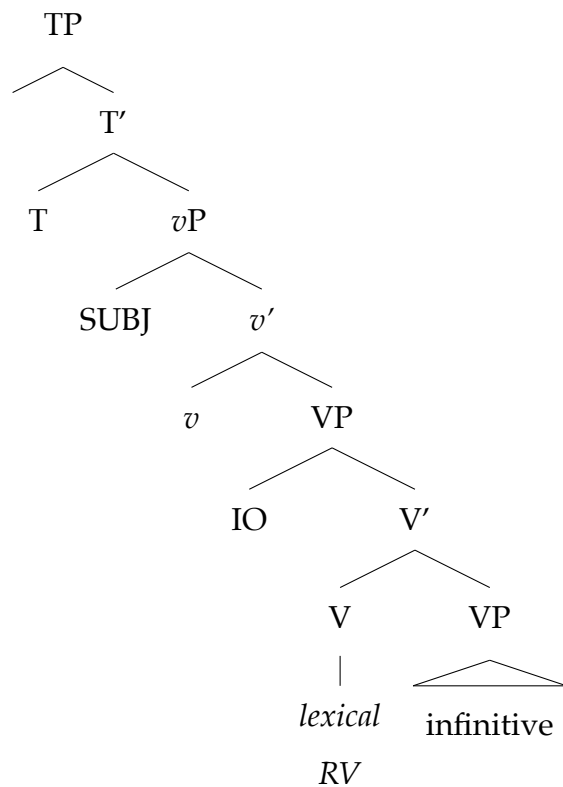
tional clustering verbs, in Haider’s 2010 terms), and verbs such as modals or raising verbs, which do not assign a theta role to their subject. In her account, the latter two occupy a functional position in the clause, while control verbs are lexical heads of the VP. Thus, she proposes that infinitives governed by these two groups of verbs do not fall under the same category of mono-clausal construals, but rather the distinction between functional restructuring infinitives and lexical restructuring infinitives has to be made. Functional restructuring infinitives are governed by verbs in a functional projection (e.g. modals, auxiliaries or raising verbs) and constitute the main predicate of the sentence, whereas lexical restructuring infinitives are governed by a verb in the V projection, that in turn embeds a non-finite VP (see also Wurmbrand, 2004b). The two structures are exemplified in (50) and (51).

(50) Functional restructuring



(Wurmbrand, 2004b: 992 (2a))

(51) Lexical Restructuring



(Wurmbrand, 2004b: 992 (2b))

Crucially, no complex head formation is involved in this account but rather non-clausal infinitives project an individual VP. The small size of this projection is responsible for the mono-clausal behaviour of the construction without having to assume a complex head configuration. See Wurmbrand (2007) for a detailed discussion of the two approaches.

Wurmbrand (2001) further identifies a type of construction she defines as reduced non-restructuring. These infinitival constructions share the possibility of pronoun fronting with lexical restructuring verbs (52), i.e. a restructuring or coherence property, as shown in section 3.1.3.1, but they also differ from this group of verbs in that they do not allow long distance passive and non-focus scrambling, which corresponds to the third construction type of pattern (53). According to Wurmbrand (2001), this distribution of coherence properties is due a difference in the syntactic size of the infinitives: while lexical restructuring infinitives are VP-complements, reduced non-restructuring are *v*P's or TP's, i.e. they have a structural case position, thus blocking long object movement and non-focus scrambling.

- (52) a. weil ihn der Hans zu reparieren versuchte
 since it-ACC the John to repair tried
 'since John tried to repair it'
- b. weil ihn der Hans zu reparieren plante
 since it-ACC the John to repair planned
 'since John planned to repair it'
- c. weil ihn der Hans zu reparieren beschloss
 since it-ACC the John to repair decided
 'since John decided to repair it'

(Wurmbrand, 2001: 268 (215a, 216a,b))

- (53) a. dass der Traktor zu reparieren versucht wurde
 that the tractor-NOM to repair tried was
 'that they tried to repair the tractor'
- b. *dass der Traktor zu reparieren geplant wurde
 that the tractor-NOM to repair planned was
 'that they planned to repair the tractor'
- c. *dass der Traktor zu reparieren beschlossen wurde
 that the tractor-NOM to repair decided was
 'that they decided to repair the tractor'

(Wurmbrand, 2001: 267 (214))

Fully non-restructuring constructions are, in Wurmbrand's (2001) account, those that block all coherence properties, including pronoun fronting, cf. (54). Since pronoun fronting targets the matrix C-domain, infinitives that do not allow it, i.e. non-restructuring infinitives, must have a C-domain of their own. Further evidence for the presence of a CP complement is represented by the possibility of relative clause pied-piping. That is, a construction in which the whole infinitival complement can be relativized and moved to SpecC, as exemplified in (55-a). Since this movement involves *wh*-features, it is only possible when the embedded infinitive has a *wh*-landing site, thus a C-domain. In smaller infinitival complements pied-piping is excluded (55-b-c).

- (54) a. dass Hans bedauerte den Traktor repariert zu haben
 that John regretted the tractor-ACC repaired to have
 'that John regretted that he had repaired the tractor'
- b. *dass der Traktor repariert zu haben bedauert wurde
 that the tractor-NOM repair to have regretted was

'that they regretted that they had repaired the tractor'

- c. *dass ihn Hans repariert zu haben bedauerte
that it-ACC John repaired to have regretted
'that John regretted that he had repaired it'
- d. *dass Hans nur den Traktor bedauert hat zu reparieren
that John only the tractor-ACC regretted has
'that John only regretted having repaired only the tractor'

(Wurmbrand, 2001: 286 (227))

- (55)
- a. der Roman [den schon gelesen zu haben] der Hans
the novel [that already read to have] the John-NOM
bedauerte
regretted
'the novel that John regretted having read already'
 - b. *der Roman [den lesen] der Hans muss
the novel [that read] the John-NOM must
'the novel that John must read'
 - c. *der Roman [den zu lesen] der Hans schien
the novel [that to read] the John-NOM seemed
'the novel that John seemed to be reading'

(Wurmbrand, 2001: 288 (228a, 229))

According to Wurmbrand (2001), these syntactic properties of infinitival constructions also correlate to the semantics of the matrix verbs. Taking as an example the verb *vergessen* 'forget', which is semantically ambiguous between an implicative and a factive interpretation, she shows how restructuring phenomena are only possible under the implicative reading. Similarly, for the verb *befürchten* 'fear', pronoun fronting is possible under the irrealis reading but not under the propositional interpretation. She thus presents an approach under which fully non-restructuring, i.e. the presence of a C-domain, is the only structural option if the matrix verb is propositional or factive, whereas restructuring, in the gradient fashion presented above, is possible with other semantic groups such as irrealis, implicatives, aspectuals etc.

Finally, as in other accounts, also Wurmbrand (2001) points to the observation that different infinitival complements show different preferences as regards their position with respect to the matrix verb. As we have seen in the pre-

vious sections, extraposition of obligatorily or functional restructuring infinitives is excluded. On the other hand, intraposed infinitives are always possible, but in Wurmbrand's (2001) view, highly marked, if the infinitive is a fully non-restructuring one. Accordingly, the intermediate categories allow intraposition or extraposition on a gradual scale. This different behaviour is determined by a prosodic markedness constraint, that Wurmbrand (2001) formulates as follows:

- i) the unmarked position of a full clause (i.e., a CP) is post-verbal, which in prosodic terms would correspond to a constraint against embedding a category of the highest type on the prosodic hierarchy (e.g., an utterance or intonational phrase following Selkirk 1984, 1986) inside another prosodic phrase; ii) the unmarked position of a non-clausal category is its base position, which prosodically could be seen as a reluctance against re-ordering smaller prosodic units (e.g., prosodic phrases). (Wurmbrand, 2001: 294)

This prosodic markedness constraint essentially follows from the same principles assumed in Féry (2015), in her approach to extraposition of finite complement clauses (cf. Chapter 2).

It is to be noted that Wurmbrand's (2001) system is based on the assumption of a different clause structure for German than that assumed here, see Chapter 2, since she postulates the existence of further projections above V and below C. Whether these are motivated in German, beyond the phenomenon of infinitival complementation, is debated. Reis and Sternefeld (2004) also provide a detailed discussion of Wurmbrand's (2001) approach and criticism against the postulation of such projections as regards infinitival syntax. Nevertheless, this account has the merit of trying to account for gradience in coherence behaviour, which had otherwise been neglected⁵. Whether this gradience is reflected directly in syntax or can be ascribed to other factors, needs, in my opinion, further research⁶.

⁵With the exception of Reis (2001), who proposes that modal and raising verbs exhibit stronger coherence than control verbs. How her proposal is implemented formally remains unclear to me, however.

⁶An attempt in this direction is represented by Grosse (2005), who argues that the coherence behaviour of control verbs correlates with frequency of the matrix verb, in other words, the more frequent a verb is, the more it is likely to allow for a coherent behaviour.

A final note on the issue of possible word order properties and the structure of restructuring infinitives is to be added here. As mentioned above, Wurmbrand (2001) does not assume syntactic cluster formation, but rather maintains that each verbal projection remains separate in syntax. In subsequent work she further motivates this assumption by showing that the separate VP-projections account still predicts two word order properties that had previously been accounted for by postulating complex head formation. The first concerns the adjacency requirement that had been central in Haider's (2003) argumentation for clustering constructions, the second regards the variable ordering in sentence final verb sequences, also commonly referred to as verb clusters. In Wurmbrand (2007), she shows how adjacency can be accounted for by a prosodic constraint, without the need for complex head formation. Under this approach, movement of non-verbal material can in principle target any of the VPs involved, i.e. also a position between the verbs. However, prosodic structure will prohibit to pronounce the non-verbal material in a position that interrupts a prosodic phrase, thus maintaining adjacency between the verbs at PF. This is illustrated in (56) where relative clause extraposition is only possible if spelled out at the edge of the prosodic constituent, that is, attached to the highest VP (56-c), while interrupting the prosodic constituent either by targeting the position between the verbs (56-a) or immediately before them (56-b) is excluded.

- (56) a. *dass er [_{VP} [_{VP} [jenen t_{REL}] etwas gegeben] [die ihn darum
that he [_{VP} [_{VP} [those t_{REL}] sth. given] [who him for.it
gebeten haben] hat]
asked have] has]
'that he gave something to those who asked him for it'
- b. *dass er [_{VP} [_{VP} [jenen t_{REL}] etwas t_V] [die ihn darum gebeten
that he [_{VP} [_{VP} [those t_{REL}] sth. t_V] [who him for.it asked
haben] gegeben hat]
have] given has]
- c. dass er [_{VP} [_{VP} [jenen t_{REL}] etwas gegeben] hat] [die ihn darum
that he [_{VP} [_{VP} [those t_{REL}] sth. given] has] [who him for.it
gebeten haben]
asked have]

(Wurmbrand, 2007: 249 (8))

As to the second property, based on the observation that verb re-ordering does not have any semantic effect, Wurmbrand (2004a) proposes that re-ordering of the verbs does not happen in syntax but rather takes place post-syntactically. In this PF linearisation process sister nodes can be inverted according to language specific linearisation rules. Crucially, since only sister nodes can be inverted, for three-verbs clusters only four of the six possible orders can be generated via this PF mechanism. Thus according to Wurmbrand the orders 3-1-2 and 2-1-3 must be generated via syntactic movement and consequently she predicts that a semantic effect (e.g. focus effects) should be found with these orders (cf. Wurmbrand, 2004a: 294). Interestingly, in German the 2-1-3 order corresponds the surface pattern of what we called the third construction, that is, it is found only in verb sequences involving a zu-infinitive.

- (57) dass Lisa den Artikel versucht_{V2} hat_{V1} zu schreiben_{V3}
 that Lisa the article tried has to write

3.1.4 Empirical approaches

Alongside theoretical scholarship on infinitival syntax, some studies have approached the discussion from an empirical perspective, in order to test the theoretical assumptions presented in the previous section. One of the first examples is the study by Schmid et al. (2005), who investigate the coherence (in-)compatibility of different sub-groups of control verbs through an acceptability rating study. 56 control verbs, grouped according to their control properties and argument structure (cf. Table 3.1) were tested in seven conditions: four coherence configurations, that is pronoun fronting, topicalisation of the verb chain, long passive and wide scope of negation, two incoherence configurations, namely extraposition and narrow scope of negation and in addition ambiguous intraposition. The results of the acceptability rating study showed that all verb sub-groups behave similarly with respect to the incoherence tests: extraposition received the best ratings of all conditions for all groups, while intraposition with the incoherent reading (narrow scope) was rated worst throughout (cf. Table 3.2). On the contrary, the acceptability of coherent patterns was modulated by the verb group: subject control verbs with the infinitive replac-

Table 3.1: Subclasses of control verbs used in the questionnaire study (from Schmid et al., 2005: 443)

Control	Infinitive in function of	Additional objects	Examples	Nr. of verbs
Subject	Accusative	0	<i>versuchen</i> ‘try’, <i>beschließen</i> ‘decide’	14
Subject	Accusative	Dative	<i>drohen</i> ‘threaten’, <i>versprechen</i> ‘promise’	7
Subject	PP	0	<i>aufhören</i> ‘stop’, <i>klagen</i> ‘complain’)	7
Accusative Object	PP	Accusative	<i>auffordern</i> ‘ask’, <i>ermahnen</i> ‘urge’	14
Dative Object	Accusative	Dative	<i>erlauben</i> ‘allow’, <i>verbieten</i> ‘forbid’	14

Table 3.2: Results of main experiment: Mean ratings on a scale from 1 (best) to 5 (worst). (from Schmid et al., 2005: 445)

constructions	subj	subj. + dat.	subj. inf as PP	obj-dat	obj-acc
extraposition	1.27	1.53	1.34	1.24	1.26
narrow scope	3.89	3.79	4.00	3.89	3.96
intraposition	2.19	2.90	2.73	2.49	2.77
VC fronting	2.76	3.59	3.00	2.99	3.66
scrambling	2.30	3.44	2.44	2.66	3.43
wide negation	3.21	4.04	3.91	3.74	4.00
long passive	3.10	3.54	3.69	2.87	4.30

ing the direct object obtained the best ratings in the coherent configurations, that is pronoun fronting, topicalisation, long passive and wide scope of negation, while accusative object control verbs with the infinitive replacing the PP performed worst in these configurations. They consider this result to confirm

Haider's (1993) generalisation according to which a coherent construction is only possible when the infinitive occupies the direct object position (Schmid et al., 2005: 452). Interestingly, the same type of modulation was found in the ratings for ambiguous intraposition condition. The authors take this result to suggest that ambiguous intraposition is computed as a coherent structure during parsing, a hypothesis they investigate in a further study.

In Bayer et al. (2005) they discuss the combined results of three empirical studies as well as comparative-theoretical investigations to get a deeper understanding of the nature of intraposed infinitives, that is whether intraposition is always indicative of a mono-clausal structure, as the results from Schmid et al. (2005) suggest, or whether clausal intraposed infinitives exist in German, as traditionally assumed (cf. also Reis, 2001: 306). In addition to the acceptability rating data presented in Schmid et al. (2005) they report the results from a corpus study and a reading time experiment. The corpus data showed that intraposition is infrequently attested with control verbs overall and that it is only attested with a small portion of the investigated verbs. Furthermore, all of the attested intraposed infinitives, are of the ambiguous type, that is the matrix verb and the infinitive are always adjacent and patterns as in (58), where the two verbs are separated by non verbal material thus indicating an incoherent structure, are not attested in the corpus.

- (58) ..., daß sie das Buch zu lesen **mehrfach** versucht hat.
 that she the book to read repeatedly tried has
 'that she repeatedly has tried to read the book.'

(Bayer et al., 2005: 82, (6))

In the reading time experiment, critical items consisted of sentences with an intraposed infinitive including a negative quantifier and a sentence final negated conjunct (59). The negated conjunct forces wide scope of negation, hence the pattern is indicative of coherent behaviour.

- (59) Der Opa hat keines von den Büchern zu lesen versucht und der
 the grandpa has none of the books to read tried and the
 Onkel auch nicht.
 uncle also not

‘Grandpa didn’t try to read any of the books, and the uncle didn’t either.’

(Bayer et al., 2005: 87, (11))

The same verb sub-groups investigated in Schmid et al. (2005) were tested and the results showed that reading time on the main verb correlates with the mean coherence score obtained in the rating task: the better a verb was rated in coherent configurations, the faster it was read. This results again suggests that intraposed infinitives are assigned a mono-clausal structure. However, no correlation was found between mean coherence score of the verb and reading times on the clause final negation.

Assuming that the Human Sentence Processing Mechanism is subject to the Left-to-Right Constraint, i.e. it works incrementally such that each item is incorporated into the representation as soon as it is encountered (Bayer et al., 2005: 81) and is driven by economy principles that compute the simplest possible structure (Ibid.: 81), thus they conclude that the parser will always assign a mono-clausal construction first, since there is no reason for assuming a more complex structure. Further support for this claim comes from sentence completion tasks, where fragments as (60) are usually completed by using di-transitive verbs such as *zeigte* ‘showed’, *gab* ‘gave’, *verkaufte* ‘sold’ (Ibid.: ft. 28), thus confirming that a simple clause structure is the preferred option.

(60) daß Max mir nur das Lexikon ...
that Max me only the lexicon ...

(Bayer et al., 2005: 104, (28))

Once the matrix verb is encountered, its lexical properties are evaluated and in the case that the verb is not compatible with a coherent structure, increased reading times occur. However, the lack of correlation between mean coherence score of the verb and reading times on the clause final negation suggest that no reanalysis of the initial structure towards the incoherent variant takes place. The authors argue that, since reanalysis of a wrongly parsed structure is a costly option, the coherent analysis will be retained as long as possible, thus explaining why no correlation between coherence and reading times on the

negation was found. While the empirical results could suggest that intraposed clausal infinitives are excluded from the grammar, the authors show through a comparative theoretical approach that this is not the case, even though, for the reasons just explained, the mono-clausal option will be computed first during processing.

In a further study Bader and Schmid (2009a) expand on the processability of infinitival complements and test the hypothesis that although a coherent structure is preferred over a non-coherent one when the infinitive is in intraposed position according to economy principles, it nevertheless comes at a cost, since an operation that merges the argument structures of the two verbs is required (see section 3.1.3.1). Results of three acceptability judgment experiments confirm this hypothesis in that sentences containing intraposed infinitives receive intermediate to low ratings both when they have a mono-clausal structure as well as when they are clearly bi-clausal. Extraposed infinitives on the other hand are judged better than intraposed infinitives, receiving very high ratings.

While the above mentioned studies focus on intraposed and extraposed infinitival complements, Bosch et al. (2021) additionally investigate the behaviour of third construction patterns across a number of experimental investigations, in order to test whether performance is influenced by processing economy constraints. With respect to the third construction they predict increased processing costs, since this pattern breaks up two dependencies and additionally yields local ambiguity: by realising the infinitive as a discontinuous constituent, where part of it is realised pre-verbally and part of it is realised post-verbally, as in (61), both the matrix and the embedded subject-verb dependencies are interrupted (*Fred versucht* 'Fred tries' and *den Kuchen zu schneiden* 'to cut the cake', respectively) and increasing the distance between dependent elements has been shown to yield processing cost. Additionally, from an incremental processing perspective, the embedded object *den Kuchen* 'the cake', realised in clause internal position, could be analysed as the direct object of the matrix verb *versuchen* 'try', thus giving rise to an initial structural misanalysis that needs to be revised when the infinitive *zu schneiden* 'to cut' is encountered. Such a structural reanalysis is also claimed to be a costly operation from a pro-

cessing point of view.

- (61) dass Fred [den Kuchen] versucht [zu schneiden]
that Fred the cake tries to cut

(Bosch et al., 2021, (6))

Indeed Bosch et al. (2021) find that not only third construction is dispreferred in language production, as shown by low corpus frequency and low production rate in a spoken production experiment, but it also yields a significant processing disadvantage in the online reading-time task, that is, it elicited slowest reading times compared to extraposition and intraposition. Thus they conclude that processing cost can influence speakers' performance.

3.1.5 Summary

German infinitives show variable behaviour in the way they are integrated into the matrix clause. This has generated a large discussion on their syntactic nature and different proposals have been put forward that range from the simple dichotomy between clausal (or incoherent) and non-clausal (or coherent) infinitives to a more fine-grained distinction between different degrees of coherence.

What most approaches agree on however, is that a class of verb exists that obligatorily selects a non-clausal infinitive and that differences in syntactic behaviour play a role in determining word order variation. Next to verbs selecting a bare infinitive, the class of obligatorily non-clausal or obligatorily coherent infinitive includes the raising verbs *scheinen* 'seem', *pflügen* 'be in the habit of' and the verbs *drohen* 'threaten' and *versprechen* 'promise' in their raising variant. For these verbs intraposition of the infinitive is obligatory in PDG, while extraposition and third construction are excluded⁷. Following Haider (2003) and Haider (2010a), it is assumed in the present work that these verbs form a clustering configuration where matrix verb and infinitive are merged in a complex-head construction. With this respect, modal verb construction and raising verb constructions are considered to be syntactically identical to periphrastic verb forms, e.g. with auxiliary and participle.

⁷But see Reis (2005) for exceptions with *drohen* 'threaten' and *versprechen* 'promise'.

Control verbs on the other hand have been argued to embed clausal infinitives⁸ and thus allow both intraposed and extraposed infinitives. Some control verbs however, are also optionally transparent for clause-bound phenomena such as pronoun fronting or wide scope of negation, thus have been claimed to optionally embed a non-clausal infinitive and additionally allow for third construction, a pattern that has been claimed to show mono-clausal properties, but is excluded with verbs obligatorily selecting a non-clausal infinitive. Whether there is an homogeneous class of control verbs that optionally allows for coherent structure or whether a more gradient conceptualisation is needed, and what are the criteria that make it possible for a control verb to optionally yield a coherent structure is still a matter of debate. Proposals include argument structure and semantics of the matrix verb among the decisive criteria, but what rather seems easier to identify is the class of control verbs that is never compatible with coherent behaviour. Despite the evidence showing that variability in syntactic behaviour within the group of control verbs influences the performance of intraposed infinitival complements in that it correlates with the (in)coherence compatibility of the matrix verb, it has also been shown by previous empirical studies that extraposed infinitival complements represent the preferred pattern both in corpus and experimental data, regardless of the (in)coherence compatibility of the matrix verb. In addition, third construction has been found to be rare in both corpus and experimental data. Thus, although control verbs allow in principle for more word order variability, in practice extraposition is the dominant variant in PDG. The result is that PDG shows a dichotomy not only in the classification of infinitive type but also in the distribution of word order patterns, as illustrated in Table 3.3.

Two types of constraints have been claimed to account for the dichotomy of word order preferences. Wurmbrand (2001) has proposed a prosodic markedness constraint that is responsible for the correlation between infinitive type and preferred word order, a proposal which is in line with Féry (2015) on the prosodic account of extraposition in German more generally, as discussed in section 2.3.2. According to these accounts, a clausal constituent forms the high-

⁸The verb *wissen* 'know' represents the only exception with this regard (cf. Reis, 2001)

Table 3.3: Correlation between matrix verb type, infinitive type and word order pattern

Matrix verb	Infinitive type	Word order pattern
Auxiliaries		
Modal verbs	Non-clausal / Coherent	Intraposition
Raising verbs		
Control verbs	Clausal / Incoherent	Extraposition

est type of prosodic constituent, which embedded into another, smaller, prosodic constituent gives rise to an ill-formed prosodic structure. In order to avoid the formation of such an ill-formed structure, the prosodic unmarked position of clausal constituents is assumed to be post-verbal, hence extraposition. Non-clausal constituents on the contrary are part of a single prosodic constituent and thus are prosodically unmarked in their base position, i.e. in pre-verbal position. Further, empirical studies on infinitival complements of control verbs have proposed that processing factors might influence word order preference. Due to constraints that favour the least possible structure during parsing, intraposition is claimed to be first associated with a non-clausal structure and thus to potentially involve initial structural misanalysis, in case the matrix verb does not allow for a coherent construal. This would in turn require a structural reanalysis, which is associated with high processing costs. From this it follows that clausal infinitives are at a disadvantage in intraposed position compared to non-clausal infinitives. The disadvantage is mitigated if the matrix verb optionally allows for a coherent, mono-clausal structure, since no reanalysis is required there. Even in this case, however, intraposition is not the ideal word order option, as argument structure unification has been claimed to also generate some processing cost. Third construction has also been shown to yield increase processing costs because it increases the distance between dependent elements and creates local ambiguity. It has thus been argued that extraposition of control verbs' infinitival complements represents the easiest option from a processing perspective because it entirely avoids the problem of initial

structural misanalysis, it is not subject to the costs associated with argument structure unification required when infinitive and matrix verb build a complex verbal head and it also minimises distances between dependent elements, thus avoiding centre-embedding, which has also been shown to cause processing issues. Obligatory coherent structures, on the other hand, do not have the same processing problems with intraposition since no structural misanalysis can occur, argument structure need not be unified as there is only one verb that assigns theta roles, i.e. the lexical verb, and finally, they do not yield center embedding due to their small syntactic size. Processing, and in particular the idea that the parser prefers minimal structure, is also considered to be the reason why the clustering construction is the best suited structural option for non-clausal infinitives in OV languages.

3.2 Diachrony

In the first part of this chapter, theoretical and empirical approaches to infinitival complementation in PDG were presented. The following sections are dedicated to the review of the work that discusses the relation between word order and infinitive types in the history of German. Finally, the research program of the present thesis will be outlined at the end of the chapter.

3.2.1 Status selection in older German

Before beginning with the discussion of word order and infinitive type in the history of German, a short note on status selection is in order. As observed by Bech's (1955) coherence rule, status selection is a decisive factor in determining the coherence behaviour of infinitival complements. In particular, verbs selecting the first status, i.e. a bare infinitive, such as modals, and those selecting the third status, i.e. a participle, such as auxiliaries, are obligatorily coherent in PDG. Verbs selecting the second status, i.e. a *zu*-infinitive, on the other hand, in principle can embed incoherent infinitives, with the exception of verbs such as *scheinen* 'seem' and *pflügen* 'be in the habit of', that obligatorily embed coherent infinitives, although selecting the second status. This correlation between the

morphological form of the infinitive and coherence has, however, not always existed in German. In fact, the *zu*-infinitive only emerged in the course of OHG, meaning that control verbs were still characterised by variable status selection in this period (Demske, 2001). The alternation between first and second status with control verbs continued through the Middle High German (MHG) period (1050 – 1350) and it is only by the 15th century, that control verbs combine exclusively with the second status (Speyer, 2017). Modal verbs on the other hand, were found to select the first status throughout. Another group that underwent change with regards to status selection is that of the raising verbs: while they only select the second status in PDG, raising verbs only selected the first status in OHG, similarly to modal verbs (Demske, 2001, and Diewald and Stathi, 2019 on *scheinen* ‘seem’). Why they have developed the second status, although they pattern with modals in their syntactic behaviour remains, to the best of my knowledge, an open question. Studies on *scheinen* ‘seem’ have shown however, that this development is fulfilled in the course of ENHG (Diewald and Stathi, 2019, Diewald and Smirnova, 2010).

3.2.2 Word order and coherence

As anticipated above, the association between different infinitive types and word order patterns does not seem to be present in older stages of German, since patterns other than intraposition are still attested in ENHG with verbs that obligatorily yield coherent construals in PDG. Demske (2008) addresses the question for OHG and shows that verbs which obligatorily construe coherently in PDG, hence obligatorily require intraposition, are found with post-verbal infinitival complements in OHG. In (62), the infinitival complement *hônēn nâmen bréiten* ‘spread his humiliating name’ follows the matrix raising verb *dünken* ‘seem, think’, while in (63) the non-finite complement follows the matrix modal verb *múgîst* ‘might’. Also note that, unlike in PDG, both infinitives are in the first status, accordingly to what was said in section 3.2.1.

(62) sô gezímet uuóla. dáz er ménnisk-ôn ne-dúnche
 so befit surely that he.NOM men-DAT.PL NEG-thinks
hônem námen bréiten
 humiliating name spread.INF
 ‘for all men, it befits surely, that he doesn’t think to spread his humili-
 ating name’ (N BCon 133.27; Demske, 2008: 161, (33))

(63) táz tu dánne múgîst **taz uuâra lieht keséhen**
 that you then might the genuine light see
 ‘that you might see the genuine light then’

(N BCon 40.11; Demske, 2008: 167, (43))

Since extraposition is considered a clear indicator of a clausal constituent in PDG, the question arises as to whether these infinitival complements have clausal status in OHG. Demske (2008) finds independent evidence showing that this is not the case. For example, infinitives governed by perception verbs, which are obligatorily coherent in PDG still get accusative case from the matrix clause when extraposed in OHG, as illustrated in (64). This wouldn’t be possible if the infinitive had clausal status, since case must be assigned inside the VP.

(64) sô ir sament sehent **ten mennisk-en** in-erdo gan. unde
 as you together see the.ACC man-ACC on-earth walk and
 dia sunnun in-himile ûf kan.
 the.ACC sun in-sky rise
 ‘as all of you see man walk on earth and the sun rise in the sky’

(N BCon 266.20; Demske, 2008: 168, (45))

Demske (2008) thus takes examples like (64) to show that as of OHG the linearisation of the complement in extraposed position is no reliable indicator of its clausal nature and the distinction between mono-clausal and bi-clausal structures is already present in OHG, although not supported by word order properties as it is the case in PDG.

The correlation between infinitive type and word order is still not present in ENHG. Referring to the regularities captured by Bech’s (1955) coherence rule (cf. section 3.1.1), Ebert (1976) argues that these do not fully hold in ENHG. In fact, object complements with a bare infinitive can appear both intraposed and

extraposed (Ibid.: 96). In addition, he finds examples of discontinuous infinitival complements, of the type labelled as third construction above, which had not been discussed by Bech (1955). In (65) the dative object of the extraposed embedded infinitive precedes the matrix verb *begert* ‘desires’. According to the generalisation proposed by Haider (1993), Haider (2010a) the subject control verb *begehren* ‘desire’ selects the infinitive as a direct object and would thus in principle allow a coherent structure. The third construction is thus possible with the verb *begehren* ‘desire’ in PDG according to this criterium. The fact that Bech (1955) does not discuss it however, suggests that it is not a common pattern. In (66) a similar pattern is found, where the reflexive pronoun *sich* ‘oneself’ precedes the matrix verb *pflegen* ‘be in the habit of’, while the rest of the infinitive follows it. In this case, the matrix verb is a raising verb, which is excluded from third construction patterns in PDG.

(65) Ain mensche der geren recht thât / vnnd vnserem herren begert
 A person who gladly right does and our.DAT lord desires
mit allem fleiß zu dienen ...
 with all diligence to serve
 ‘A person who likes to do what is right and desires to serve our lord
 diligently’ (P 138d; Ebert, 1976: 92)

(66) sich hüten vor schaden des geystes / als man **sich**
 oneself protect from damages the.GEN spirit as one oneself
pflicht zu hütenn vor schaden des fleisches
 is.in.the.habit.of to protect from damages the.GEN flesh
 ‘to beware of the spiritual damages as one bewares of the damages of
 the flesh’ (S 152d; Ebert, 1976: 92)

Building on previous work showing that infinitival complements do not undergo the same word order regularities as in PDG, and therefore that word order was not a clear indicator of (in)coherence behaviour in older German, Maché and Abraham (2011) investigate whether unambiguous diagnostic patterns of the type discussed in the literature on PDG infinitival syntax (cf. section 3.1.3) could be found in ENHG. They focus on verbs which are obligatorily coherent in PDG, including modals and (subject and object) raising verbs. The

study is conducted on one text from 1567, the travelogue entitled *Neuwe Welt* by Ulrich Schmid. Similarly to what was found for OHG, Maché and Abraham (2011) find evidence for mono-clausal construals, although in some cases the PDG word order restrictions are violated. (67) and (68) represent examples of wide scope of negation and pronoun fronting, respectively. Both properties are indicative of mono-clausal behaviour. The negation element *kein* ‘no’ in (67) takes scope on the matrix verb *kundte* ‘could’, so no clausal boundary can be present. In (68) an element of the embedded infinitival complement, the pronoun *sie* ‘her’, is intertwined with elements of the matrix clause, preceding the subject *der Oberste* ‘the colonel’.

- (67) Des morgens als der Oberste sahe / das er **kein** Wasser finden
 the morning when the colonel saw the he no water find
 kundte [...]
 could wanted
 ‘In the morning, when the chief saw that he could not find any water’

(NW B10r; Maché and Abraham, 2011: 254, (26))

- (68) das **sie** der Oberst zu frieden stellen solte.
 that her the.NOM colonel to piece put should
 ‘that the colonel should satisfy her’

(NW B9l; Maché and Abraham, 2011: 255, (30))

In both examples above the verb order reflects that of PDG, but Maché and Abraham (2011) find instances of pronoun fronting also when the infinitive is discontinuous, confirming that third construction patterns are instances of mono-clausal construals, as argued by Wöllstein-Leisten (2001) and Haider (2010a), and are so already in ENHG. The example in (69) shows that the embedded object pronoun *jhn* ‘him’ can precede the subject *die Moren* ‘the Moors’ even if the infinitive follows the matrix modal verb *koenten* ‘could’.

- (69) derwegen **jhn** die Moren koenten **leichtlich** wenden
 therefore him the Moors could easily turn
 ‘therefore the Moors could easily turn him’

(NW B29r; Maché and Abraham, 2011: 255, (29))

These unambiguous examples all involve modal verbs, while no such evidence could be found for raising verbs, since in total only seven observations containing a raising verb with an infinitival complement were found in the text. Further research is thus needed that investigates the coherence behaviour of raising verbs in ENHG, and whether it patterns with that of modals.

In summary, what emerges from these studies is that verbs that are associated with obligatory coherent behaviour in PDG yielded mono-clausal constructions already in earlier stages of German, but that this didn't obligatorily require the infinitive to be intraposed. Extraposition of non-verbal material, together with the non-finite verb, further indicates that modals and raising verbs and their infinitives do not obligatorily enter a clustering construction, as it is assumed to be the case in PDG.

The question of when such clustering constructions emerge in the history of German is addressed in Demske (2015). In her view, the word order patterns attested with modal and raising verbs in OHG are indicative of the fact that these predicates select VP complements at that stage and that verb clusters as a structural option for infinitival complements only emerge later in the history of German. The presence of extraposition (70) and third construction (66), (69) in ENHG texts shows that clustering is still not obligatory in this stage of the language for modal and raising verbs.

- (70) vnd zeigte vns an / wie wir ohne grosse gefahr nicht köndten
 and tells us how we without great risk not could
hinauff biß an das Dorff fahren
 up to at the village go
 'and he tells us that we could not go up to the village without taking
 great risks' (Am 2.33; Demske, 2015: 30, (44a))

However, Demske (2015) also observes that in the course of the 16th century intraposition of the infinitives increases regardless of the matrix verb they occur with. The patterns in (69) and (70) only represent a small portion of cases with modal and raising verbs. Instead intraposition, i.e. the sentence final positioning of the finite verb, is increasingly attested, with both modals (71-a) and raising verbs (71-b).

- (71) a. daß sich die Weisen der Religion halben
 that themselves the wise.men the religion concerning
 vergleichen sollen
 compromise should
 ‘that the wise men should find a compromise concerning religion’

(Rel 30.20; Demske, 2015: 29, (42a))

- b. aber der Wind war so hefftig/ daß wir nicht so hoch
 but the wind was so violent that we not so upwards
 kondten kommen/ als da die Fischer **auff dem Fischfang**
 could come as there the fishermen on the fishing
zu ligen pflügen
 to lay used.to
 ‘the storm, however, was so violent, that we could not go upstream
 far enough where the fishermen used to be moored for fishing’

(Am 1.29; Demske, 2015: 31, (45b))

Also control verbs, which are typically associated with extraposition in PDG, thus with clausal infinitives, increasingly select intraposed infinitives in ENHG. This does not only affect verbs that are optionally compatible with a coherent structure, like the subject control verb *begehren* ‘demand’ (72) and the object control verb *vergönnen* ‘allow’ (73), but also verbs that do not allow for a coherent construal in PDG, as it is the case for the accusative object control verb *zwingen* ‘force’, (74).

- (72) Zu Florentz seyn etliche junge vom Adel/ von der Inquisition
 in Florence be some young of nobility by the Inquisition
 eingezogen worden/ wegen daß sie einen Babst vnter jhnen
 drafted been because that they a pope among them
 erwehlet/ von deme sie viel Indulgentz/ auch **jederzeit Fleisch**
 chose of him they much grace also anytime meat
zuessen begert
 to.eat demanded
 ‘In Florence, a number of young nobles have been drafted by the Inquisition / because they chose a Pope among them / from whom they demanded a lot of indulgence / and that meat can be eaten anytime as well’

(A 135.33; Demske, 2015: 31, (45a))

- (73) dessen begeren ware/ das die Herrschaft zu Venedig/ an ein
 whose purpose was that the sovereign of Venice at a

bequemes ort ein Fortezza bawen/ oder aber jhme **solche zu**
 comfortable place a fortress build or however him such to
bauwen vergünnen wöllen
 build allow want
 ‘whose purpose was that the sovereign of Venice build a fortress at a
 comfortable place or allow him to build a fortress himself’

(AC 23.15; Demske, 2015: 30, (43c))

- (74) vnnd war vns der Strom vnnd Windt so entgegen/ daß wir **mit**
 and was us the storm and wind so against that we with
vnsern kleinen Nachen den Vorwindt zu nemmen gezwungen
 our small boats the downwind to take forced
wurden.
 were
 ‘and storm and wind was against us so that we were forced to use the
 downwind with our small boats’

(Am 19.31; Demske, 2015: 32, (46a))

That these infinitives can be clausal complements despite intraposition is shown in sentences like (75) and (76), where the finite and the non-finite verb forms are interrupted by non-verbal material. Moreover (76) shows an instance of pied-piped infinitive, which, as argued in 3.1.3 is only compatible with an incoherent structure.

- (75) ahm Königl. Hoff wehre zwar unter etlichen hohen
 at the royal court were indeed among some high-ranking
 Officierern einiger Mißverstand vorgangen/ aber bald wieder
 officers some clash happened but soon again
 beygelegt/ und [dergleichen mehr zu üben] **scharpff verboten**
 resolved and of-this more to do strictly forbidden
worden/
 were
 ‘there was a clash among some high-ranking officers at the royal court
 which was resolved soon, and it has strictly been forbidden to do more
 of this’

(PZ 8.20; Demske, 2015: 33, (47a))

- (76) Wir hatten vns allda auff einem schönen Sandt gelandet/ vnnd
 we had us there at a nice shore berthed and
 funden mehrden 1000. Tortugas oder Schildtkrotten Eyer/ **welche zu**
 found more than 1000 turtle eggs which to

essen gar gesundt seyndt.

eat very healthy are

‘we berthed at a nice shore where we found more than 1000 turtle eggs
which are very healthy to eat’

(Am 27.23; Demske, 2015: 33, (47c))

According to Demske (2015) the increase of intraposition is to be ascribed to major structural changes happening at this stage of the language. She assumes, following Haider (2010b) and Haider (2014), that whereas the directionality of the verbal head is underspecified in OHG, making German neither OV nor VO but of a third, mixed (OV/VO) type, allowing the verbal head to take complements both at its left and at its right, basic word order in German changes from OV/VO to OV in the course of the 16th century. It is this increase of intraposition, caused by the strengthening of the OV grammar that, in Demske’s (2015) view, creates the need for verb cluster formation, since they offer a parser-friendly solution to the otherwise difficult to parse intraposed infinitives. However, the fact that modal and raising verbs, obligatorily coherent verbs in PDG, still allow for extraposition suggests that the adoption of the clustering construction is not obligatory for these verbs in ENHG and that the process must have gone to completion only after the end of ENHG. As Demske (2015) points out, the changes happening in the 16th century affect all types of infinitival constructions, from modal and raising verb constructions to infinitival complements of control verbs. However, while the (diachronic) word order variation within verbal groups containing modal verbs and bare infinitives received considerable attention in the literature, raising verb constructions and control verb constructions embedding *zu*-infinitives have either been ignored in these historical investigations or have received less attention due to their infrequent attestation (cf. e.g. Maché and Abraham, 2011). Next to the studies reported in this section which have specifically addressed the question of the correlation between word order and infinitive type in older stages of German, a considerable body of literature exists that has focused on the first group only, and has investigated the diachronic word order variation within these verb groups, also typically referred to as verb clusters or verbal complexes in the literature.

Although not contributing directly to the question of when the correlation between word order and coherence emerged, these studies give important insights into word order variation and change in the history of German. In the rest of the chapter, I briefly summarise some of the main findings from these studies, before outlining the goals of the present study in more detail.

3.2.3 Word order in “verb clusters”

Although, as was shown in 3.1.3, raising verbs selecting a *zu*-infinitive such as *scheinen* ‘seem’, belong to the group of obligatorily clustering verbs in PDG, and undergo the same word order restrictions as modal and auxiliary constructions (i.e. periphrastic verb forms), it is usually only the last two that fall under the descriptive label of verb clusters (cf. for example Wurmbrand, 2004c, Schmid and Vogel, 2004, Barbiers, 2005, Sapp, 2011, Durrell, 2019). Studies on so-called verb clusters often focus on the verbal complex itself, that is, on the possible ordering of sentence final verb groups (e.g. 1-2 or 2-1, where 1 indicates the hierarchically highest verb and 2 the embedded verb, cf. (77)) and how they can be accounted for, assuming without doubt, that the embedded predicate does not project its own clause.

- (77) a. daß der Bapst solche dem newen König in Hungern
 that the pope these the.DAT new king in Hungary
 Matthias **werde**₁ **zuschicken**₂.
 Matthias will send
 ‘that the pope will send these to the new king Matthias in Hungary’
 (1609, Cont I 1)
- b. nach dem er jn **hatte**₁ **gesehen**₂
 after he him had seen
 ‘after he had seen him’
 (1599, Am 8.6)

One of the most recent and comprehensive studies of the verbal complex in the history of German is reported in Sapp (2011). Building on a series of studies that had previously been concerned with variation in verb ordering, he systematically investigates the role of different factors on the possible variants. Although, as he points out, these previous studies are all incomplete in some

sense, in that for example they only look at data from one dialect, or even one city or look at a wider range of sources but do not control for dialect or simply do not make use of any statistical tool (see Sapp, 2011: 13, for an overview of the previous scholarship), his results are consistent with findings from the previous studies in at least three aspects.

Firstly, and not surprisingly, variation in verb ordering decreases over time, such that for two-verb clusters, the PDG order, i.e. where the finite verb (V_1) follows the non-finite verb (V_2), becomes increasingly dominant. However, the 1-2 order is still attested in the second half of the 16th century (the youngest period in Sapp's 2011 investigation) with a rate of 11% (Sapp, 2011: 67). For three-verbs complexes the descending order is still relatively infrequent in ENHG (Ibid.: 85).

Secondly, prosodic factors show a significant effect on verb ordering, as previously suggested by other studies. For example, in two-verb complexes, the presence of a non-finite verb with a separable stressed prefix favours the 1-2 order in both MHG and ENHG. The weight of the word preceding the verbal complex also has an influence in the verb ordering, such that an unstressed word, e.g. a pronoun, preceding the verbal complex favours the 2-1 order while the presence of a preceding stressed word, e.g. a full NP yields more 1-2 orders. The latter effect was particularly strong in MHG, while it becomes restricted to some dialects in ENHG (Sapp, 2011: 60). Sapp (2011) additionally tests for the effect of information structure and finds that if the object is part of focus the 1-2 order is favoured. Building on the work of Selkirk (1984) on the Principle of Rhythmic Alternation (PRA), and on the assumption that auxiliary verbs are less stressed than lexical verbs, Sapp (2011) proposes that the word order variation in verb clusters represents a strategy to guarantee the alternation of stressed and unstressed beats on word and/or syllable level. For example, the effect of the preceding word on verb order in the verb cluster can be accounted for by the PRA on the word level. A non-pronominal stressed word preceding a 2-1 verb cluster, that is adjacent to a lexical verb would result in a crush, since both words are stressed (78-a). The order 1-2 is thus the strategy used in MHG and ENHG to avoid this clash. This option is not grammatical in standard

PDG but it is still available in some dialects, cf. the Zurich German example in (78-b). On the other hand, when the word preceding the verb cluster is a pronoun, therefore not stressed, the clash does not exist, so the 2-1 option is in order, cf. (80).

(78) dass Martin einen ROMAN SCHREIBEN muss.
 that Martin a novel write2 must1
 (Sapp, 2011: 192, (39a))

(79) dass dä Martin en ROMAN mues schriibe.
 that the Martin a novel must1 write2
 (Sapp, 2011: 193, (41c))

(80) dass Martin ihn SCHREIBEN muss
 that Martin it write must

An example of the PRA working at both the word and the syllable level is the effect of prefix. As we have seen Sapp (2011) found that the presence of a stressed prefix favours the 1-2 order. In fact, according to the PRA, the 2-1 order would constitute a violation, since not only two stressed words are adjacent (the stressed object and the lexical verb), but also two syllables, cf. (81-a). By inverting the verb order, that is by placing the unstressed modal verb in between, the clash is resolved (81-b).

(81) a. *wan sich dy SEL ABSchaiden sol von dem LEIB
 when REFL the soul away.part2 shall1 from the body
 (constructed)

b. wan sich dy SEL sol ABSchaiden von dem LEIB
 when REFL the soul shall1 away.part2 from the body
 'when the soul shall depart the body'

(Pillenreuth 161, Sapp, 2011: 195 (43))

On the other hand, when the prefix is not stressed the clash at the word level is mitigated by the syllable level, since the unstressed prefix interrupts the clash.

(82) daz GOT geSEGent het
 REL God blessed2 had1
 'that God had blessed'

(Buch der Könige 04va, Sapp, 2011: 195 (44))

Similarly, the effect of focus can be reduced to a prosodic effect as well, assuming that objects that are part of focus bear sentential stress. This would give rise to a scenario similar to (78), where two stressed words are adjacent and result in a clash. Again, the 1-2 order is preferred to avoid this clash.

A third type of factor that has an effect on verb order, and one that is in line with previous findings, is an extra-linguistic factor, namely the register/genre of the source text. Similarly to previous studies Sapp (2011) finds that more formal registers (e.g. chancery documents, chronicles and technical prose) show a higher rate of the 2-1 order, compared to less formal registers such as literature and religious texts, in both MHG and ENHG. This result is usually taken to be an indicator of what was called *change from above*, that is the spread of a prestige variant to other registers toward a standard.

In conclusion, even though word order variation in verb clusters decreases over time, it is still present in the ENHG period and so are the factors influencing it, i.e. prosody and register. An indication of when the variation disappears, in favour of what became the standard PDG order is given in Durrell (2019), who investigates word order in verb clusters in the period between 1650 and 1800. He shows that the 2-1 order has established itself by 1750, and that after that period the alternative order is only rarely found.

3.2.4 Summary

Aim of the present chapter was to outline how the syntax of infinitival complements and of the governing verbs plays a role in determining their linearisation in the sentence. It was shown that in PDG a correlation exists between obligatorily coherent or mono-clausal construals, and intraposition on the one hand, and incoherent or bi-clausal construals, and extraposed infinitives on the other. It was argued that this dichotomy results from the interaction of syntactic, prosodic and processing factors. Furthermore, it was shown that this dichotomy did not exist in older stages of German, at least not until the end of ENHG period, since the linearisation of the infinitive was not restricted by its syntactic properties. In particular, verbs that obligatorily yield clustering con-

structions and only allow for intraposition in PDG, still show considerable variability in word order patterns at the beginning of the ENHG period. It is only starting from the 16th century, towards the end of ENHG, that intraposition of the infinitive increases. However, this increase affects also infinitival complements that are predominantly extraposed in PDG, hence the lack of dichotomy. Also, while the third construction plays a marginal role in PDG, being restricted to a subset of control verbs, it was much more widespread in older German. These facts have also led researchers to hypothesise that the cluster construction that characterises PDG coherent infinitives, was not a structural option until after the ENHG period but that clustering constructions emerge as a consequence of the increase of intraposition, since they offer a parser friendlier structure compared to left-branching VPs. So far, studies that have investigated the correlation between infinitive type and word order in historical German have done so by mainly adopting a qualitative approach and focusing on a limited number of text sources. Quantitative studies on word order variation in infinitival complementation only focus on verb clusters, i.e. modal and auxiliary constructions, which represent only a subgroup of obligatorily coherent verbs in PDG, thus not addressing the question of the emergence of such correlation. However, these studies allow us to get an orientation of when the PDG order becomes the default, namely around 1750.

3.3 Object and organisation of the thesis

Building on previous work, in particular on Demske (2015), the present work aims at tracing the emergence of the dichotomy observed in PDG and establishing the causes that led to it. In order to do so, the present study investigates the word order properties of infinitival complements that, from a diachronic perspective, have so far received only marginal attention. That is infinitival complements of control verbs, which, from a present-day perspective, are considered to yield preferably or exclusively bi-clausal, incoherent structures and those of raising verbs such as *scheinen* 'seem' or *pflügen* 'to be in the habit of', which are claimed to show a non-clausal behaviour, thus to yield a coherent

structure. Since, as illustrated above, much is known about the diachronic word order development in verb clusters, and since especially for periphrastic verb forms, it is safely assumed that the non-finite verb form does not project a separate clausal domain, these will not be the focus of the investigation. In other words, the main object of the study are *zu*-infinitives only. A comparison of the two subgroups of coherent infinitives will nevertheless be useful for some aspects of the study. The empirical evidence for the investigation draws on corpus data from different stages of German. Building on previous studies showing that crucial changes concerning the phenomenon in question, and possibly word order in German more generally, can be observed in this period, the investigation starts with ENHG and traces word order developments of the two verb groups up until PDG in order to find out when and how the PDG dichotomy emerged in the history of German. More specifically, the diachronic study has following aims: first, it tests adopting a quantitative, statistical approach whether an increase of intraposition can be confirmed in the course of ENHG and whether it affects both verb groups, as suggested by Demske's (2015) data. Second, it aims at identifying the point in time when intraposition becomes the only option for raising verbs and simultaneously what the development path of control verbs has been. Third, the two verb groups will be analysed separately in relation to the question of whether the changes in word order distribution are related to a change in their selection properties, i.e. whether these verbs allowed more infinitive types than in PDG. Furthermore, the second part of the thesis aims at identifying other possible causes for the diachronic word order variation.

The rest of this thesis is organised as follows: Chapter 4 presents the corpus representing the empirical basis for this thesis, giving information about the sources used for each time period. It further provides an illustration of methods of data analysis. Particular attention will be given to the introduction of the statistical test employed in the quantitative evaluations in order to provide the reader with all necessary information to process the results. The main corpus study and its results will be presented in Chapter 5. In the first part of the chapter the quantitative study, including both raising and control verbs,

will be illustrated that addresses the first two questions. The second part of the chapter is dedicated to the two groups of matrix verbs separately. Both provide a qualitative evaluation of the attested patterns in order to establish whether they show any evidence for mono- or bi-clausal behaviour. Section 5.3 further compares the development of raising verb constructions with that of modal and auxiliary constructions as attested in the present corpus and addresses the question of whether cluster configurations can be assumed already in ENHG or whether they emerge later in the history of German. Section 5.4 examines the group of control verbs more in depth and tests whether the structural factors which are claimed to determine (in-)coherence preferences in PDG, such as control properties, affected the preference for one or the other word order variant diachronically and whether processing factors apply in older German as well. Chapter 6 discusses Demske's (2015) hypothesis according to which changes in the distribution of infinitives and the emergence of the cluster construction as a structural option are due to major structural changes affecting the language in the 16th century. Further empirical data will be collected in order to evaluate this hypothesis. Finally, an alternative proposal will be put forward and the relevant data discussed in Chapter 7. Chapter 8 concludes.

4

Data and Methods

As introduced above, the present study addresses the questions of when and how the association of infinitive type and word order patterns, as observed in PDG, emerged in the history of German and it does so by means of a diachronic corpus study. As such it is mainly concerned with usage data. The use of corpus data, hence of usage data, for the synchronic study of language as a formal system has been often criticised, mainly because it is claimed that usage data may not correspond to actual linguistic knowledge, and because it does not provide negative evidence. The problem becomes even greater with historical corpus data, since historical linguists are often faced with the challenge of having to deal with what Labov (1972) called “bad data”, data they have no control over, that might be “produced by a series of historical accidents” or “removed from the actual productions of native speakers” (Ibid.: 100). However, besides the fact that for investigations of earlier language stages we can only rely on corpus data, I believe that the investigation of corpus data, and of what is preferred in performance data more in general, can offer important insights into the factors shaping the faculty of language and the role of interface conditions and general cognitive principles, an issue that has been receiving increasingly attention (cf. section 2.3.1). Moreover, problems linked to the possibility of accidental evidence or the lack of negative evidence, can be overcome by means of statistical testing. As also pointed out by Stefanowitsch (2006), Stefanowitsch (2020), by analysing corpus data statistically we can determine whether the occurrence, or the absence, of a linguistic form is accidental or not. His approach is based on the idea that an occurrence of 0 is as informative as any

frequency value and that corpora do provide negative evidence in a sense, at least as far as usage data are concerned. It is then the linguist's task to find out why this is the case and what the significant absence of a pattern means. Applying statistical analysis to corpus data also has a number of other advantages that I will illustrate below. The present chapter is organised as follows: in section 4.1, I present the collection of sources that make up the corpus at the base of the present empirical investigation, while section 4.2 introduces some main concepts of statistical analysis, discusses its relevance in historical corpus linguistics and finally presents the method used in the present study more in detail.

4.1 The corpus

The study draws mostly on data from previously existing and publicly available corpora. However, when the data base did not allow to retrieve enough instances of the construction under investigation, additional sources were considered. In order to cover the entire period of time from ENHG up to PDG, data was extracted from different corpora of (historical) German. For ENHG the Potsdam Treebank of ENHG (Baumbank.UP, Demske, 2019), a syntactically annotated corpus of 26 ENHG texts, which comprises a total of around 600.000 words and covers the whole ENHG period, was initially considered¹. The corpus is organised in 50-years time windows and the texts were chosen such that in each time window each of the four dialect regions (West Central German, East Central German, East Upper German, West Upper German) were covered by at least one text². Although the Potsdam Treebank of ENHG is a valuable resource for studying the syntax of this historical stage of the language, it represents a relatively small data base for the construction under investigation. In order to gather more data, the investigation additionally drew upon texts

¹Data was extracted from the pre-published version of the corpus dating from November 2018 using the software TIGERSearch (Lezius, 2002). This version already includes all 26 texts but sentence ID-numbers could deviate from the current published version due to partial editing of the sentence segmentation.

²<https://www.uni-potsdam.de/de/guvdds/baumbankup> (accessed on February 24th, 2021).

from the Bonn Corpus of ENHG (Das Bonner Frühneuhochdeutsch-Korpus, Fisseni, 2017), the Mercurius Treebank (Demske, 2007), as well as a number of additional texts, which were made available in digitalised form from the chair of History and Variation of the German language at the University of Potsdam (Prof. Dr. Ulrike Demske). A complete list of these texts is available in the Primary Sources section and the total number of word forms is shown in Table 4.1³. In total, the sources homogeneously covered, to the extent possible, four text types, which were determined based on the text type classification in use for the Bonn Corpus of ENHG and the Potsdam Treebank of ENHG. These are:

- Informational texts (including chronicles, travelogues and newspapers);
- Fictional prose;
- Religious texts;
- Scientific texts.

The same text types were considered in the selection of the German Text Archive (DTA) subcorpus, covering the period from 1700 ca. to 1900. In total, the DTA comprises around 250.000.000 words⁴, but the subcorpus was restricted to a total number of 2.087.833, in order to keep the distribution of text type balanced.

As to the period from 1900 to the present-day, following corpora were considered: for the 20th century infinitival complements were extracted from the DWDS-Kernkorpus, which comprises around 121.397.601 tokens and is balanced as to the included text types⁵. Since much larger corpora are available for PDG, but these do not always include different text types, I selected three sub-corpora from existing resources on written German. The first corpus consisted of articles from the year 2016 of the German national newspapers *Die Zeit* and *Süddeutsche Zeitung*, available online as part of the German Reference Corpus (DeReKo) created at the Institut für Deutsche Sprache in Mannheim.

³Some texts, for example the newspaper *Nordischer Mercurius* from 1667, which gives the name to the Mercurius Baumbank, go beyond the commonly assumed approximate end date of ENHG (1650), hence 1670 as the end date for the first time period.

⁴<http://www.deutsches-textarchiv.de/doku/ueberblick> (accessed on September 17th, 2019).

⁵<https://www.dwds.de/d/k-referenz#kern> (accessed on September 17th, 2019).

In addition, narrative and scientific texts available under the DWDS Kernkorpus 21 were investigated. The third sub-group was represented by the German Twitter Corpus created at the University of Potsdam (Scheffler, 2014)⁶. A summary of the corpus size per time period is provided in Table 4.1⁷. As it becomes clear from the table, the size of the younger corpora is much larger than that of corpora of historical German, which could potentially represent a problem for a comparison between time periods. It is also for this kind of problems that statistical analysis is beneficial, as I will show in section 4.2.

Table 4.1: Corpus size per time period

Period of time	Size (words)
1350 - 1670	1.666.760
1670 - 1900	2.087.833
1900 - 2016	517.606.663
<i>Total</i>	521.361.256

Also, including different text types in a corpus study can be a valuable resource, as it allows for a more representative sample from a given time period or can provide additional information as regards the sociolinguistic and stylistic distribution of a particular phenomenon, but it can be problematic when comparing different time periods because, if the text types are not balanced across those, they risk becoming a confounding factor rather than an informative one. Although an effort was made to keep the distribution of the genres balanced across the diachronic corpus, it is difficult to do so when the investigation expands over many centuries and new text types emerge, that did not exist in previous time periods (e.g. Twitter). However, this should not be a major con-

⁶For legal reasons the corpus cannot be made available online.

⁷For the Twitter corpus and the DWDS corpora the size is only available as total number of tokens, i.e. including words as well as non-words, while for the rest of the sources the size is indicated in number of words. While this is not ideal from a methodological perspective, it does not affect our frequency count or statistical analysis, since computations always consider the frequency of a pattern relative to the total number of the infinitives attested and are not based on normalisations relative to the size of the corpus.

cern for the present study, since this factor will be controlled for in the analysis, as I will illustrate in the second part of the chapter.

A final note on the presentation of the linguistic examples is in order. For examples from the corpus, I provide both a gloss and translation. Glosses follow the Leipzig glossing conventions, but where not relevant, grammatical information has been glossed with the English counterpart and not labeled accordingly. For each example the information on the source is indicated below the translation: year of composition of the source text and the source text itself are given for all examples and, according to what information was provided by the corpus query tools, an indication of either the sentence number (1-a) – this was only the case for texts included in the Potsdam Treebank of ENHG and the Mercurius Treebank –, the page number (1-b), the page and the line (1-c), or other corpus specific details, e.g. (1-d) for Twitter and (1-e) for DeReKo, was added.

- (1) a. (1582, Rauw s196)
- b. (1821, Klüber 154)
- c. (1667, PZ 78.33)
- d. (2013, Twitter ID150855424)
- e. (2016, U16/FEB.01951)

4.2 Quantitative data analysis

As introduced above, historical corpus data can be problematic for a number of reasons. It can be limited, fragmentary, accidental and we also don't have the possibility to recur to native speakers' intuitions or judgments to complement this data. As Jensen and McGillivray (2017) have put it "The historical linguistic reality is lost. [...] [W]hatever reality we wish to describe, understand, or approximate is irrecoverably lost. It cannot be directly accessed and hence we can only study it indirectly." (Ibid.: 38). Corpus data is all that historical linguists can rely on. What historical linguists can do, is to determine whether something is attested and how frequently it is attested. We could refer to the first approach as qualitative approach and to the second as quantitative

approach. While qualitative investigations have long represented the norm in historical linguistics, quantitative approaches have been increasingly adopted in the last decades (see Jensen and McGillivray, 2017 for an overview). But what does it mean to adopt a quantitative approach? Gries (2013) points out three goals of quantitative research: the first one is “*description* of [the] data on some phenomenon and means that [the] data and results must be reported as accurately as possible.” (Ibid.: 3). This usually involves the application of descriptive methods such as means, percentages etc. The second one is the “*explanation* of [the] data, usually on the basis of hypotheses about what kind(s) of relations you expected to find in the data.” (Ibid.: 3). These two aspects are usually addressed in quantitative historical studies. However, there is a third aspect that is rather neglected in historical linguistics but, as I am going to illustrate below, can benefit historical linguistics research in that it helps the historical linguist “to make the best of this bad data”, to use Labov’s (1972) words. That is the goal of *prediction*, in other words, to establish whether what was observed in the analysed data sample would be valid for a different sample too, that is whether we can consider our results to be reliable or whether they are only found by chance in our data. This is where statistical testing comes into play. Statistical analysis has been standardly employed in other sub-disciplines of linguistics such as for example psycholinguistics and sociolinguistics for several decades, and corpus linguistics has more recently started to follow this approach. The methods of inferential statistics, i.e. the statistical tests used, can differ from discipline to discipline, or even from study to study, since there are a number of factors that need to be considered before choosing a statistical test. Before coming to the choice of the method that is relevant for the present study and illustrating its advantages for historical linguistics, I first introduce some key concepts of statistics that are common to all methods.

4.2.1 Fundamentals of statistical analysis

In every quantitative study we need to identify a dependent variable, that is the variable we want to measure and “whose values, variation, or distribution is

to be explained” (Gries, 2013: 12). Often, but not necessarily, our explanation includes some factors causing or influencing the observed values, variation, or distribution of the dependent variable, these factors are also referred to as independent variables or predictors. In some cases we are not interested in determining which factors influence the dependent variable but in how its values are distributed. In these cases no independent variable is involved. Since those cases are not discussed in the present work, I will not illustrate the different scenarios here but refer the reader to Gries (2013), Chapter 1, for an introduction. Irrespective of the statistical test employed, what we do when using a statistical test is to evaluate the relation between the dependent variable and the independent variable. While the logical hypothesis is usually that there is a relation between the variables, that is that the independent variable does have an effect on the dependent variable, a key notion in statistical testing is that of null hypothesis (H_0), that is the hypothesis stating that there is no relation between the variables, hence that the independent variable does not have an effect on the dependent variable. When conducting a statistical test the computation is evaluating the probability of the H_0 being true and this probability is expressed by the output value known as p-value. Thus the smaller the p-value is, the more likely it is that the H_0 is false, that is, that we do have a relation between the variables, or in more technical terms that we have a significant effect of the independent variable on the dependent variable. The significance level is usually set at 0,05. Hence, if a p-value is smaller than 0,05 the H_0 can be rejected and the effect is considered significant. Sometimes the following significance levels are further distinguished (the asterisk is used to mark a significant result, and different significance levels are marked with a different number of asterisks, see (2)):

(2)

<i>p-value</i>	<i>significance level</i>	
$p < 0.001$	highly significant	***
$0.001 \leq p < 0.01$	very significant	**
$0.01 \leq p < 0.05$	significant	*

(cf. Gries, 2013: 29)

Concerning the choice of the statistical test, as mentioned above, there are a number of aspects that need to be considered. First, the type of dependent variable. Depending on the study we are conducting we might have different types of dependent variables. For example, in a psycholinguistic experiment such as a self-paced reading study, what is being measured are reading times, hence real numbers. In corpus studies, and more specifically in the context of variation, what one might be interested in measuring is how often alternative variants, e.g. intraposed vs. non-intraposed infinitive or regular vs. irregular inflection, are attested. What we are dealing with are categorical values rather than numbers. Another important aspect is whether independent variables are being considered and how many there are. In case we want to consider two (or more) independent variables, which is the case for the studies in the present work, what we want to have is a statistical method that can handle multiple predictors in one analysis, this is what is referred to as multifactorial analysis. Ideally we want to know not only how the single predictors are related to the dependent variable (i.e. whether there is a main effect) but also to each other, i.e. whether they interact. All this can be achieved with a method called logistic regression, implemented by making use of the dedicated function in the open source software R (R Core Team, 2021). In the remaining of this chapter, I illustrate the basics of logistic regression and its application to corpus linguistics with a concrete example, and thereby introduce the notion of mixed-effects logistic regression, which is the method ultimately used in the present study. I further present possible application contexts and its advantages in historical linguistics.

4.2.2 Mixed-effects logistic regression

To recapitulate: a logistic regression is a type of analysis that is applied when the dependent variable represents a binary choice, that is a choice between two possible alternatives and we want to estimate the probability of one of the outcomes given the value of the predictor(s) (Baayen, 2008: 195). As an example, we will look at particle placement in English (cf. Gries, 2013: 8ff.). As shown

in (3), transitive phrasal verbs constructions can be realised either in the order verb-particle-object, as in (3-a), or in the order verb-object-particle as in (3-b). Since these variants are considered synonyms by native speakers of English (Ibid.: 8), studies have tried to identify possible factors that constrain this alternation. These are listed in (4) (for illustration purposes only two are reported here, see Gries (2013): 9f. for a complete overview).

- (3) a. He picked up [NP the book]. VPO (Verb - Particle - Object)
 b. He picked [NP the book] up. VOP (Verb - Object - Particle)

(Gries, 2013: 8, (1))

- (4) COMPLEXITY: is the direct object a simple direct object (e.g. *the book*), a phrasally-modified object (e.g. *the brown book* or *the book on the table*) or a clausally-modified object (e.g. *the book I had bought in Europe*);
 ANIMACY: whether the referent of the direct object is inanimate as in *He picked up the book*, or animate as in *He picked his dad up*.

(Gries, 2013: 9)

Now let us imagine we are conducting a corpus study in which we want to evaluate whether the factors in (4) influence the distribution of the VPO and VOP constructions by means of statistical analysis. Based on the previous literature we first formulate hypotheses about the relation between the variables, these are shown in (5).

- (5) a. H1: “if the direct object of a transitive phrasal verb is syntactically complex [phrasally-modified or clausally-modified], then native speakers will produce the constituent order VPO more often than when the direct object is syntactically simple”;

(Gries, 2013: 9)

- b. H2: if the direct object of a transitive phrasal verb is inanimate, then native speakers will produce the constituent order VPO more often than when the direct object is animate.

(based on Gries, 2013: 10, (Table 3))

We then run a logistic regression in which the choice of construction VPO (vs. VOP) is the dependent variable – we can think of this as a 1 vs. 0 scenario, where each observation with VPO is given a 1 and each observation with VOP is assigned a 0 – and the variables Complexity and Animacy are the independent variables or predictors. But what are we measuring exactly? The usual way to think about these types of analysis is to treat the proportion of VPO, that is, the number of times VPO is chosen over VOP for a total number of observations containing a transitive phrasal verb, as the dependent variable, and use this value in the statistical analysis. What a logistic regression does, however, is to evaluate the probabilities indirectly, which means that the analysis takes into account the number of observations that went into the calculation of the proportion (see Baayen, 2008: 196, for a more detailed discussion of this aspect). Knowing how many observations went into the calculation of the proportion allows the analysis to provide more reliable results than just comparing proportions. It is clear that a proportion based on a total number of five observations is less reliable than a proportion based on 100 observations. This is a crucial advantage for the purpose of the present study, since the number of observations available differ substantially for the different time periods investigated, as suggested by the difference in corpus size (cf. section 4.1).

As to the independent variables or predictors, in the analysis we specify that, in addition to the main effects of the predictors (i.e. those formulated in (4-a) and (4-b) respectively⁸), we are interested in their interaction, e.g. whether the effect of Complexity acts on both animate and inanimate objects alike or if it

⁸Remember, however, that what the statistical computation evaluates is the probability of the null hypotheses (i) being true.

- (i) H₀1: “if the direct object of a transitive phrasal verb is syntactically complex [phrasally-modified or clausally-modified], then native speakers will *not* produce the constituent order VPO more often than when the direct object is syntactically simple”; (Gries, 2013: 9)
- H₀2: if the direct object of a transitive phrasal verb is inanimate, then native speakers will *not* produce the constituent order VPO more often than when the direct object is animate. (based on Gries, 2013: 10, (Table 3))

is only valid for, let's say, animate objects. This gives us a more comprehensive understanding of the phenomenon and the role of the factors at play there.

So far the components and properties of a simple logistic regression have been outlined. The method used in the present study however, is a variant of it, namely a mixed-effects logistic regression. In mixed-effects logistic regression, in addition to the effect of the predictors of interest, we can take into account so-called random effects. Random effects are factors that may influence the distribution of the dependent variable but whose "levels [are] randomly sampled from a much larger population" (Baayen, 2008: 241). Thus, while independent variables or predictors have a fixed number of levels – e.g. the predictor Complexity in our example has three levels ("simple direct object", "phrasally-modified object" and "clausally-modified object"), and the predictor Animacy has two levels ("inanimate" and "animate") – the levels of a random effects in one study do not cover all possible levels in the population (Gries, 2013: 333). Random effects are standardly included in psycholinguistic studies and are typically Participant and Item. It is clear that the number of participants taking part in one experiment is only a sample from the entire population, e.g. of native speakers of English, for which we want to test particle placement in transitive phrasal verbs constructions. Similarly, the items that are tested, that is the sentences we constructed for the experiment, are only a sample of all possible sentences including transitive phrasal verbs that can be uttered. In corpus linguistics, mixed-effects logistic regressions are only rarely applied (cf. Gries, 2015), however this method is equally relevant for corpus studies as for experiments. Similarly to psycholinguistic experiments, also in corpus studies there are factors that are randomly selected, or most of the time, available. One that is directly comparable with the random effect of Participant in psycholinguistic studies is the random effect of Text. When conducting a corpus study we analyse a collection of texts that are only a sample of all possible texts produced. Going back to our example of particle placement in English, a random effect along similar lines to that of Item presented above for experiments, could be the random effect of Verb. When collecting observations of transitive phrasal verbs in a corpus, we usually only get a selection of phrasal verbs, not

all phrasal verbs that exist in English.

Crucially, specifying random effects in the statistical analysis accounts for group-level variation, that is for the fact that some data points are not independent of one another, as, for example, they are generated by the same person (by the single participant in an experiment or by the single author of the text in a corpus study), who could have a preference for one of the outputs, regardless of the independent variables. This means that the statistical model including random effects will be able to take into account possible idiosyncratic effects of single units (e.g. single authors or a particular verb) (cf. Gries, 2015).

A second important aspect of mixed-effects methods, one which is particularly relevant for corpus studies, is that through the specification of random effects we can take into account the unbalanced nature of corpus data. Unlike in experimental settings, where the number of observations per participant and per item is usually balanced, in corpus studies we rarely get a balanced design (cf. *Ibid.*). Our corpus data could be, and in fact most probably will be, unbalanced in that for example from each text we get a different number of observations or that some verbs are attested more frequently than others. Baayen (2008) reports an example from Bresnan et al. (2007), in which the effect of multiple predictors on the alternation between PP and NP in the realisation of dative in English is studied. In the study there are repeated measures for the verbs, i.e. each verb is attested more than once. However, the verbs differ in their attested frequency. While *give* is the most frequent ($N=1666$), others are attested less frequently (e.g. *tell*, $N=128$, *offer*, $N=79$) or rarely (e.g. *deny*, $N=12$). This means that the observed effects could be dominated by the verb *give* (*Ibid.* 304). In fact, by re-running the analysis with a random effect of verb, Baayen (2008) finds that one of the effects is not significant anymore.

The analyses presented in the present study are conducted using the `glmer` function from the package `lme4` (Bates et al., 2015) in R (version 3.5.1, R Core Team, 2021). An illustration of how the analysis is implemented is given in (6), based on the example on phrasal verb constructions.

(6) `glmer(VPO ~ Complexity * Animacy + (1 | Text), family = "binomial")`

Inside the parentheses we need to specify (i) the dependent variable, which is the first parameter to appear in the equation and is followed by a tilde; (ii) the independent variables, which appear after the tilde and are separated by an asterisk indicating that we want to test for their interaction – if we wanted to test for main effects only, the independent variables would be separated by a plus sign; (iii) the random effect(s) which are specified after a plus sign in the format shown in example (6). Random effects need not necessarily be included in the statistical analysis but are usually of advantage, as the example in Baayen (2008) shows. Whether including random effects does in fact represent an advantage is determined in the process of model selection. The term model refers to the “formal characterization of the relationship between predictors – independent variables and their interactions – and one or more dependent variables” (Gries, 2013: 253), in other words it refers to the regression equation formulated inside parenthesis in (6). There are different approaches to model selection, here I follow the procedure presented in Gries (2015), which starts with an analysis including all predictors and random effects (also called maximal model). Random effects are successively removed from the analysis to test whether the new analysis explains the data better, which is determined via a significance-based approach, using the `anova` function⁹. The `glmer` function actually covers generalised linear mixed-effects models more generally, of which logistic regression is one subtype (each subtype depends on how exactly our dependent variable looks like). That is why we need to specify that we want to perform a logistic regression and we do so by setting the `family` parameter to the binomial type, as shown in (6).

Once the best model has been determined, we can finally turn to the results. The results of the analysis include a number of values which are usually shown in the format in Table 4.2¹⁰.

⁹Another method to determine which model is better is based the AIC measure. AIC is “one measure that relates the quality of a model to the number of predictors it contains” (Gries, 2013: 261). Thus, if a predictor improves the model, this will result in a lower AIC, meaning that the predictor can be included in the analysis (Ibid.: 261).

¹⁰The values reported here are fictitious and do not result from a real application of the model in (6).

Table 4.2: Effects of Complexity and Animacy and their interaction on choice of VPO construction (Fictitious model output).

	Estimate (β)	Std. error	z-value	p-value
(intercept)	0.4608	0.3922	1.175	0.240076
ComplexityPhrasModif	3.4113	0.6783	5.029	4.93e-07 ***
ComplexitySimple	-2.9350	0.6149	4.773	1.82e-06 ***
Animacy	1.2821	0.3827	3.350	0.000809 ***
ComplexityPhrasModif * Animacy	1.0909	1.1184	0.975	0.329373
ComplexitySimple * Animacy	3.1714	0.6313	5.024	5.06e-07 ***

In the first column on the left are listed the levels of the independent variables. The second column indicates the model estimate. The model estimate represents the best prediction that can be formulated based on the given data, considering the random effects. In our example the estimate for ComplexityPhrasModif is positive ($\beta=3.4113$), which means that in presence of a phrasally modified object, the probability of the VPO construction increases. The estimate for ComplexitySimple, on the other hand, is negative ($\beta=-2.9350$), hence the probability of finding the VPO construction decreases if the object is not modified. The standard error (SE) is shown in the third column and is indicative of the variation around the estimate. A lower SE indicates that the observed values are closer to the estimate, whereas larger SE values point at a larger variation around the estimate. Further, the z-value represents the test statistic used for the calculation of the p-value, which is given in the last column (cf. Jensen and McGillivray, 2017: 184). The effects of ComplexityPhrasModif and ComplexitySimple are significant as indicated by the p-values. From a positive or negative estimate we can see the direction of the effect, however what is expressed by the estimate is not directly interpretable in terms of probability. In order to transform the value of the estimate to probabilities we can use the effect function from the effects package (Fox, 2003) in R (R Core Team, 2021). Also, interpreting interactions can be quite complex when only looking at the estimates. We see from the table that one interaction is significant and one is

not, however, what this means exactly for our predictors can be best illustrated by plotting the model results in a graph, as I will do when presenting the data from the present study, using the `ggplot2` package (Wickham, 2016).

4.2.3 Mixed-effects logistic regression in historical linguistics

So far the application of logistic regression and mixed-effects logistic regression has been discussed in relation to corpus linguistics more generally, let us now come to its application in historical (corpus) linguistics. As for the examples already discussed, (mixed-effects) logistic regression is used in variation contexts, i.e. when the dependent variable represents a choice between two alternatives (e.g. extraposed vs. non-extraposed subject, declarative V2 vs. declarative VEnd sentences and so on). The variation one might be interested in can be synchronic, that is, one wants to find out which linguistic or non-linguistic factors influence the variation in a given language stage, e.g. ENHG. In this case the rationale remains exactly as in the examples presented so far. Or, one might be interested in diachronic variation. This, in turn, could mean that one is interested in (i) whether the values of the dependent variable change over time or (ii) whether the effect of given predictors on the dependent variable changes over time. Again, the rationale remains the same, but Time will be added to the analysis as an independent variable. In the first case Time will be the only predictor, while in the second case we will test for the interaction of the predictor Time with the other predictor(s) of interest. Depending on how the design of the study and the specific research questions look like, the independent variable Time can be coded as either continuous or categorical. In the following sections, I present an example of the first option and subsequently present a bottom-up approach to coding Time as a categorical variable.

4.2.3.1 Coding Time as a continuous variable

An example of mixed-effects logistic regression including Time as a continuous variable can be found in Wallenberg (2016). Here, the author wants to show that “relative clause extraposition is in the process of being lost” in four languages

namely English, Icelandic, French and Portuguese (Ibid.: 237). An example of relative clause extraposition in English is given in (7-a). The author claims that this construction is disappearing over time in favour of the in-situ variant (7-b). No specific hypothesis is presented as to when this is expected to happen, what is being tested is the existence of a decreasing trend.

- (7) a. Another method ... may be employed which is less open to the above objection. (John Strutt's scientific papers, date: 1890)
- b. Another method which is less open to the above objection may be employed. (constructed)

(Wallenberg, 2016: 237, (1))

While a look at the raw proportions already suggests a slight decline of the extraposed variant (cf. Figure 4.1 on the English data), the author further analyses the data by means of mixed-effects logistic regression in order to test whether this decline is significant in each of the languages.

The dependent variable is the choice of the extraposed variant over the in-situ variant. Time is included in the analysis as a continuous independent variable with Year of composition as the unit. A random effect of Text was also included in the analysis. For all of the languages, Year of composition is a significant predictor with a negative estimate, which confirms that the probability of extraposition is decreasing over time. In addition to the main effect of Time, the author also tested for its interaction with the predictor Weight of the relative clause (in number of words), but the result was not significant. The absence of a significant interaction suggests that the effect of Weight remained constant over time.

4.2.3.2 A bottom-up approach to coding Time as categorical variable: the Variability-based Neighbour Clustering approach

In the example presented in the previous section, treating time as a continuous variable results in an estimate value that indicates the overall trend, in this case, a negative one. However, sometimes we may not only be interested in the

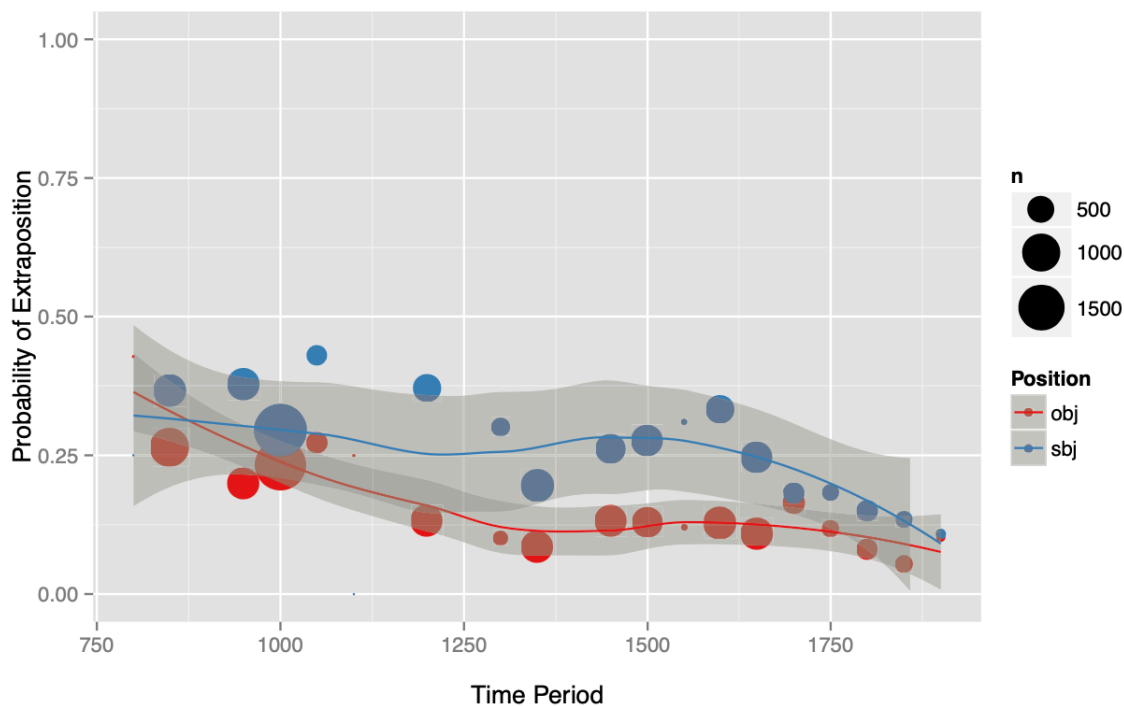


Figure 4.1: Declining proportion of relative clause extraposition (vs. in situ) from subject and object positions, early Old English prose through Modern English. $N = 18,530$ relative clauses. Lines are LOES (Wallenberg, 2016: 240, Figure 1)

trend, but have specific hypotheses about different time periods. A possibility in this case is to treat time as a categorical variable, with the periods of interest as its levels. In historical linguistics it is common to analyse the data – whether the analysis involves statistical testing or purely descriptive illustration of frequencies over time – on the basis of pre-defined periods, that either reflect the history of the language as a whole, e.g. OHG, MHG, ENHG, or are arbitrarily defined by the researcher, e.g. 50-year, 100-year windows etc. As Gries and Hilpert (2008) point out however, the risk by adopting these approaches to periodisation is to distort the perception of the development for a specific linguistic phenomenon that might not follow pre-defined or equally long stages. Indeed, the observations presented in Demske (2015) suggest that ENHG does not behave homogeneously throughout the period as regards infinitive placement. Thus, using *a priori* defined periods as the levels for our categorical predictor time might be problematic.

In order to avoid the risk deriving from the adherence to pre-defined periods, Gries and Hilpert (2008) propose a bottom up, data-driven approach to periodisation, the variability-based neighbour clustering (VNC). VNC is a modification of hierarchical clustering approaches. What is different from standard hierarchical clustering approaches is that VNC works on temporally adjacent observations only, iteratively assessing the similarities between them and iteratively merging the most similar observations¹¹. The output of VNC is a dendrogram showing the amalgamation of time periods and the distance in summed variation coefficients. The variation coefficients are further plotted in form of a scree plot, that suggests how many clusters, i.e. stages, one should assume. This is indicated by the point at which the slope of the downward curve levels off to the right (creating an “elbow”). In Figure 4.2 this point is at cluster three (B), which means that the data is best represented by a solution with three clusters, that are then shown in the dendrogram (A).

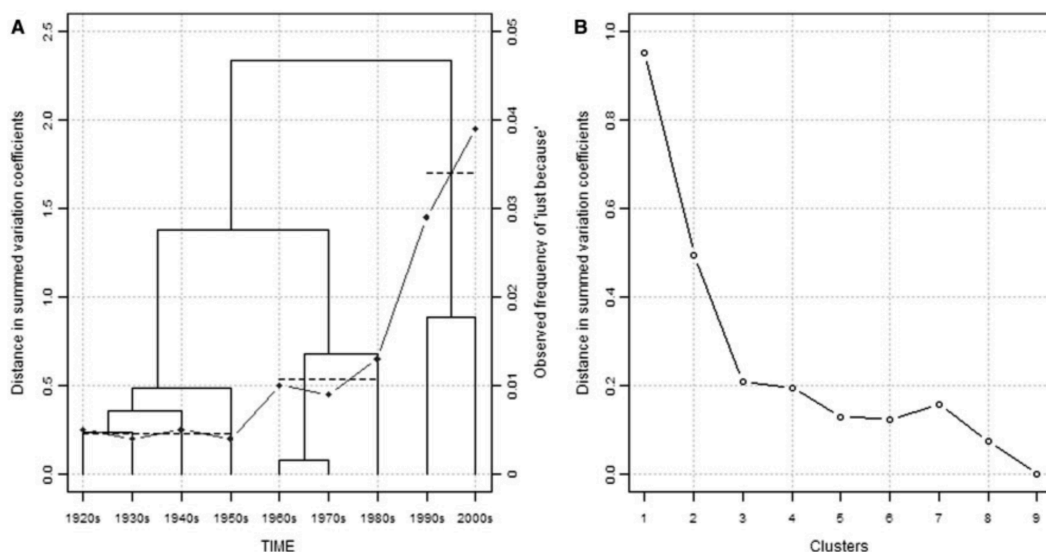


Figure 4.2: VNC dendrogram for the TIME data on *just because* (A) with overlaid line plots of observed frequencies and mean frequencies per cluster and scree plot (B) (from Hilpert and Gries, 2009)

Importantly, if clusters consisting of only one time period, i.e. year, are found, the observations for that year are considered as outliers and therefore discarded.

¹¹see Gries and Hilpert (2008) for a detailed discussion of the algorithm.

A second VNC analysis is then run to assess whether the outlier removal has improved the homogeneity of the data (Gries and Hilpert, 2008; Gries and Hilpert, 2010). Finally, it is important to mention that the authors present VNC as an exploratory approach “intended to help researchers to detect structure in large/complex sets of chronologically-ordered data” (Gries and Hilpert, 2008: 77) and not as an hypothesis-testing approach. This approach can however be combined with statistical testing in that the clusters identified by the VNC analysis can be used as the unit of the independent variable Time in a regression analysis. This is the approach I adopt in the present study (see also Gries and Hilpert, 2010 for an application on the development of English third person singular suffix).

4.2.4 Conclusions

To summarise, this section presented the relevant background information on statistical analysis more generally and on the method used in the present work, namely mixed-effects logistic regression. I have argued that since for older stages of German empirical data are the only source of information we have, information about the reliability of the observed frequencies is crucial to make any claims. Evaluating the data by means of statistical analysis means getting objective information about the reliability of the data. In addition, by controlling for random effects, it is possible to compensate for some of the “bad data” structure that is intrinsic in historical data. By taking into account idiosyncratic effects and the unbalanced nature of corpus data, especially deriving from the inclusion of corpora with very different sizes, predicted probabilities which result from a mixed-effects logistic regression offer a more reliable representation of the overall data structure than, for example, raw percentages. Since the variation under investigation is diachronic, time needs to be included in the analysis as an independent variable. I have discussed different ways in which this can be done and presented the approach to periodisation that I want to pursue in the present work, namely VNC. Thus before proceeding with the regression analysis of the data, I divide the period under investigation (ca. 1400 bis 2016)

in data-driven stages or VNC periods. The identified VNC periods will serve as the levels of my independent variable Time. The combination of the VNC periodisation approach and mixed-effect logistic regression allows not only to test whether significant changes happen over time but also to get a more fine-grained picture of the development, by identifying at which moments in time things change, without the risks of adopting *a priori* stages, as discussed above. To conclude, it should be noted that one of the problems, and probably one of the reasons statistical methods are not applied often in historical linguistics, is the scarcity of data and hence the low chances of getting any significant results anyways. However, when looking at very large data sets as the one in the present study, including different time stages and a variety of text types, statistical analysis is not only possible but also extremely valuable.

5

Tracing the change: matrix verbs, infinitive types and the emergence of word order regularities

The present chapter is concerned with the description of the diachronic distribution of infinitival complements' word order patterns and aims at tracing the emergence of the regularities between word order patterns and type of matrix verb observed in PDG. As illustrated in Chapter 3, in PDG raising verbs obligatorily yield a mono-clausal clustering construal, hence the embedded infinitive does not project a separate clausal domain and is obligatorily intraposed. Control verbs on the other hand, can always embed a clausal infinitive and although clausal infinitives are allowed in intraposed position in German, they are predominantly extraposed. Previous studies have shown that this type of dichotomy did not exist in older stages of German, at least not until ENHG, since verbs obligatorily yielding mono-clausal construals, hence obligatorily requiring intraposition in PDG are still found with extraposed infinitives or in third construction patterns (Demske, 2008, Demske, 2015, Maché and Abraham, 2011). The latter observation further suggests that clustering constructions as a structural option did not exist in ENHG but only emerged later. Demske (2015) advances the hypothesis that these emerge as a consequence of the increase of intraposition observed in late ENHG, which in turn is due to structural changes affecting basic word order in German more generally. What is not clear however, is when intraposition, and hence clustering, became obligatory with raising verbs and what the development path of con-

trol verbs' infinitival complements has been, since Demske (2015) claims that the increase of intraposition in ENHG affects raising and control verbs alike, but control verbs ended up preferring extraposition in PDG.

The present chapter addresses these questions by means of a corpus study investigating the word order distribution of both raising and control verbs' infinitival complements and is organised as follows: section 5.1 illustrates the criteria and the process of data collection. Section 5.2 is concerned with the time course of the development and reports the results of a quantitative analysis of the corpus data. The second part of the chapter contains two sections each dedicated to one group of matrix verbs separately. Both sections provide a qualitative evaluation of the constructions other than intraposition attested in the diachronic corpus study as well as of diagnostic constructions in order to establish if they show any unambiguous evidence for mono- or bi-clausal behaviour, hence whether these matrix verbs have undergone change concerning their selection properties. 5.3 is dedicated to the group of raising verbs, while 5.4 examines the group of control verbs.

5.1 Data collection

Based on the dichotomy observed in PDG between raising and control verbs the present study investigates infinitival complements of both raising and control verbs for their word order preferences. For the first group, the investigation is based on the verbs *scheinen* 'seem', *pfliegen* 'to be in the habit of' and the verbs *drohen*₂ 'threaten' and *versprechen*₂ 'promise' in their raising variant¹. It is to be noted that the term raising is used here merely as a label to indicate this group of verbs embedding a *zu*-infinitive that are not fully lexical but express functional meaning to some extent and do not theta mark their subject. It is thus not intended to imply a subject-to-subject movement operation (see Chapter 3). Due to these characteristics, these verbs are also referred to as semi-modals (e.g. Colomo, 2011, Reis, 2005, Reis, 2007, Eisen-

¹For verbs with both a raising and a control variant I use the index ₂ for the raising variant and the index ₁ for the control variant.

berg, 2013, Gunkel, 2000), modality verbs (Askedal, 1997) or semi-auxiliaries (e.g. Diewald and Stathi, 2019, Diewald and Smirnova, 2010) in the literature. While some approaches subsume all verbs under an epistemic modality semantics (Gunkel, 2000) or evidentiality (Eisenberg, 2013, Diewald and Smirnova, 2010) other consider *versprechen*₂ ‘promise’ and *drohen*₂ ‘threaten’ to express temporal-aspectual meaning (Reis, 2005, Jędrzejowski, 2017). The exact semantics of these verbs is not of crucial importance for the present study, but in order to conduct a diachronic study their emergence is.

For all four verbs it is assumed that the raising variant has evolved from the full verb variant through a process of grammaticalisation, in which the semantics of the full verb was gradually bleached and finally evolved into the semi-modal variant². Work by Diewald and Stathi (2019), Diewald and Smirnova (2010) has shown that the functional variant of *scheinen* ‘seem’ starts emerging already in MHG but it is starting from ENHG that is it also found with *zu*-infinitives. Jędrzejowski (2021) reports attestations of *pflügen* ‘be in the habit of’ with *zu*-infinitives already in MHG and considers the functional variant to have grammaticalised by then. For these two verbs it should therefore be possible to retrieve instances with an embedded infinitive from the earliest period. The situation is a bit more problematic for *drohen*₂ ‘threaten’ and *versprechen*₂ ‘promise’ since their development in the epistemic form is dated later. While the functional variant is attested already in ENHG with DP objects, *versprechen*₂ ‘promise’ and *drohen*₂ ‘threaten’ are attested with infinitives only starting from the 18th century (Jędrzejowski, 2017, Diewald and Smirnova, 2010). Thus, for the older stages, the investigation will have to rest on the verbs *scheinen* ‘seem’ and *pflügen* ‘be in the habit of’ only, while *drohen*₂ ‘threaten’ and *versprechen*₂ ‘promise’ will be included in the analysis of the later periods.

The investigation does not exclude those examples from the ENHG data *a priori*, however, since the search queries target infinitives and not individual matrix verbs. In the resources that include a POS level of annotation – Baum-

²But see Jędrzejowski (2017) for a view in which no semantic bleaching is involved in this grammaticalisation process, rather the meaning of functional verbs is taken to be more complex than that of lexical verbs.

bank.UP, Mercurius Treebank, DTA – this can be addressed by searching for the tags “PTKZU” (which finds exactly the infinitival marker *zu*) or “VVIZU” (which finds separable verbs where the infinitival marker *zu* is contained in the verb, e.g. *auf-zu-stehen*). Texts that do not contain any levels of annotation were searched for the string “zu” and its possible orthographic variants. The search thus targets all *zu*-infinitives, including those selected by control verbs³. In the 20th and 21st century corpora the search was restricted to the four raising verbs and nine control verbs due to the much larger size of the corpora and consequently of the available data. The latter include the propositional and factive control verbs *ankündigen* ‘announce’ and *bedauern* ‘regret’, two accusative object control verbs *bitten* ‘ask’ and *zwingen* ‘force’, the subject control verbs *beschließen* ‘decide’ and *versuchen* ‘try’ and three dative control verbs, *empfehlen* ‘recommand’, *verbieten* ‘forbid’, *versprechen* ‘promise’. POS-annotated resources (DWDS Kernkorpus, DWDS Kernkorpus 21 and Twitter) were searched using the tag “PTKZU” or “VVIZU” plus the selected verbs, while the IDS corpus was searched for the lemma corresponding to each of the matrix verbs.

For each corpus, hits were filtered manually to include only cases in which the infinitival complements occur in sentences with a closed sentence bracket, that is either verb final subordinate clauses (1) or main clauses with a full sentence bracket (2).

- (1) ... daß irgendwer versucht, sie zu erreichen
 ... that someone tries her to reach
 ‘that someone tries to reach her’ (2000, Spione 93)
- (2) Man muß versuchen, glücklich zu sein
 one must try happy to be
 ‘one must try to be happy’ (2001, Arbogast 163)

³Not included in the analysis were items where the selecting verb was either an aspectual verb (*anfangen* ‘start’, *aufhören* ‘stop’, *anheben* ‘start’, *beginnen* ‘begin’), or the control verb *wissen*. As to aspectual verbs, their status concerning the classification in raising or control verbs and consequently their coherence properties, are still highly debated (Gunkel, 2000, Wurmbrand, 2001), whereas *wissen* ‘know’ represents a special case of a control verb showing obligatorily coherent properties (Reis, 2001).

The manual analysis further excluded ambiguous cases such as for example those in which the matrix predicate is in the so-called stative passive (3-b), which is ambiguous between a verbal and adjectival predicate (cf. Rapp, 1996).

- (3) a. dass er gezwungen wurde, den Raum zu verlassen
 that he forced became, the room to leave
- b. dass er gezwungen ist, den Raum zu verlassen
 that he forced is, the room to leave

Table 5.1: Subclasses of control verbs included in the corpus study

Control	Example verb
Subject	<i>versuchen</i> 'try', <i>begehren</i> 'desire'
Dative object	<i>empfehlen</i> 'recommand', <i>erlauben</i> 'allow'
Accusative object	<i>bitten</i> 'ask', <i>nötigen</i> 'force'

The remaining data were stored in an SQL database and were annotated both with metadata including the text in which they were found, the year in which the text was written and the genre of the text as well as with linguistic information such as the matrix verb lexeme, the type of matrix verb (raising or control), the control property of the verb for the latter type, as in Table 5.1 and the position of the infinitival complement, with following options:

- (4) **Intraposition**
 Wenn ich [mit Daniela zu sprechen] versuchte
 When I with Daniela to speak tried
 'When I tried to speak with Daniela' (2000, Sartoris 134)

- (5) **Extraposition**
 wenn er noch einmal versuchte, [sie zu befreien]
 if he once again tried her to free
 'if he tried once again to free her' (2003, Tintenherz 510)

- (6) **Third construction**
 Auch nachdem mein Vater [mir] versucht hatte [zu erklären]
 Also after my father me.DAT tried had to explain
 'Also after my father tried to explain to me'
 (2003, Hochzeitsvorbereitungen 153)

In addition, the intraposition cases were further annotated as coherent or incoherent, if they showed disambiguating properties such as pronoun fronting (7) or relative clause pied piping (8).

(7) **Intraposition Coherent**

wie [ihn] Ernst Nolte 1963 [zu etablieren] versuchte
as it.ACC Erst Nolte 1963 to establish tried
'as Erst Nolte tried to establish it in 1963' (2016, Z16/SEP.00736)

(8) **Intraposition Incoherent**

Heimat ist ein Begriff, [den anzuwenden] man nur erfahrenen
home is a term which to-use one only experienced
Praktikern der Chaos Theorie empfehlen sollte
practitioners.DAT the.GEN chaos-theory recommend shall
'Home is a term that should only be used by experienced practitioners
of chaos theory' (2016, Z16/NOV.00650)

5.2 Intraposition over time: a quantitative analysis

The aim of this section is to provide quantitative corpus evidence that illustrates word order changes for both raising and control verb constructions. In particular, it aims first at testing whether Demske's (2015) observation according to which intraposed infinitives increase towards the end of ENHG can be confirmed and whether it affects both raising and control verbs alike. Second, it seeks to identify when intraposition became obligatory for raising verbs, thus providing the necessary condition for cluster formation, according to Demske (2015), and how word order variation has developed for control verbs.

These questions are addressed from a quantitative perspective, analysing the corpus data by means of mixed-effects logistic regression with the choice of intraposition as the dependent variable. In order to do so, the extracted data was coded in a binary fashion, that is collapsing together data that was annotated as either extraposition or third construction as non-intraposed. Also, the presence of disambiguating patterns annotated as intraposition coherent or intraposition incoherent did not play a role at this stage. These latter two conditions were collapsed together with the ambiguous intraposition cases. Since

the focus of the study is on the diachronic dimension, Time needs to be included in the analysis as a predictor. Since we are also interested in the difference between raising verbs and control verbs, Verb Type is also included in the statistical analysis as a predictor, as well as the interaction between the two. Including the interaction between Time and Verb Type will allow us to find out whether the two groups behave differently over time, while main effects for the two factors will reveal respectively whether the probability of finding intraposition in the corpus changes as a function of time, for both verb groups together (main effect of Time), and whether the probability of intraposition in the corpus changes as a function of the matrix verb, averaging all time periods (main effect of Verb Type). While the main effect of Time is relevant for our research questions, the main effect of Verb Type is only marginally interesting and will not be discussed further in the results.

As to the types of predictors, while Verb Type is clearly categorical (raising vs. control), there are different options as to how to code the variable Time. As it was shown in section 4.2.3, one possibility is to treat Time continuously and thus model the outcome on the single year of composition. The information that we would gather from such an analysis, therefore from a positive or negative estimate, is that intraposition is increasing or decreasing over time with no specific reference to a point in time. However, since I want to test hypothesis about different time periods as well as to identify specific points in time, I want to treat time as a categorical variable. For the reasons illustrated in 4.2.3, I do so by identifying data-driven time periods, instead of using historical stages of the language or determining time periods *a priori*. Indeed, Demske (2015) suggests that ENHG does not behave homogeneously throughout the period as regards infinitival complements, and that some changes can be observed towards the end of ENHG. Using historical stages as the levels of the categorical factor Time would not allow to test for Demske's (2015) hypothesis, while determining time windows *a priori* would mean running the risk of missing out the relevant period for the change. Thus the VNC analysis seems like the most appropriate approach. By assessing the similarities between neighbour data points and merging them into clusters if they behave similarly, VNC will

give us an overview of different stages of the development that can be used as the levels of the categorical variable Time in the regression analysis. The VNC analysis to determine these data-driven periods is reported in the next section.

As outlined in section 4.2, one of the advantages of analysing corpus data by means of mixed-effect logistic regression is the possibility to level out, by including the so-called random effects, some of the problems that can arise when working with a corpus composed of different-sized subparts, where the number of observations differs for each level of the investigated factors and possible idiosyncratic effects can distort the overview on the development. For the present data, next to the effect of the fixed factors of interest, namely Verb Type and Time and their interaction, three random effects were identified: the lexically specific effect for Verb, and the effects for Text and Genre. Including random effects allows the model to account for any idiosyncratic effect deriving from any of these group level factors, e.g. the singular behaviour of a particular verb, a particular text or genre with regards to the usage of intraposition, and thus to derive the overall trend in the data, without being misled from individual deviations. As discussed in section 4.2, including random effects does not necessarily improve the statistical model. Whether all three random effects should be included in the analysis of the present data set will be discussed in section 5.2.3.

5.2.1 Variability-based Neighbour Clustering analysis

Before proceeding to test the role of the matrix verb in infinitive placement by means of mixed-effects logistic regression, a VNC analysis was conducted in order to establish a data-driven periodisation for the phenomenon under investigation. The stages identified by the VNC analysis are used as the level of the independent variable Time in the regression analysis. Using categorical time stages instead of testing time as a continuous variable, has the advantage of providing more fine-grained information on how the type of matrix verb interacts with time, as pointed out in the previous section. In particular, given Demske's (2015) observation about the increase of intraposition in the course of

ENHG, the VNC analysis is particularly valuable to identify whether such an increase is also observable in the present data and if yes, at what point in time during the ENHG period this increase can be placed. Whether such an increase is statistically significant will be determined in the regression analysis. As a first step of the data analysis I therefore conducted a VNC analysis using the `vnc` function (Gries and Hilpert, 2008) in R (version 3.5.1, R Core Team, 2021), evaluating the distribution of intraposed infinitives (against extraposition and third construction) for each given year⁴. Note that in the VNC analysis raising and control verbs are considered together, in order to evaluate the overall distribution of intraposition over time. The VNC algorithm iteratively merges together neighbour years that show similar distribution of intraposition into clusters. In addition to providing data-driven stages for the phenomenon under investigation, VNC also serves as an objective tool for the identification of outliers. Data from a given year are considered to be outliers when they build a cluster of their own. This happens when they deviate from the behaviour of the neighbour data points. The first analysis led to the identification of one outlier, as shown by the dendrogram in Figure 5.1. For the year 1990, no intraposition observations are attested, which represents an atypical value compared to that of its neighbours, thus the data points from this year are not merged with those of the neighbour years and result in a cluster of their own.

⁴Years are shown as grouped by decades in the dendrogram for ease of exposition, since there were mostly not more than one year per decade available. Note in addition that not all decades are covered, since observations for those decades are missing.

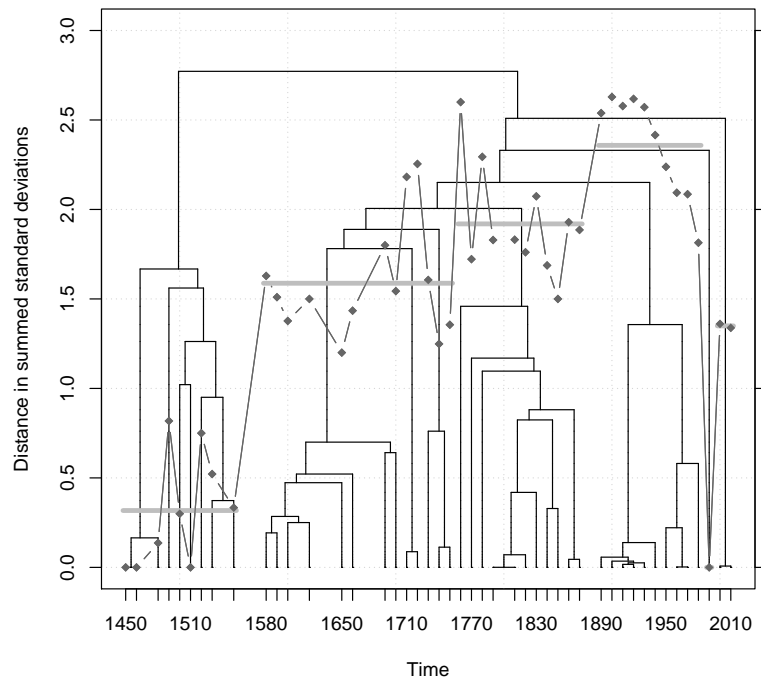


Figure 5.1: First VNC dendrogram for the mean intraposition rate for German infinitival complements

A second VNC analysis was run without the data points for the year 1990 and revealed a five-cluster solution (cf. Figure 5.2). The first cluster includes data until 1550 and is characterised by a low rate of intraposition. An increase of intraposition can be observed in the second cluster, which goes from 1580 till 1750. A further increase is shown in the following two clusters going respectively from 1760 to 1870 and from 1890 to 1980, while the last period, which comprehends the youngest decades, from 2000 to 2016 is characterised by a decrease of intraposed infinitives. The identified VNC periods are summarised in Table 5.2.

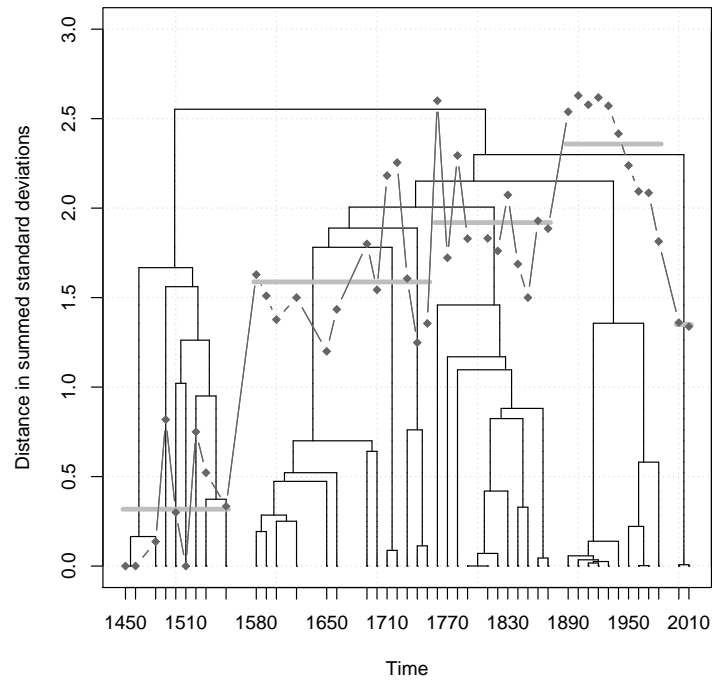


Figure 5.2: Second VNC dendrogram for the mean intraposition rate for German infinitival complements (outlier removed)

Table 5.2: Time periods identified by VNC

VNC period 1	VNC period 2	VNC period 3	VNC period 4	VNC period 5
1450–1550	1580–1750	1760–1870	1890–1980	2000–2016

The results of the VNC analysis provide a first indication of the pattern followed by intraposition over time: the increase from period 1 to period 2, as well as the cutoff point between the two (around 1550) are in line with Demske’s (2015) proposal according to which a change starts in late ENHG. The fact that period two goes until around 1750 further supports her hypothesis that the change is fully completed only after the end of the ENHG. Note however, that the diachronic distribution of intraposition shown by the VNC analysis is only indicative at this point, since it does not take into account aspects of the data that will be controlled for in the regression analysis and most importantly, does not reveal if raising and control verbs behave alike or differ with respect to intraposed infinitives. By analysing the data by means of mixed-effects logistic

regression, it will be possible to establish whether the differences between the identified periods are significant, as well as what the role of the matrix verb over time is.

5.2.2 Expected outcomes

Once the levels of the predictor Time were identified, the regression model can be fit to address the research questions outlined above. The VNC analysis already revealed that ENHG does not behave homogeneously but that two phases can be distinguished. A first one, corresponding approximately to the first half (until around 1550) in which the relative frequency of intraposition in the corpus is rather low, and a second phase, characterised by an increase of intraposed infinitives, as already suggested by Demske (2015). What we want to know at this point is firstly, whether this increase is significant, and secondly if it affects both raising and control verbs or is driven by one group only. In order to answer the first question we will have to look at whether a significant main effect of Time between period 1 and period 2 can be found. As to the second question, the comparisons of interest are whether a difference between raising and control verbs can be found in period 1 and period 2 respectively, and whether Verb Type interacts with Time between period 1 and period 2. In order for Demske's (2015) observations to be confirmed, what we should find is a significant effect of Time between period 1 and period 2 with a positive estimate, indicating that the probability of intraposition increases significantly from period 1 to period 2 and the lack of an interaction between Time and Verb Type, indicating that the raising and control verbs both show a similar increase of intraposed infinitives. The comparison between the two groups in each time period will further reveal whether they show a significantly different behaviour already in ENHG. The second aim of the present study is to identify at which point in time intraposition becomes obligatory for raising verbs and what the development for control verbs looks like, in other words, when the PDG dichotomy emerged in the history of German. What is already known from previous literature and should be confirmed in the present study is that

raising and control verbs show opposite behaviour with respect to intraposition in PDG: while this is required with raising verbs, control verbs strongly disprefer this pattern. Thus a significant difference between the two groups should be found in period 5, which corresponds to the youngest data. From when this difference appear remains and open question that will be revealed by the interaction data.

5.2.3 Model selection

As mentioned above it is not always necessary to include random effects in the statistical analysis because these may not account for the variation after all. Whether they do, and hence whether they improve the fit of the model, is determined in the model selection process. Following Gries (2015), the appropriate model for the present data was determined by stepwise model comparison. In the first step, the optimal random-effects structure was determined. Starting from the maximal random-effects structure, that is with the model including all random effects, next to the fixed effects, and successively removing one random-effect at a time, the model that best fits the data was determined using the anova function (see Gries, 2015 for a discussion on this aspect). From this process it emerged that the optimal model structure should include all three random effects: Verb, Text and Genre⁵.

The same process can then be applied to the fixed effects, the predictors of interest. In the present case, having only two of them plus their interaction the only way the model can be made simpler is by deleting the interaction and asses whether the model without interaction explains the data better (cf. Gries, 2015). According to model comparison through the anova function this is not the case, so the interaction can be left in the model. This is not surprising given that we predict that there is indeed an interaction between the two factors, that is, that there is a change across time in the relation between the behaviour of infinitival complements selected by a raising verb and those selected by a control verb. To recapitulate, the model included the fixed effects Verb Type, Time (VNC

⁵The final model also obtained the smallest AIC value, which is another indicator for a better fit (cf. Gries, 2013; Gries, 2015)

Period) and their interaction and the random effects Verb, Text and Genre.

The comparisons of interest were obtained by employing contrast coding and by releveling factors and refitting the model: for the predictor Time repeated contrasts were computed, in order to compare how each time period behaves compared to next one (Schad et al., 2018). Sum contrasts were computed from the generalised inverse function (Schad et al., 2018) for the predictor Verb Type so that the effects would be showed as main effects, while default treatment contrasts were used to test for the differences between raising and control in each Time period. In the following section, only results relevant for the discussion, and their respective line of the model output, will be presented. Tables with the full model outputs are provided in the Appendix.

5.2.4 Results

Figure 5.3 illustrates the estimated probability of intraposition of the infinitival complement as predicted by the model for the two factors under investigation, namely the time period and the type of matrix verb. As the figure shows, the intraposition rate is quite low for both verb types in the first period, while it increases in the second period. After period 2, intraposition continues increasing for raising verbs but starts decreasing for control verbs. This image confirms our expectations with regards to the emergence of a dichotomous distribution after the end of ENHG. Let us now look at the results from the statistical analyses and focus on the older periods first.

The aim of the analysis was to test whether there is a significant increase from period 1 (first half of ENHG) to period 2 (approx. second half of ENHG). This increase is significant ($\beta=2.9350$, $SE=0.6149$, $p<0.001$). The positive estimate (β) indicates that the probability of finding intraposition in period 2 is higher than in period 1, and the p-value reveals that this difference is significant. Also, raising verbs were not found to yield significantly more intraposition than control verbs in period 1 ($\beta= -1.2549$, $SE=1.1236$, $p=0.264065$) and period 2 ($\beta= -0.1639$, $SE=0.6866$, $p=0.811293$) – the estimates are negative, but the p-values indicate that no significant difference could be found for either

of the two time periods. In addition, the higher standard error (SE) for period 1 suggests that this period is characterised by a high degree of variability. Furthermore, no significant interaction between the two predictors Verb Type and Time period was found for the first two periods ($\beta=1.0909$, $SE=1.1184$, $p=0.329373$), indicating that the effect of the matrix verb, or in this case the lack thereof, remained stable between the first two periods. These results confirm the first hypothesis.

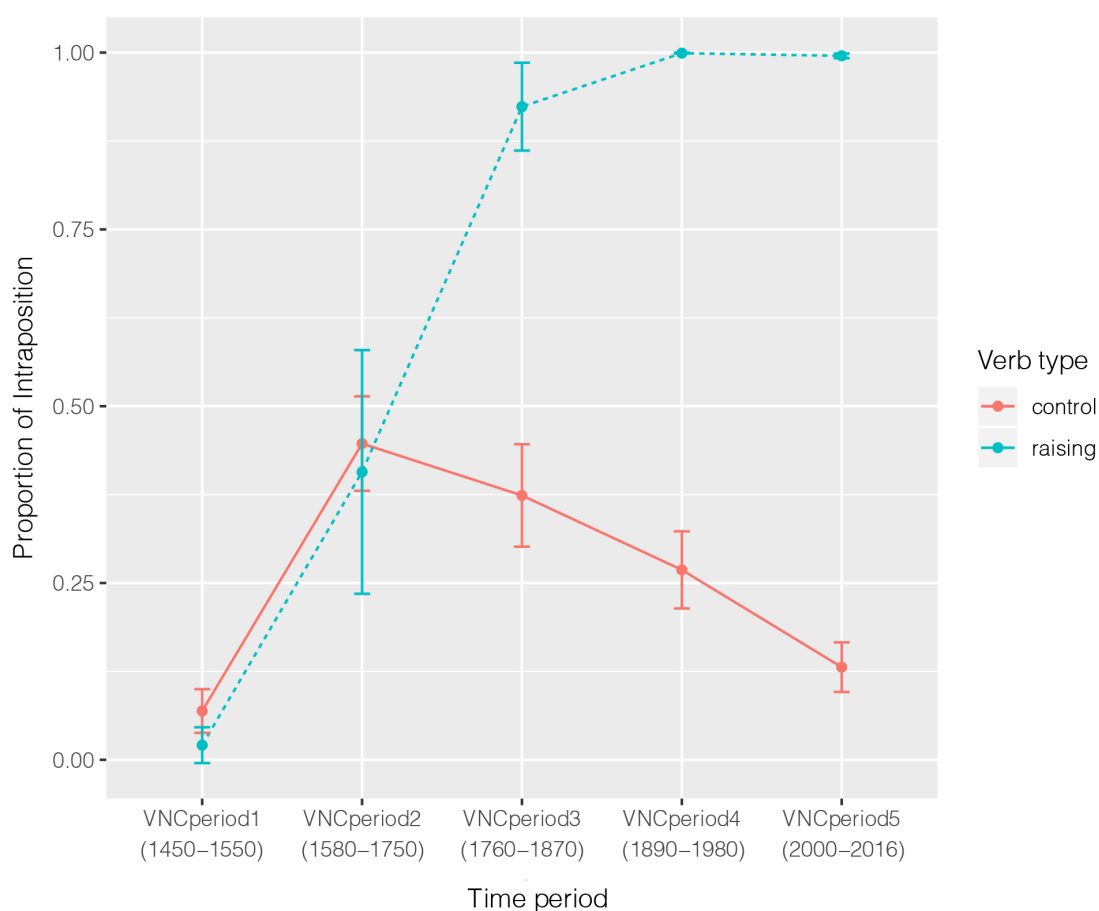


Figure 5.3: Interaction plot for predictors Verb Type and Time period (Probability of intraposition as predicted by model results)

Looking at the results after the first two periods, main effects of Time reveal that, overall, intraposition continues to increase significantly from each period to the next, with the exception of VNC period 5, when it decreases again (period 3 vs period 2: $\beta=1.2821$, $SE=0.3827$, $p<0.001$; period 4 vs period 3 $\beta=2.1061$, $SE=0.4541$, $p<0.001$; period 5 vs period 4 $\beta= -1.3483$, $SE=0.3189$, $p<0.001$). This

confirms that the stages identified by the VNC analysis are significantly different from each other. However, a significant interaction of VNC period with Verb Type was found from period 2 to period 3 ($\beta=3.1714$, $SE=0.6313$, $p<0.001$) and from period 3 to period 4 ($\beta=5.1845$, $SE=0.8305$, $p<0.001$), revealing that this increase does not affect raising verbs and control verbs alike. In fact, as was already shown in Figure 5.3, while intraposition for raising verbs increases with time passing, the rate of intraposition for control verbs rather shows a decreasing tendency starting from period 3, although this decrease is only significant from period 4 to period 5 ($\beta=-0.8904$, $SE=0.1886$, $p<0.001$). Note also the small standard error, indicating that the data points for control verbs behave quite homogeneously in the last period. Accordingly, looking at the comparison between raising and control verbs in each period reveals that starting from period 3 up to period 5, raising verbs yield significantly more intraposed infinitival complements than control verbs in each period (period 3: $\beta=3.0076$, $SE=0.8313$, $p<0.001$; period 4: $\beta=8.1918$, $SE=0.8227$, $p<0.001$, period 5: $\beta=7.2760$, $SE=0.7105$, $p<0.001$). As the estimates show, the difference between the two verb groups is bigger in period 4 and 5 than in period 3, as also confirmed by the significant interaction from period 3 to period 4. The second part of our hypothesis is also confirmed: in the youngest period raising and control verbs yield significantly different proportions of intraposition. This difference is found also in period 4 and period 3, although it is smaller in period 3.

For completeness, a final remark on the random effects. As already discussed, specifying random effects in the model allows the analysis to account for group-level variability, for example for the particular behaviour of a verb or a text. The results discussed above are already adjusted to generalise over the variability deriving from these factors but looking at the summary of random effects we can have an idea of where the most variability is located (Gries, 2015). Table 5.3 shows that, in our dataset, the largest variance is found within the group Verb, as indicated by the largest values for Variance and Standard Deviation, followed by Text and finally Genre. This indicates that individual verbs behave heterogeneously with respect to their word order preferences, but

that such group level variability is also found in individual texts and genres.

Table 5.3: Random effects' summary

Group	Variance	Standard Deviation
Verb	1.8418	1.3571
Text	0.6091	0.7805
Genre	0.1287	0.3588

5.2.5 Summary and discussion

Summing up, the present data confirms that while raising and control verbs behave differently as to intraposition of the infinitive in PDG, the type of matrix verb was not a decisive predictor in determining word order preferences in older German, at least not until after the end of ENHG. Instead, a significant increase of intraposed infinitival complements was found after 1550 for both verb types, confirming Demske's (2015) observation. Still, both verb groups show variability as to the linearisation of the infinitive, as intraposition is predicted to occur only in 50% of the cases in period 2, i.e. between 1550 and 1750. It is from around 1750 that raising and control verbs show significant differences regarding intraposition: around this date, the predicted rate of intraposition for raising verbs already approaches 100%, while it starts showing a decreasing trend for control verbs, giving rise to the emergence of the PDG dichotomy. A significant decrease of intraposition for control verbs was found from period 4 to period 5. In the last period, hence in PDG, control verbs only show a low predicted probability of intraposition (around 10%), a result that confirms what has been observed in previous literature on PDG infinitival complements. As mentioned in previous chapters, the fact that a correlation between type of matrix verb and word order pattern did not exist in older German, and the fact that the two groups of matrix verbs did not behave differently in previous stages of the language, raises the question as to whether they were already restricted as to the infinitive type they select or whether their selection properties have changed. In order to answer this question, the two groups are analysed sepa-

rately in the rest of the chapter. Section 5.3 is dedicated to the group of raising verbs, and 5.4 analyses control verbs.

5.3 Raising verbs

The previous section presented quantitative evidence for the fact that the restriction according to which raising structures only occur with intraposed infinitives in PDG did not hold in previous stages of German, at least not until around 1750. It is only from this period on that raising verbs combine (almost) exclusively with intraposed infinitives. In the present section the group of raising verbs is analysed separately. I present a qualitative investigation of the patterns other than intraposition that are attested with raising structures across the investigated time periods and address the question of whether raising verbs yield mono-clausal structures throughout the history of German or whether the variable word order behaviour is indicative of a change in infinitive type selection, that is, whether raising verbs could select clausal infinitives in older German. Building on the assumption that raising verbs yield clustering configuration in PDG, as discussed in Chapter 3, I will additionally discuss the question of how and when this structural option emerged in the history of German.

The group of raising verbs investigated includes *scheinen* ‘seem’, *pflügen* ‘be in the habit of’, *versprechen₂* ‘promise’, and *drohen₂* ‘threaten’. While *scheinen* ‘seem’ and *pflügen* ‘be in the habit of’ are attested already in ENHG, however, the verbs *versprechen₂* ‘promise’ and *drohen₂* ‘threaten’ with an infinitival complement are only attested from period 4 onwards in the corpus.

5.3.1 Word order patterns from ENHG to PDG

Up until 1750, the raising verbs *scheinen* ‘seem’ and *pflügen* ‘be in the habit of’ show considerable variation as to the linearisation of their infinitival complement. Next to intraposition (9), which is still poorly attested in the early period (1450-1550), other patterns can be observed in the data.

- (9) a. als he zo vorens [zo doin] plach.
 as he before to do was.in.the.habit.of
 ‘as he used to do before’

(1499, 153JK 11v.13)

- b. wie die Becken vnd Müller bey vns [zuo thon]
 how the bakers and millers among us to do
pflegen.
 are in the habit of
 ‘how the bakers and millers are in the habit of doing’

(1582, Rauw s196)

In cases where the infinitival complement consists of the non-finite verb and a further object, it can either be fully placed at the right of the matrix verb as in (10), that is in the extraposition pattern, or can appear in the third construction pattern, with part of the complement preceding the matrix verb and part following it. (11) exemplifies different configurations that fall under the third construction pattern. In (11-a) only the infinitive *zu thun* ‘to make’ follows the finite verb *pflegen* ‘be in the habit of’, while the direct object of the infinitive *Würst* ‘sausage’ is pre-verbal. (11-b) shows a similar configuration, with the embedded direct object in pre-verbal position and the infinitive in post-verbal position, but other non-verbal material is placed between the finite verb and the extraposed infinitive. Similarly, in (11-c) and (11-d) the infinitive is extraposed together with other non-verbal material but elements dependent on it are also found in pre-verbal position, in these cases a prepositional object.

- (10) die sie sunst pflegen [in das Wasser zu fieren].
 that they otherwise are.in.the.habit in the water to put
 ‘that they otherwise are in the habit of putting in the water’

(1515, Ulenspiegel 46)

- (11) a. als man [Würst] pfleget [zu thun]
 how one sausage is.in.the.habit.of to do
 ‘how sausages are usually made’

(1515, Ulenspiegel 37)

- b. Wie dann Christus [seine Wort vnnnd Predigen] gemeinlich
 as then Christ his words and sermons usually

pfl egte [mit Wunderwercken zu bekraefftigen]
 was.in.the.habit.of with miracles to strengthen
 ‘as then Christ used to strengthen his words and sermons with mir-
 acles’

(1650, Faber s802)

- c. wie dann immittels seine Reuterey auff dem Land [mit
 how then meanwhile his cavalry on the countryside with
 Rauben und Plündern] scheinen [einen Ahnfang zu machen].
 robberies and plundering seem a start to make
 ‘as then meanwhile his cavalry seems to be starting with robberies
 and plunderings on the countryside’

(1667, PZ 78.33)

- d. daß die Tartarn [ohne Raub] nit pfl egten [auß
 that the Tartars without robbery not were.in.the.habit.of from
 frembden Ländern zu gehen]
 foreign lands to go
 ‘that the Tartars were not in the habit of leaving foreign lands with-
 out robbery.’

(1667, PZ 186.22)

Furthermore, when the infinitival complement consists only of the non-finite verb, without further arguments, this can directly follow the matrix verb as in (12). I label this pattern as extraposition adjacent.

- (12) als man zu der Zeit pflag [zu tragen].
 how one at the time was.in.the.habit.of to wear
 ‘how people used to wear it at the time’

(1515, Ulenspiegel 67)

Starting from 1750, intraposition establishes itself as the default pattern with raising verbs, while alternative variants occur only sparsely. Isolated examples of non-intraposed infinitives are still attested in period 3 (1760-1870) with the verb *pfl egen* ‘be in the habit of’. In (13) the infinitive entirely follows the matrix verb and (14) represent a third construction pattern, where only the non-finite verbs are post-verbal.

- (13) wie man pfleget bey der Zubereitung zum Kohl-Gewächsen zu
 as one is.in.the.habit in the preparation to cabbage-plants to
 verfahren
 procede
 ‘as is customary in the preparation of cabbage plants’

(1765, Reichardt 27)

- (14) Das letzte, wie sorgfältig auch [darüber] pfllegt
 the latter, however carefully also thereon is.in.the.habit.
 [gehalten zu werden], ist kein eigentlicher Gegenstand des
 hold to be is no proper subject the.GEN
 Völkerrechtes
 international law
 ‘The latter, however carefully one is in the habit of observing it, is not
 a proper subject of international law.’

(1821, Klüber 154)

In period 4 (1890-1980) and period 5 (2000-2016) the verbs *scheinen* ‘seem’ and *pfliegen* ‘be in the habit of’ are consistently attested with intraposed infinitives, while cases of non-intraposed infinitival complements occur only with the verbs *drohen*₂ ‘threaten’ and *versprechen*₂ ‘promise’, see (15), where the infinitive is attested post-verbally although the sentences are typical raising contexts. (15-a) and (15-c) exhibit inanimate, non-agentive subjects and the embedded verbs denote unintentional events, which are the typical properties of the raising variant of *drohen* ‘threaten’ and *versprechen* ‘promise’ (cf. Gunkel, 2000). In (15-b), although the subject denotes an animate, potentially agentive entity, both the embedded verb, which is again an unintentional event, and the context suggest the temporal-aspectual reading, thus the presence of the raising variant of *drohen* ‘threaten’.

- (15) a. wie die Felsen in einer nordischen Landschaft, die ständig
 like the rocks in a nordic landscape that constantly
droht, [in Düsternis zu versinken]
 threatens in gloom to sink
 ‘Like the rocks in a Nordic landscape that constantly threatens to
 sink into gloom’

(2016, DeReKo U16/JUN.03278, S. 11)

- b. Füreinander da sein heißt, den anderen aufzufangen, wenn
 For.each.other there be means the other to-catch, when
 er droht [zu fallen].
 he threatens to fall
 To be there for each other means to catch the other when they are
 about to fall.

(2013, Twitter ID97607259)

- c. Da es verspricht [ein echt schönes Frühlingswochenende zu
 As it promises a really nice spring.weekend to
 werden]
 become
 'As it promises to be a really nice spring weekend'

(2013, Twitter ID150855424)

It is to be noted, however, that at least for some of the attested examples of non-intraposed infinitives with the verb *versprechen* 'promise', the sentences are ambiguous between the raising and the control reading. The inanimate subject *eine Gentherapie* 'a gene therapy' in (16-a) initially suggests a raising reading, however a closer look reveals the ambiguity. On the one hand, (16-a) can denote a situation in which first results of the therapy on patients with an inherited metabolic disease have been positive, i.e. *versprechen* 'promise' is used in its temporal-aspectual sense, thus in the raising variant. On the other hand, the subject *eine Gentherapie* 'a gene therapy' could be used metonymically to indicate those developing, promoting or selling the therapy who have actually promised in a given occasion to help the patients in question, thus *versprechen* 'promise' would be used in the control variant. In the latter case the post-verbal position of the infinitival complement would not represent an exceptional case (see also Reis, 2005, footnote 7, for a similar remark). A similar ambiguity is present in (16-b), where again (the referent of) the subject of the verb *versprechen* 'promise' could instead indicate actual human beings that are part of the institution and who as such can literally carry out the action of promising.

- (16) a. [...] eine Gentherapie, die verspricht, [Patienten zu helfen, die
 a gene.therapy that promises patients to help who

an einer ererbten Stoffwechselerkrankung leiden].
 from an inherited metabolic disease suffer
 ‘The most expensive drug to date is Glybera, a gene therapy that
 promises to help patients suffering from an inherited metabolic
 disease’

(2016, Z16/JAN.00006)

- b. Man sucht darum eine geheime Hightech-Institution auf, die
 One seeks therefore a secret high-tech institution out that
verspricht, [siehe Körper so zu konservieren], dass sie zu einer
 promises sick bodies so to preserve that they at a
 späteren Zeit kuriert weiterleben können.
 later time cured live on can
 ‘They therefore seek out a secret high-tech institution that promises
 to preserve sick bodies so that they can live on cured at a later time.’

(2016, U16/MAI.00200)

These results are not completely unexpected, however. Meurers (2000) and Reis (2005) had already observed that the two verbs constitute an exception among the group of obligatorily coherent raising verbs in that they are also attested with non-intrapped infinitives in PDG. Why this is the case is still a matter of debate. Meurers (2000) suggests that an explanation to the variation still observed in PDG could be the interference of the control variant. In fact, while *scheinen* ‘seem’ and *pflügen* ‘be in the habit of’ do not have an infinitive embedding control counterpart, *drohen*₂ ‘threaten’ and *versprechen*₂ ‘promise’ do and keeping apart the two readings is not always straightforward, as we have seen in (16). An alternative, or perhaps complementary, explanation appeals to the process of grammaticalisation. All verbs considered here are also referred to as semi-auxiliaries (cf. Diewald and Stathi, 2019, Diewald and Smirnova, 2010) or semi-modals (cf. Colomo, 2011, Reis, 2005, Reis, 2007) and have developed a more grammatical meaning (e.g. evidential or temporal-aspectual, see also section 5.1) from a fully lexical one, as is typical in grammaticalisation processes, but *drohen*₂ ‘threaten’, and *versprechen*₂ ‘promise’, have started developing this grammatical meaning only later (see section 5.1). This could

lead to assumption that these two verbs are not fully grammaticalised yet and that relevant word order properties are thus not consolidated. The data presented here support this observation in that *drohen*₂ ‘threaten’ and *versprechen*₂ ‘promise’ plus infinitive are attested in the corpus only in the last two periods (cf. Table 5.4 for a summary of the raw distributions). What does not match with the grammaticalisation account in the present data, however, is that non-intraposited infinitives are attested with *versprechen*₂ ‘promise’ in the last time period, but not in the preceding one, where only intraposited infinitives occur. One would expect the opposite to be true, if an increasing grammaticalisation is assumed for *versprechen*₂ ‘promise’.

Table 5.4: Distribution of word order patterns across time periods.

	Period1 (1450-1550)	Period2 (1580-1750)	Period3 (1760-1870)	Period4 (1890-1980)	Period5 (2000-2016)
<i>pfliegen</i> ‘be in the habit’					
Extraposition	2	15	1	0	0
Extraposition A.	7	19	1	0	0
Intraposition	1	138	64	1536	136
Third Construction	8	26	1	0	0
<i>scheinen</i> ‘seem’					
Extraposition	0	3	0	0	0
Extraposition A.	0	2	0	0	0
Intraposition	0	32	73	2522	1649
Third Construction	0	4	0	0	0
<i>drohen</i> ‘threaten’					
Extraposition	0	0	0	3	16
Extraposition A.	0	0	0	1	2
Intraposition	0	0	0	342	305
Third Construction	0	0	0	0	1
<i>versprechen</i> ‘promise’					
Extraposition	0	0	0	0	9
Extraposition A.	0	0	0	0	0
Intraposition	0	0	0	55	21
Third Construction	0	0	0	0	0

5.3.2 Raising verbs and coherence properties

In view of the observed word order variability, the question arises of whether raising verb constructions can be ascribed to mono-clausal construals throughout the investigated period, even though they do not undergo the same word order restrictions they are subject to in PDG, or whether they have undergone change, in that they could select clausal infinitives in older German but are now restricted to mono-clausal construals. In order to answer this question the observations were searched for unambiguous indicators of syntactic behaviour of the type discussed in Chapter 3. Clause-bound phenomena such as for example pronoun fronting or wide scope of negation are indicative of mono-clausal behaviour and are thus expected to be found throughout the investigated period if raising verbs have always selected non-clausal infinitives. Third construction patterns, which have already been identified in the previous section, also belong to the mono-clausal patterns. Infinitive pied-piping and narrow scope of negation, on the contrary, are indicative of clausal behaviour. The presence of such patterns in older stages of German would thus indicate that raising verbs used to select clausal infinitives in addition to non-clausal infinitives.

Although these diagnostic patterns are widely discussed in the theoretical literature on PDG infinitives and have proved to be reliable indicators of syntactic behaviour in experimental settings (cf. section 3.1.4), they are rare to find in corpus data. Nevertheless, evidence in line with Demske (2008), Demske (2015) and Maché and Abraham (2011) could be observed in the present data as well: diagnostic environments indicating coherent behaviour are attested already starting from ENHG, though sparsely, and thus suggest that raising verbs build a coherent construals with their infinitival complement at least since the ENHG period. Examples of such diagnostic environments are illustrated in (17), which shows observations from the 16th, 17th and 18th century, respectively. Here the scope of negation elements or adverbs is ambiguous and can thus apply both on the matrix verb and on the infinitive, indicating that no clausal boundaries are present and the construction is mono-clausal. This is the case even if part of the infinitive is post-verbal, as in (17-a). Here the in-

finitive *zu regieren* ‘to reign’ follows the matrix verb *pflügen* ‘be in the habit of’, still, the adverb *vil* ‘much’ can take scope on *pflügen* ‘be in the habit of’ and the negation is ambiguous between *pflügen* ‘be in the habit of’ and *regieren* ‘rule’. In (17-b) and (17-c) the infinitive is intraposed but similarly the scopal element is ambiguous between matrix verb and infinitive, as indicated by the respective paraphrases.

- (17) a. da fieng der Sudenwindt / der doch in der zeit jares
 there began the south wind that PRT in that time year.GEN
nit vil pflügt zu regieren / an zu wehen
 NEG much is.in.the.habit.of to reign Prctl to blow
 ‘then the south wind began to blow, which is not in the habit of not
 ruling much in this time of the year’ or
 ‘then the south wind began to blow, which is in the habit of not
 ruling much in this time of the year’

(1557, Staden s322)

- b. daß er [...] **Nichts** zumachen pfleget.
 that he [...] nothing to do is.in.the.habit.of
 ‘that he is in the habit of doing nothing’ or
 ‘that he is not in the habit of doing anything’

(1668, 137SB 68.19)

- c. als welche Persohnen von Qualität und Character einander auf
 as which people of quality and character each.other in
 solchen Fall **niemahls** zu verweigern pflügten.
 this case never to deny used to
 ‘which people of quality and character never used to deny to each
 another’ or
 ‘which people of quality and character used to never deny to each
 other’

(1712, HollstCorr26 4)

Unambiguous coherent patterns are attested in the youngest periods as well and include also cases of pronoun fronting, as shown in (18). In both examples pronominal elements of the embedded infinitives precede the matrix subject in the middle-field, again indicating the absence of clausal boundaries.

- (18) a. daß **sich** das Spiel zu verkehren drohte
 that REFL the game to turn threathens
 ‘that the game was about to turn’

(1933, Werfel 295)

- b. als **es** das Kartellamt und die Monopolkommission
 than it.ACC the Cartel Office and the Monopolies Commission
 gewöhnlich zu tun pflügen.
 usually to do are.in.the.habit
 ‘than the Cartel Office and the Monopolies Commission usually
 do.’

(2016, U16/APR.01100)

No indication of a bi-clausal structure was found for this group of verbs in any of the investigated periods. Although the unambiguous cases are not frequently attested overall, the complete absence of incoherence indicators within the group of raising verbs throughout the investigated period can be considered first evidence for the fact that raising verbs build a coherent construals with their infinitival complement already in older German, or at least since ENHG, based on the present data.

In order to substantiate this claim, the data was compared to a further dataset, that was generated from the same corpus under investigation for the main study. In this second step of data collection, instances of what is typically referred to as verb clusters in the literature were extracted.

5.3.3 Raising verbs and typical verb clusters

Although infinitive embedding raising verbs are also considered to yield clustering configuration in PDG, (cf. Chapter 3), the term verb cluster is often adopted pre-theoretically to indicate sentence-final verb chains and often refers to the types presented in (19) only, that is auxiliary and modal verbs constructions (cf. for example Wurmbrand, 2004c, Schmid and Vogel, 2004, Barbiers, 2005, Sapp, 2011, Durrell, 2019)⁶.

⁶There is of course also work that includes *zu*-infinitives in the discussion, cf. Bader and Schmid (2009b).

- (19) a. dass er das Buch gelesen hat
 that he the book read has
- b. dass er das Buch lesen wird
 that he the book read will
- c. dass er das Buch lesen will
 that he the book read wants

As discussed in section 3.2.3 these constructions have been extensively studied both from an empirical and theoretical perspective and both synchronically and diachronically. In particular, studies have focused on the variation in the linearisation of the verb forms and on the factors determining the variation. As to the syntactic representation of these constructions, even though the accounts differ in many respects among each other (see Wurmbrand, 2017 for an overview), it is without question that these multiple verb constructions belong to one single clausal domain even in older German, where the non-finite verb form could follow the matrix verb.

Based on the widespread assumption that raising verb constructions, i.e. the verbs *scheinen* ‘seem’, *pflegen* ‘be in the habit of’, *drohen*₂ ‘threaten’ and *versprechen*₂ ‘promise’ embedding a *zu*-infinitive, behave syntactically like typical verb clusters in PDG, that is they yield mono-clausal construals, and that typical verb clusters, i.e. auxiliary and modal verb constructions with a participle or a bare infinitive, have always yielded mono-clausal construals in the history of German, the present section aims to show that infinitival constructions with raising verbs and *zu*-infinitives show the same pattern of diachronic variation as typical verb clusters, and thus can be claimed to behave as mono-clausal construals in older stages of the language as well. As was found in previous studies, variable ordering in verb clusters was still present in ENHG but increasingly declined until it disappeared around 1750 (cf. section 3.2.3). In order to compare the diachronic development of the two types of constructions, that is verb clusters in the narrow sense and raising verb constructions, the first were extracted from the corpus under investigation and analysed as to their ordering properties. The search was limited to two-verb clusters. In POS-annotated resources these were retrieved by searching for a combination

of either a finite auxiliary (“VAFIN”) or modal (“VMFIN”) verb and either a participle (“VVPP”) or a bare infinitive form (“VVINF”) in the same sentence. For texts without annotation the observations were retrieved manually. Since, compared to raising verb constructions, verb clusters with auxiliaries and modals are generally much more frequent, the first 150 attestations were selected if a text contained more. The data was analysed and annotated as to the order of the verbs and the position of their complements, when present, such that a qualitative comparisons of the patterns attested with raising verb constructions and the emergence of a fixed order for both groups could be drawn.

From a qualitative perspective, if one looks at the patterns attested with so-called verb clusters more closely, that is beyond the typical ordering labels 2-1 or 1-2, where 1 indicates the hierarchically highest verb and 2 the embedded verb, it becomes clear that the labels I used to describe the word order patterns in 5.3.1 can be applied to the verb clusters as well. (20), which is typically identified as the 2-1 order, corresponds to intraposition, with the finite matrix verb in sentence final position and the non-finite verb and its arguments preceding it.

- (20) sonderlich die vffs Pompeij Seyten gewest₂ warn₁
 particularly those on Pompei side been was
 ‘in particular those, who have been on the side of Pompei’

(1599, Bange s346)

In (21-a) the order of the verbs is reversed (1-2), that is the non-finite verb form *eyn genommen* ‘taken’ follows the finite verb *haben* ‘have’ at the right periphery of the clause, while the object *etwas* ‘something’ precedes both verbs. This pattern resembles third construction and is the most common pattern among the non 2-1 orders. (21-b) also falls under the label of third construction, since the infinitive *mir helfen* ‘to help me’ is split between the pre-verbal and post-verbal position. However, here non-verbal material, i.e. the prepositional phrase *zuo eyner andern* ‘to another’ is also extraposed with the non-finite verb *helffen* ‘help’.

- (21) a. biß sie endlich etwas haben₁ eyn genomen₂
 until they finally something have in taken
 ‘until they have finally taken something in’

(1624, Brun s251)

- b. Jch batt jnen / dieweil ich die reyse versaumet hette / das
 I asked him because I my journey missed had that
 er mir woelte₁ zuo eyner andern helffen₂
 he me wanted to one other help
 ‘I asked him, because I had missed the trip, to help me find another
 one’

(1557, Staden s107)

In (22) both the embedded object *schiffbruch* ‘shipwreck’ and the non-finite verb form *gelitten* ‘suffered’ follow the finite verb *hetten* ‘had’, a pattern that resembles what I have been labeling extraposition.

- (22) ob wir hetten₁ schiffbruch gelitten₂
 if we had shipwreck suffered
 ‘if we had been wrecked’

(1557, Staden s265)

Finally, examples showing verbs in the reverse order 1-2 without further objects were attested, a pattern I called extraposition adjacent, to distinguish it from those in (22). This is exemplified in (23).

- (23) Da nun Julius so schendlich war₁ vmb komen₂
 as now Julius so disgraceful was killed
 ‘As Julius was killed that disgracefully’

(1599, Bange s351)

In summary, by looking at the variation within verb clusters more closely, it can be concluded that they show the same patterns attested with raising verb constructions in ENHG. As discussed above, the ordering variation within verb clusters decreases over time and the PDG order is claimed to have established itself around 1750. As the results from the diachronic analysis presented in 5.2 show, it is also at that time that intraposition becomes the default pattern for raising verb constructions.

In order to compare the diachronic development of what is the standard pattern in PDG between the two groups, I plotted the relative frequency of verb clusters where the matrix verb is in sentence final position, i.e. the 2-1, per time period (as determined in 5.2.1) against the relative frequency of intraposition with raising verb constructions (Figure 5.4)⁷. First, as Figure 5.4 shows, the data from the present corpus confirms the observation presented in Durrell (2019) that the 2-1 order is established as the default order for verb clusters starting from 1750, which corresponds with the start of period 3. Second, it is also in the same time period that intraposition becomes the default pattern for raising verbs, as already mentioned. Third, both constructions show an increase of the target variant from the earliest period to the subsequent ones. What strikes as different however, is that verb clusters show a high proportion of 2-1 order already in the earliest period, while the proportion of intraposition with raising verb constructions is rather low in the earliest period.

This last observation is problematic only at first glance. Indeed, it has been shown by previous studies that the type of construction is a relevant factor in determining the ordering preference. In particular, syntagms with infinitives (future tense, modal constructions) have been found to show more 1-2 order than syntagms including a participle in ENHG (cf. Sapp, 2011: 56). The hierarchy found in these studies is summarised in (24).

- (24) a. *sein* passive > *werden* passive > *haben* perfect > future > *sein* perfect
> modal (Sapp 2011)
- b. *werden* passive > *sein* passive > *haben* perfect > *sein* perfect > future
> modal (Bies 1996)
- c. *werden* passive > *sein* passive > *haben* perfect > future > modal >
sein perfect (Ebert 1992)

(Sapp, 2011: 57, (26))

⁷Note that the figure illustrates raw proportions, not estimated probability as in section 5.2, since the data presented in the present section primarily serves as an illustration of the qualitative distribution over time and therefore has not been analysed statistically.

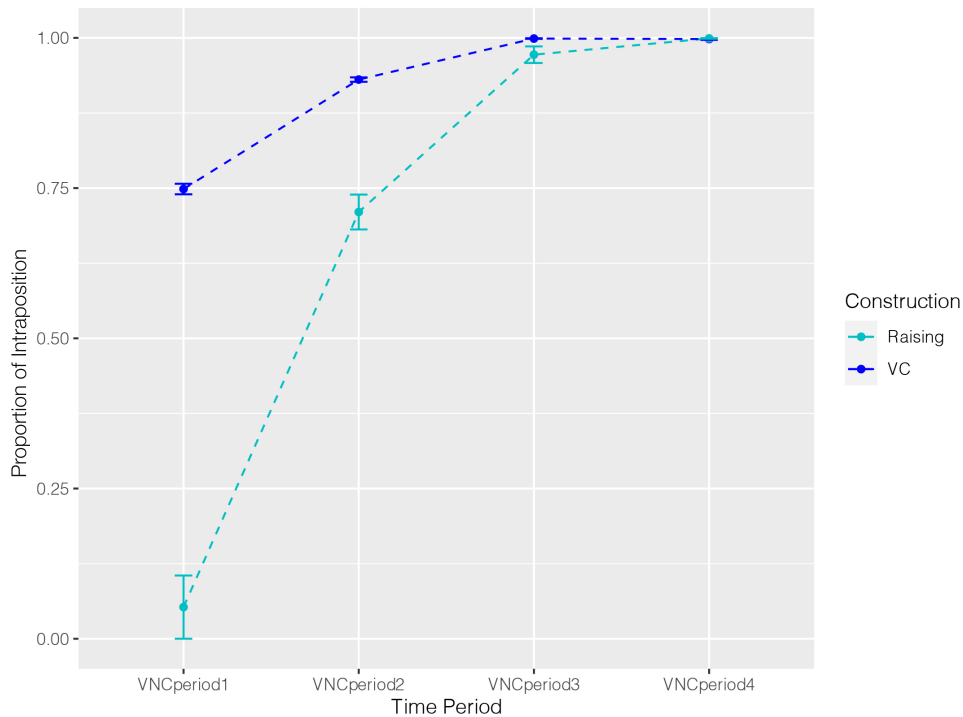


Figure 5.4: Relative frequency of the intraposition pattern for raising verb constructions and verb clusters over time

Dividing the verb cluster data collected in the present study by syntagm type, as in these previous studies, confirms the presence of this hierarchy in period 1, as shown in Figure 5.5. Raising verb constructions with *zu*-infinitives thus seem to follow this pattern and to be placed at the bottom of the hierarchy (25).

- (25) *werden* passive > *sein* passive > *haben* perfect > *sein* perfect > future > modal > raising

To conclude, the present section has shown that raising verb constructions behave like typical verb clusters in many respects. They show the same variation patterns in ENHG and diachronically, they both follow a similar development pattern towards an increasing fixed order. Based on these comparisons, and on the evidence presented in the previous sections, it seems implausible that the attested word order variation is due to raising verbs selecting clausal infinitives in older German. In the next chapters alternative causes for this variation will be discussed but before that, the next section presents some considerations on

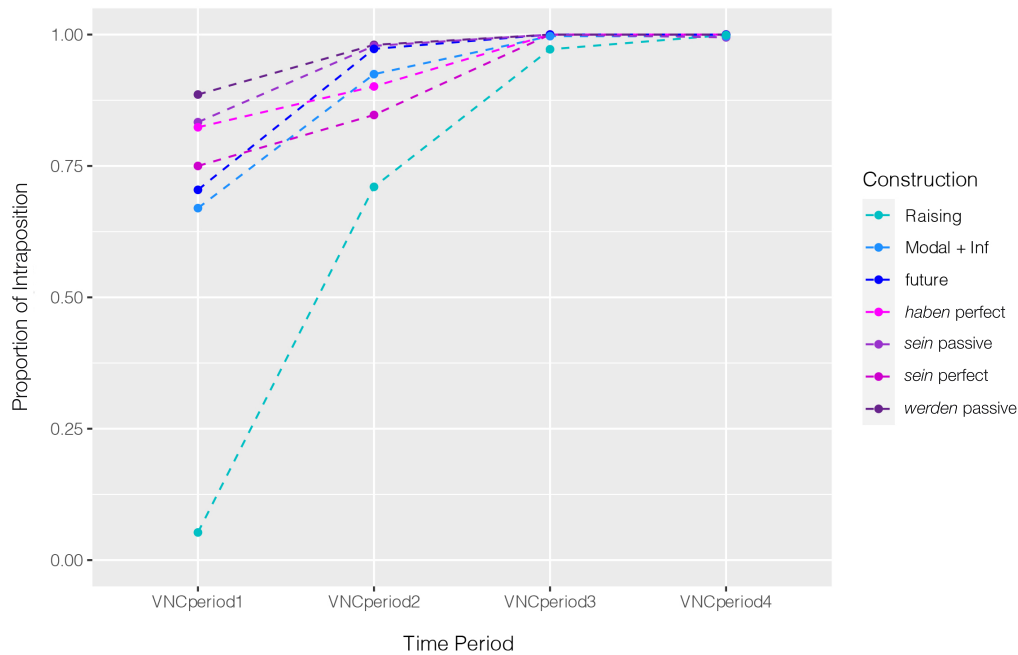


Figure 5.5: Relative frequency of the intraposition pattern for raising verb constructions and verb clusters split by syntagm type over time

the syntax of raising verb constructions from a diachronic perspective.

5.3.4 The emergence of the clustering construction as a structural option

Given the evidence presented in the previous sections, I propose, in line with previous work (Demske, 2008, Demske, 2015, Maché and Abraham, 2011), that we can retain the analysis of raising construction as mono-clausal construction throughout the investigated period. First, only patterns indicating a mono-clausal structure were found for this group, while incoherence diagnostic patterns were totally absent. Second, the diachronic distribution of the word order variants patterns with that of typical verb clusters. Both constructions show an increasing tendency towards a fixed word order, even though verb clusters show an higher proportion of the 2-1 order from earlier on. Further, the variation disappears around the same time, that is starting from 1750.

The question remains open however, whether these constructions form a verb cluster in the syntactic sense, as commonly assumed for PDG (cf. Chapter 3). With this respect, Demske (2015) proposes that clustering constructions

are not a structural option until the end of the ENHG period and that before then, mono-clausal infinitival complements are best represented as embedded VPs. According to her account, clustering constructions emerge as a consequence of the increase of intraposition, which in turn she ascribes to structural changes affecting the directionality of the VP in German, as proposed in Haider (2010b). Such an increase of intraposed infinitives has indeed been confirmed by our data, as discussed in 5.2. Speyer (2018), on the other hand, suggests that at least for periphrastic verb forms, clustering construction might have been present already in MHG. In his account, clustering constructions arise in the history of German as the final step of a grammaticalisation process in which the main lexical verb gradually loses semantic features, a process also referred to as semantic bleaching, as we have seen above. This final step is characterised by the reanalysis of the recursive VPs into one verbal projection where the head of the embedded VP is adjoined to the governing head. In his view, the clustering analysis has the advantage of eliminating an empty position, thus simplifying clause structure. Once the reanalysis has taken place, the permutation of the verbs inside the verb cluster is possible⁸. Since sentence final verb groups with permuted order are attested already in MHG, he considers the reanalysis to have happened already by then.

Let us now evaluate these hypotheses in light of the data presented in this chapter. Under a clustering analysis it would be possible to account for orders in (9-b) and (20), repeated here in (26-a) and (26-b), where the finite verb is in clause final position and the infinitive or participle immediately precedes it.

- (26) a. wie die Becken vnd Müller bey vns [_v zuo thon
how the bakers and millers among us to do
pflegen].
are.in.the.habit.of
‘how the bakers and millers are in the habit of doing’

(1582, Rauw s196)

⁸Speyer (2018) notes that reordering might take place post-syntactically, see also Wurmbrand (2004a) for a similar account, however assuming reordering via left-adjunction as proposed in Haider (2003) does not affect the argument. I will come back to this aspect in Chapter 7.

- b. sonderlich die vffs Pompeij Seyten [v gewest warn]
 particularly those on Pompei side been was
 in particular those, who have been on the side of Pompei

(1599, Bange s346)

The permuted order where the infinitive or participle immediately follows the finite verb in clause final position, as in (12) and (23), repeated as (27-a) and (27-b) respectively, are also compatible with a clustering configuration, since, according to the literature, reordering inside the cluster is possible. These include also cases of third construction in which only the infinitive verb follows the matrix verb but the rest of the complement precedes it, as in (11-a) and (21-a), repeated under (28).

- (27) a. als man zu der Zeit [v pflag zu tragen].
 how one at the time was.in.the.habit.of to wear
 'how people used to wear it at the time'

(1515, Ulenspiegel 67)

- b. Da nun Julius so schendlich [v war vmb komen]
 as now Julius so disgraceful was perished
 'As Julius was killed that disgracefully'

(1599, Bange s351)

- (28) a. als man Würst [v pflaget zu thun]
 how one sausage is in the habit of to do
 'how sausages are usually made'

(1515, Ulenspiegel 37)

- b. biß sie endlich etwas [v haben eyn genomen]
 until they finally something have in taken
 'until they have finally taken something in'

(1624, Brun s251)

This means that the low frequency of intraposed infinitives in the first half of the ENHG period, as shown in 5.2, is not necessarily excluding the possibility of a verb cluster analysis, since these patterns with adjacent verbs could have also been analysed as clustering.

Extrapolation of the entire embedded infinitive, as in (10) and (22), repeated here as (29-a) and (29-b) respectively, or third construction patterns of the type illustrated in (11-b) and (21-b), repeated here as (30-a) and (30-b), where not only the non-finite verb but also non-verbal material follows the matrix verb, would not be allowed under a verb cluster analysis, however.

(29) a. die sie sunst pflegen in das Wasser zu fieren.
 the they otherwise are.in.the.habit in the water to create
 ‘that they otherwise are in the habit of putting in the water’
 (1515, Ulenspiegel 46)

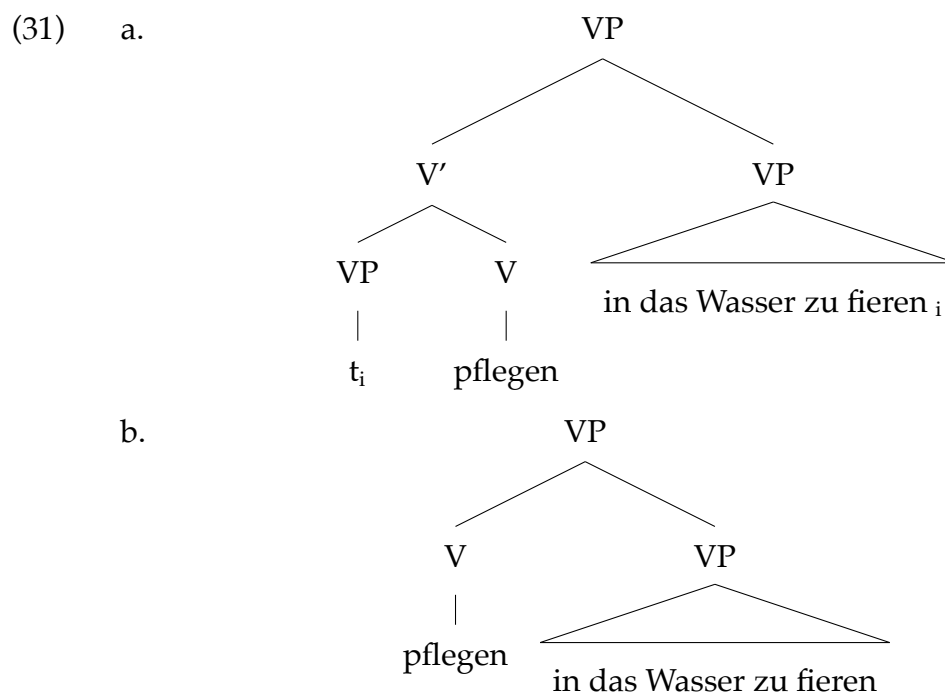
b. ob wir hetten schiffbruch gelitten
 if we had shipwreck suffered
 ‘if we had been wrecked’
 (1557, Staden s265)

(30) a. Wie dann Christus seine Wort vnnd Predigen gemeinlich
 as then Christ his words and sermons usually
pflegte mit Wunderwercken zu bekraefftigen
 was.in.the.habit.of with miracles to strengthen
 ‘as then Christ used to strengthen his words and sermons with mir-
 acles’
 (1650, Faber, s802)

b. Jch batt jnen / dieweil ich die reyse versaumet hette / das
 I asked him because I my journey missed had that
 er mir woelte zuo eyner andern helffen
 he me wanted to one other help
 I asked him, because I had missed the trip, to help me find another
 one.
 (1557, Staden s107)

Instead, a structure with recursive VPs can account for these word orders. Under such an account the order in (29) can be (i) derived by rightward movement of the embedded VP, assuming that the VP is head-final (31-a), or (ii) base-generated, assuming that the directionality of the VP is underspecified, that is, the verbal head can take their complements both at their right or at their left, (31-b), as more recent approaches have proposed (Haider, 2010b, Schallert,

2010, Demske, 2015). A more detailed discussion of these two options and an explanation of why the distribution of word order patterns changes as shown in section 5.2, will be presented in the next chapter.



Coming back to the emergence of clustering constructions, I propose, building on the development path proposed in Speyer (2018), that the emergence of clustering configurations might have happened earlier than originally proposed in Demske (2015) and that the variation still observed in the ENHG data can be explained by postulating that in the course of the reanalysis process the two options can co-exist, that is, the very same speaker might sometimes analyse multiple verb constructions as verb clusters, sometimes as recursive VPs (Speyer, 2018: 292), thus explaining why patterns such as (29) and (30) are still attested as to ENHG. Furthermore this approach provides an explanation for the variation observed between raising constructions and what we called typical verb clusters. As it was shown in the previous section, although the two constructions show a similar diachronic variation pattern as regards verb ordering, typical verb clusters show an higher proportion of the 2-1 order from earlier on. The hierarchy found in the present data as well as in previous studies is in line with this proposal: constructions that show the highest proportion of 2-1 order, that is those involving a participle, are already highly grammat-

icalised in early OHG, while the those involving an infinitive start developing only later, being grammaticalised by the end of ENHG (cf. Speyer, 2018). The grammaticalisation of *scheinen* ‘seem’ and *pfliegen* ‘be in the habit of’ and their fully productive use with *zu*-infinitives follows, as discussed in section 5.1. This brings us back to the discussion presented in section 5.3.1 about *drohen*₂ ‘threaten’ and *versprechen*₂ ‘promise’ and the grammaticalisation approach proposed to explain the variation still attested in PDG. As we have seen above, this could in principle apply since *drohen*₂ ‘threaten’ and *versprechen*₂ ‘promise’ have grammaticalised even later. However, as shown above (section 5.3.1) the data supports this hypothesis only partly. A final note on the term grammaticalisation is in order. In accordance with the premises in Chapter 2, that is that German lacks a T projection, I intend this term not to indicate the emergence of a separate syntactic category, e.g. of a functional category (as in Jędrzejowski, 2017), agreeing with Reis (2001), Reis (2007) that there is no evidence for its existence in German (a different situation is that of English, for example, where auxiliaries have developed distinctive characteristics that set them apart from lexical verbs, cf. Reis, 2007). Rather, I intend it as a cover term in the spirit of Reis (2001) to indicate the emergence of a bundle of (non-categorical) syntactic and semantic properties (Ibid.: 313).

To conclude, even though I assume that clustering constructions might have emerged earlier than previously proposed, I agree with Demske (2015), that it is due to the increase of intraposed infinitives that such constructions are consistently analysed as verb clusters, possibly due to a processing pressure to minimise structure building. Whether this increase in intraposition is due to the reason proposed in Demske (2015) will be discussed in the next chapter.

5.4 Control verbs

So far, control verbs have been considered as one homogeneous group in the analysis in virtue of the fact that they can always embed a clausal infinitive in PDG, hence always allow for extraposition. However, as it was shown in section 3.1 some control verbs also allow for monoclausal construals while others

do not. It has been argued that accusative objects control verbs cannot construe coherently for structural reasons (cf. Haider, 1993, Grosse, 2005) and previous empirical work has confirmed that accusative object control verbs perform worse than subject and object control verbs in coherent configurations across different experimental tasks (cf. Schmid et al., 2005, Bayer et al., 2005). In this section, the question of whether the differences in syntactic behaviour observed within the group of control verbs in PDG can be observed throughout the investigated period is addressed. Since, for obvious reasons, the answer can not be found in intuition or experimental work, the evidence has to rely on corpus data alone. The aim of the present section is thus to test whether the (in)coherence properties of different sub-groups of control verbs are also reflected in the attested corpus data and whether they change over time. To do so both a quantitative and qualitative analysis of the corpus data are conducted. In the quantitative analysis I evaluate, by means of a mixed-effects logistic regression, whether coherence (in)compatibility influences the (diachronic) distribution of intraposition. The qualitative analysis looks at whether sub-groups of control verbs differ with respect to the (diachronic) distribution of (in)coherence diagnostic patterns of the type discussed in Chapter 3.

5.4.1 The effect of control on intraposition

It was shown in section 5.2 that after an initial increase in intraposed infinitival complements for both raising and control verbs, the frequency of intraposed infinitives with control verbs shows a decreasing trend with a significant drop in the youngest period, while intraposition increases exponentially for raising verbs. In this study the group of control verbs is analysed separately in order to test for the effect of control properties on the usage of intraposition as attested in our corpus data, that is, whether there is a correlation between coherence (in)compatibility of the control verb and frequency of intraposed infinitives.

Intraposed infinitival complements of control verbs, as often attested in the corpus, are ambiguous as regards their structural analysis. As discussed in

section 3.1 intraposed infinitives like that in (32) can be analysed as clausal constituents as in (33-a) or can give rise to a mono-clausal structure where the embedded infinitive is part of the same clausal domain as the matrix verb. In this case infinitive and matrix verb are claimed to form a complex verbal head in what is usually referred to as clustering construction, as in (33-b).

- (32) dass Lisa ihnen den Artikel zu schreiben erlaubt
 that Lisa them.DAT the article to write allows
- (33) a. dass Lisa ihnen [_{CP} PRO den Artikel zu schreiben] erlaubt
 b. dass Lisa ihnen den Artikel [_V zu schreiben erlaubt]

Hence, as also discussed in section 3.1, intraposed infinitival complements are in principle possible both with control verbs obligatorily embedding a clausal infinitive and with control verbs optionally allowing coherent structures. Results from an acceptability rating study and a reading time study on PDG have shown, however, that the performance of ambiguous intraposition correlates with the degree of coherence compatibility of the control verb (cf. Schmid et al., 2005, Bayer et al., 2005). Control verbs that received bad ratings for coherent conditions, are also rated badly in the ambiguous intraposition condition and are read more slowly than optionally coherent verbs in sentences containing an ambiguous intraposed infinitive. These results are explained by postulating that the Human Sentence Processing Mechanism is subject to two principles: the Left-to-Right Constraint, or serial parsing, and Simplicity (Bayer et al., 2005, see also section 3.1.4). According to these principles, ambiguous intraposed infinitives are first assigned a coherent structure during processing, since this is the simpler structural option. Upon encountering disambiguating information, as for example a matrix verb which is not compatible with a coherent structure, however, the initial analysis needs to be revised. This re-analysis is claimed to be associated with higher processing costs and thus to yield a disadvantage, e.g. slower reading times, for verbs obligatorily yielding an incoherent structure.

Assuming that this disadvantage is also found in corpus data, control verbs obligatorily yielding incoherent structures are expected to embed less intra-

posed infinitives than verbs optionally allowing coherent structures, at least as regards the PDG data. If coherence incompatibility is stable over time, the effect is expected to be found in the earlier periods as well. In addition, concerning the decline of intraposition for control verbs altogether, as was shown in section 5.2 this additional analysis can reveal whether the effect is driven by the sub-group of incoherent control verbs only or whether it affects control verbs homogeneously.

Following on the assumption that accusative object control verbs can never yield a coherent structure for structural reasons (Haider, 1993, Haider, 2010a), and based on previous empirical results showing that accusative object control verbs are associated with bad ratings and slower reading times in coherent and ambiguous intraposition conditions (Schmid et al., 2005, Bayer et al., 2005), the present analysis tests whether the sub-group of accusative object control verbs differs from other control verbs including subject and dative object control verbs as regards the corpus frequency of intraposition, and whether these differences are present throughout the whole investigated period⁹.

According to the predictions illustrated above, this result will provide a first indication of the difference in syntactic behaviour between sub-groups of control verbs in older German, namely whether accusative object control verbs are not compatible with a coherent structure as opposed to the group of subject and dative object control verbs, which is claimed to optionally embed a coherent infinitive.

5.4.1.1 Data analysis

The analysis was conducted on the subset of the original dataset presented in section 5.2 displaying a control verb as the matrix verb. The sentences were further annotated as to the control property of the matrix verb in a binary fash-

⁹It has been argued that control properties are not the only trigger for (in-)coherent behaviour. In particular, subject control verbs with factive or propositional meaning such as *bedauern* 'regret' are typically considered obligatorily incoherent (Haider, 1993, Wurmbrand, 2001). However, it was not possible to also test for semantic effects since verbs belonging to the group of factive or propositional verbs are rather rare in the corpus.

ion, that is either as “accusative object” or “other” including subject and dative object control. In total, 8175 sentences were analysed with mixed-effects logistic regression implemented in R (version 3.5.1, R Core Team, 2021) using the function `glmer` of the `lme4` package (Bates et al., 2015). As for the previous analysis the probability of intraposition represented the dependent variable, while Control (“accusative object”, “other”), VNC Period (as determined in section 5.2) and their interaction were included as fixed effects. The best model was determined by stepwise model comparison as discussed in section 4.2 and included random effects for Verb, Text and Genre. Sum contrasts were set using the generalised inverse function (Schad et al., 2018) for the factor Control, such that the model would show main effects, that is for each level of Control the effect across all time periods. For the factor VNC Period repeated contrasts were computed (Schad et al., 2018) such that each time period would be compared to the preceding one. Importantly, when computing repeated contrasts the effect of VNC period is shown across both control verbs’ groups. The interaction between the two factors is the relevant value to determine whether the effect of Control changed over time. A significant interaction would indicate that this is the case.

5.4.1.2 Results

The model results confirm that accusative object control verbs are overall less likely to embed an intraposed infinitive compared to the rest of control verbs, as indicated by the significant main effect of Control which shows a negative estimate (cf. Table 5.5). This result meets the expectations concerning a possible disadvantage for intraposition with control verbs that are not compatible with a coherent construction and thus provides a first indication of the incoherent behaviour of accusative object control verbs in the diachronic corpus. With the exception of the comparison between period 1 and period 2, no significant interactions were found between the factors Control and VNC Period (cf. Table 5.5), which further suggests that the effect has been stable since about the end of the 16th century. Figure 5.6, which plots the model results, reveals

that the only significant interaction between Control and VNC period is due a reverse effect in VNC period 1: in this period, which goes from 1450 until around 1550, accusative object control verbs show more intraposition than the other sub-group, a result that had not been predicted. It seems implausible, however, that this result is due to a reversed change in the syntactic behaviour of the two sub-groups of control verbs. Also as it appears from Figure 5.6 the probability of intraposition with accusative object control verbs remains stable from period 1 to period 2, while it is that of subject and object control verbs that increases, thus yielding the interaction. In light of the present data and the discussion so far, any explanation for such a result is highly speculative. One tentative explanation, based on the results of the analysis including the group of raising verb presented in section 5.2, is that the absence of a significant effect of matrix verb on the whole data set, thus the absence of a significant difference between raising and control verbs overall, suggests that factors other than the matrix verb rather determine word order in this stage of German and that this could eventually lead to results that are not expected from the perspective of the present analysis, which focuses on properties of the matrix verb. Overall, the development for intraposition with control verbs as determined in section 5.2 is confirmed by the main effect of time (cf. Table 5.5). Across both groups, intraposition shows a significant increase from period 1 to period 2 but then starts decreasing. As the absence of significant interactions from period 2 onwards suggests, this decline is not driven by the group of accusative object control verbs but affects control verbs homogeneously. The parallel decline of intraposition for both verb groups is also shown in Figure 5.6.

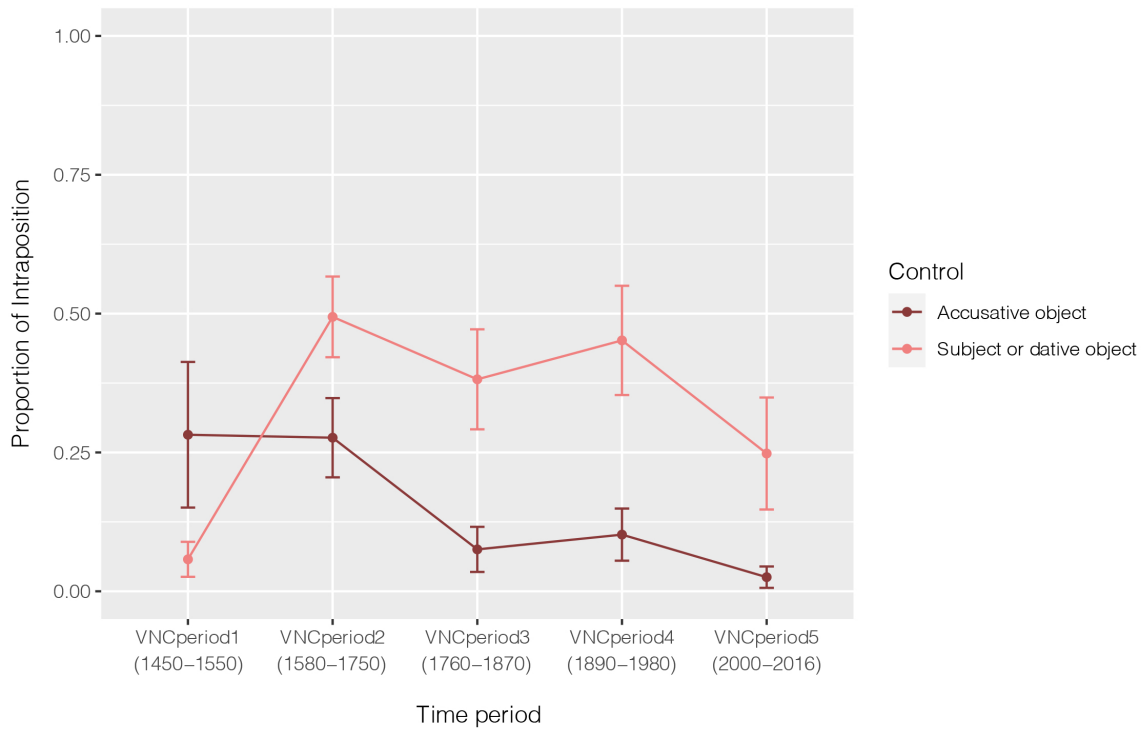


Figure 5.6: Estimated probability of intraposition for accusative object control verbs and subject/dative object control verbs

Table 5.5: Control verbs: Fixed (main) effects and their interaction

	Estimate	Std. error	z-value	p-value
(intercept)	-1.4828	0.3247	-4.567	4.94e-06 ***
Control (acc. obj. vs sub/dat obj.)	-1.1240	0.2920	-3.849	0.000119 ***
VNCperiod (2 vs 1)	1.3730	0.4774	2.876	0.004028 **
VNCperiod (3 vs 2)	-1.0016	0.3793	-2.641	0.008272 **
VNCperiod (4 vs 3)	0.3101	0.3874	0.800	0.423431
VNCperiod (5 vs 4)	-1.1937	0.3127	-3.818	0.000135 ***
Control * VNCperiod (2 vs 1)	-2.7989	0.7708	-3.631	0.000282 ***
Control * VNCperiod (3 vs 2)	-1.0853	0.5616	-1.933	0.053278 .
Control * VNCperiod (4 vs 3)	0.0423	0.5810	0.073	0.941960
Control * VNCperiod (5 vs 4)	-0.5569	0.4734	-1.176	0.239512

Model: glmer(complement position == "intra" ~ Control * VNCperiod + (1 | Text) + (1 + VNCperiod | Verb) + (1 | Genre), family="binomial")

5.4.1.3 Summary

The quantitative analysis presented in this section provided some first evidence for the distinction of two sub-groups within the class of control verbs. It could be shown that the subclass which is typically associated with obligatory incoherent behaviour, i.e. accusative object control verbs, also shows a lower proportion of intraposed infinitival complements in most of the investigated period. In the next section, I take a closer look at what word order patterns other than intraposition were attested with the two sub-groups, including any indication of coherent or incoherent behaviour.

5.4.2 Word order patterns and coherence properties

A qualitative investigation of the patterns attested with control verbs will allow us to shed more light on the nature of infinitival types they combine with. As it was argued in previous sections of the present work, the group of control verbs is the one exhibiting a higher degree of variability as to allowed word order patterns. Since they can always embed a clausal infinitive they allow the infinitive to be extraposed in PDG. On the other hand, it has been claimed that some control verbs can yield a mono-clausal construal with the embedded infinitive and allow clause-bound phenomena such as pronoun fronting or wide scope of negation as illustrated in Chapter 3. Further, some control verbs also allow for third construction, another pattern that is indicative of a mono-clausal construal (cf. Wöllstein-Leisten, 2001). Thus for the qualitative investigation, we are interested in whether the two sub-groups of control verbs under investigation (accusative object control verbs as opposed to subject and dative object control verbs) also show differences with respect to the distribution of such diagnostic word order patterns. Assuming that the sub-group of accusative object control verbs is not compatible with a mono-clausal analysis, we expect to find only ambiguous or incoherent intraposition (e.g. narrow scope of negation, non-verbal material intervening between infinitive and

matrix verb, pied-piped infinitives) and extraposed infinitives¹⁰ but no intraposition patterns indicating a mono-clausal construal (e.g. pronoun fronting) or third construction. Whilst the other group is expected to show all patterns, since these verbs are compatible with both a coherent and an incoherent structure.

The results meet this expectation: extraposition and ambiguous intraposition are attested with both sub-groups and in fact represent the two most frequent patterns. (34) illustrates examples of extraposed infinitives with a dative object control verb, *verbieten* 'forbid', (34-a), a subject control verb, *versuchen* 'try', (34-b) and an accusative object control verb, *bitten* 'ask' (34-c).

(34) a. daß die Ministri den andern verboten haben /
 that the ministers the.DAT others.DAT forbidden have /
 [keinem Gebote / nach Rom zu kommen / zu gehorsamen].
 no order / to Rome to come / to obey.
 'that the ministers forbid the others to obey any order to come to Rome.'

(1667, Merc s1945)

b. welche versucht haben / [Guiana zu entdecken]
 who tried have / Guyana to discover
 'who have tried to discover Guyana'

(1599, Am 2.28.1)

c. daß sie den König inständig bitten [eine so tyrannische
 that they the.ACC king urgently asked a so tyrannical
 Gemahlin wieder von sich zu schaffen].
 wife again from himself to take
 'that they implored the king to remove such a tyrannical wife'

(1703, Bohse 75)

In (35) the subject control verb *vermeinen* 'believe', the dative object control verb *verbieten* 'forbid' and the accusative object control *zwingen* 'force' are shown with an intraposed infinitival complement in (35-a), (35-b) and (35-c) respectively.

¹⁰Note, however, that extraposition is not considered an exclusive property of clausal infinitives in older German.

- (35) a. daß der Hertzog von Florentz / [solches Schloß für sich zu
that the duke of Florence / such castle for himself to
halten] vermain
hold believes
'that the duke of Florence believed he could claim that castle for
himself'

(1597, AC s610)

- b. so hat doch Monsr. Colbert den Frantzösischen
so has after.all Mons. Colbert the.DAT french
Kauffleuthen / [dergleichen zukauffen] verbotten/
merchants / such to.buy forbidden
'so Mons. Colbert forbade the french merchants to buy such like
after all'

(1667, PZ 38.20)

- c. daß [...] Sie Ihn / [die Stadt dem König zu
that [...] they him.ACC / the town the.DAT king to
übergeben] zwingen wolten
hand.over force wanted
'that they wanted to force him to hand over the town to the king'

(1667, Relation 128.13)

However, while both coherent and incoherent intraposition was found for the sub-group including subject and dative object control verbs, only patterns forcing an incoherent reading were attested for the accusative object control sub-group. Examples of coherent intraposition patterns with subject and dative object control verbs are illustrated in (36). In (36-a) the object of the embedded infinitive *zu saluieren* 'to save', that is the pronoun *sich* 'themselves', directly follows the complementiser *weil* 'because' and thus precedes the matrix subject *viel Bawren* 'many farmers'. This is a typical example of pronoun fronting, an operation which is only possible when no embedded clausal domain is present. Similarly, in (36-b) the embedded object *solche* 'those' precedes the matrix subject *der groß Kayser Alexander* 'the great emperor Alexander'. In (36-c) the intraposed infinitive is preceded by the negation *nicht* 'not', whose wide scope on the matrix verb *wagen* 'dare' is indicative of the lack of clausal boundaries.

- (36) a. vnd weilen **sich** viel Bawren im Dorff Straß genant
 and while themselves many farmers in village road called
 zu saluieren vermaint
 to save thought
 ‘and while many farmers thought they have saved themselves on
 the so called village road’

(1597, AC s152)

- b. deßhalben [...] **solche** der groß Kayser Alexander /
 therefore [...] those the.NOM great emperor Alexander /
 alß er in Indiam zohe / seinem Heer zuessen verbotten hat.
 when he to India went / his army to.eat forbidden had
 ‘that is why [...] the great emperor Alexander had forbidden his
 army to eat those, when he went to India’

(1582, Rauw 60.21)

- c. das selbst die gute Mutter **nicht** zu unterbrechen wagte.
 which even the good mother not to interrupt dared.
 ‘which even the good mother did not dare to interrupt.’

(1814, Chamisso 78)

Attested incoherent intraposition patterns include sentences where the infinitive and the matrix verb are separated by non-verbal material, thus indicating that a coherent analysis is not possible, as well as sentences with relative clause pied-piping. As illustrated in Chapter 3, in addition to non-verbal material intervening between the infinitive and the matrix verb, pied-piping operations involve *wh*-features and thus require that an infinitival CP is present. Examples of incoherent intraposition with subject and dative object control verbs are reported in (37). In (37-a) the infinitive *zu zulassen* ‘to allow’ and the matrix verb *versprochen* ‘promised’ are separated by the adverb *mündtlich* ‘verbally’. Similarly, in (37-b) the adverb *ernstlich* ‘seriously’ intervenes between the infinitive *zu geben* ‘to give’ and the matrix verb *beuohlen* ‘ordered’. An example of pied-piping is given in (37-c). Here the infinitive *zu besteigen* ‘to climb’ directly follows its relativised object *welche* ‘which’, thus preceding all elements of the matrix clause.

- (37) a. was sonst der König [dem vierdten Standt zu zulassen
 what else the king the fourth rank to allow verbally
mündtlich versprochen
 promised
 ‘what else the king verbally promised the fourth rank to allow’
 (1609, Aviso 93.30)
- b. Darneben hat [...] der Groß Hertzog von Toscano [...] auch
 further has the Grand Duke of Toscana also
 seinem Adel auff die Römische Frontier gute achtung zu
 his.DAT nobility to the Roman frontier good attention to
 geben / **ernstlich** beuohlen.
 pay seriously ordered.
 ‘Further the Grand Duke of Toscana has also seriously ordered his
 nobility to pay good attention to the Roman frontier’
 (1597, AC s1064)
- c. [...] höhere Firsten / **welche zu besteigen** uns weder die Zeit
 higher ridges / which to climb us neither the time
zu liesse / noch die Müdigkeit unserer Beinen.
 allow / nor the tiredness our.GEN legs
 ‘which neither the time nor the tiredness of our legs would allow
 us to climb.’ (1708, Scheuchzer 104)

Similar examples are also found with accusative object control verbs as in (38). In (38-a) the adverb *fleissig* ‘diligently’ intervenes between the infinitive *mit zu theilen* ‘to share’ and the matrix verb *gebeten* ‘asked’, while in (38-b) the two verb forms are held apart from the prepositional phrase *ausz yrem gesatz* ‘according to their law’.

- (38) a. vnd letztlich mich [...] jnen vnd andern Christen zum besten
 and finally me [...] them and other Christians for.the best
 mit zu theilen / **fleissig** gebeten
 to tell / diligently asked
 ‘and finally, he diligently asked me to tell them to you and other
 Christians’ (1597, Bange s30)
- b. so wird er zuo sterben **ausz yrem gesatz** genoet
 then will he to die of their law forced
 ‘then he will be forced to die according to their law’
 (1534, Franck s790)

As regards third construction, a pattern which has been claimed to indicate a mono-clausal construal, it is not attested with accusative object control, while it does occur within the other group. Two examples of third construction with subject control verbs are given in (39). In (39-a) the infinitival complement *christenlich ze leben* ‘to live as a christian’ is linearised discontinuously, partly preceding the matrix verb *begert* ‘want’, partly following it. Similarly, the non-finite verb form *zu suchen* ‘to look for’ in (39-b) follows the matrix verb *begerten* ‘wanted’, while the rest of the complement precedes it.

- (39) a. wer nicht [christenlich] begert [ze leben]
 who NEG christianly wants to live
 ‘who does not want to live as a christian’

(1480, BChr s443)

- b. wann wir [die R uber] begerten [zu suchen]
 if we the robbers wanted to look
 ‘if we want to look for the robbers’

(1624, Brun s710)

A summary of the distributions across the five periods is given in Table 5.6. Looking at the distributions over time also reveals that extraposition is becoming by far the most frequent pattern, especially for accusative object control verbs, at the expenses of intraposition, as the quantitative analyses in section 5.2 and 5.4.1 have confirmed, but also of third construction, whose relative frequency used to be higher in older periods than in PDG. Concerning diachronic differences, another pattern that seems to be attested more frequently in the historical data than in the PDG corpus is incoherent intraposition, which is virtually absent in the youngest period with only 5 attestation over a total of over 4000 observations.

Table 5.6: Distribution of word order patterns per verb group and across time periods.

	Period1 (1450-1550)	Period2 (1580-1750)	Period3 (1760-1870)	Period4 (1890-1980)	Period5 (2000-2016)
Acc object					
Extrapolation	15	151	87	295	537
Intrapolation	5	49	10	33	6
Intrapolation Inco.	1	4	0	0	1
Intrapolation Co.	0	0	0	0	0
Third Construction	0	0	0	0	0
Other					
Extrapolation	89	454	159	890	2838
Intrapolation	5	432	204	1011	694
Intrapolation Inco.	1	56	12	1	4
Intrapolation Co.	0	3	2	3	8
Third Construction	10	28	3	6	68

5.4.3 Discussion

In this section I investigated whether the group of control verbs behaves homogeneously as regards the distribution of infinitival word order patterns, in particular whether the coherence compatibility of different groups of control verbs could be observed in older German as well. The investigation focused on two sub-groups of control verbs which have been claimed to show different coherent behaviour due to the difference in control properties: following Haider (1993) and Grosse (2005) it was assumed that accusative object control verbs are never compatible with coherent structures, while subject and dative object control verbs are. Building on the assumption that obligatorily incoherent structures show a strong dispreference for intraposition due to increased processing effort, I tested whether the class of accusative object control verbs shows lower intraposition frequency than other control verbs, a result that would be indicative of its coherence incompatibility. The data shows that, although over time intraposed infinitives decrease for both groups, the control properties of the matrix verb have been found to have an effect on the frequency of intra-

posed infinitives already from late ENHG (from around 1550 onwards), that is, accusative object control verbs have been found to exhibit less intraposed infinitives than other control verbs in older German as well. I took this result as indicative of the fact that the two groups of control verbs did show different syntactic behaviour already back then.

In the second part of this section I focussed on the qualitative evaluation of the attested word order patterns in order to establish whether any unambiguous indication of coherent or incoherent behaviour could be found for the two sub-groups of control verbs. The fact that the two groups show different coherence behaviour is confirmed from the evidence that accusative object control verbs do not show coherence patterns such as pronoun fronting or third construction across all time periods but the group of subject and object control verbs does. Although these disambiguating patterns are rare in the corpora, it is still of interest to see that they occur with subject and dative object control verbs but not with accusative object control verbs. Taken together, these findings suggest that, since the ENHG period, control verbs as a whole have not undergone structural changes as regards the selection of infinitival complements. Specifically, that accusative object control verbs only embed clausal infinitives in historical stages of German too, while subject and object control verbs allowed for more variability as to the type of infinitival complement they combine with.

Although it has been shown that there is a correlation between syntactic behaviour and frequency of intraposition, the difference in syntactic behaviour that has been observed between the two sub-groups of control verbs has been found not to affect the overall trend concerning the diachronic distribution of intraposition, however. The decline of intraposed infinitives as observed in section 5.2 affects both sub-groups and is not driven by the group of accusative object control verbs. This finding is in line with the experimental evidence discussed in Chapter 3 supporting the idea that even though coherence compatibility of the matrix verb may mitigate the processing disadvantage for intraposition, extraposition is nevertheless a less costly option compared to intraposition. The general decline of intraposed infinitival complements in the last

period thus suggests that processing constraints may be playing an increasingly important role in determining the linearisation of the infinitival complement. A preference for extraposition might not only be due to processing factors, however. As also discussed in previous chapters, extraposition of clausal constituents is the preferred option also from the perspective of prosodic structure (cf. section 2.3.2 and 3.1.3.2). A possible explanation as to why prosodic and processing factors might be gaining in importance will be discussed in Chapter 7.

The present study has provided interesting results concerning differences in coherence (in)compatibility among the group of control verbs in the diachronic corpus, but there are some limitations that could be addressed in future research. The focus of the present study was restricted to one structural factor that has been claimed to influence coherence behaviour, namely the control properties of the matrix verbs and the constraint according to which accusative object control verbs are not compatible with a coherent structure. Unlike Schmid et al. (2005) and Bayer et al. (2005), differences in argument structure were not taken into account, that is, it was not distinguished between subject control verbs that only require an accusative object, as for example the verb *versuchen* 'try', and subject control verbs which additionally select a dative object, like *versprechen* 'promise'¹¹. In Schmid et al. (2005) and Bayer et al. (2005) the different sub-groups performed in a gradient fashion in the coherent conditions, such that the subject control verbs without an additional argument performed best, followed by dative object control, subject control with the infinitive replacing a prepositional object, subject control with additional dative object and accusative object control with accusative object control. This gradient between sub-groups cannot be captured by the present study.

Another aspect that Schmid et al. (2005) briefly mention, but one that could not be addressed here, is the difference between individual verbs within a sub-group. Although their study was not designed to study individual verbs, they

¹¹Schmid et al. (2005) also distinguish a sub-group including subject control verbs with the infinitive replacing a prepositional object, e.g. *aufhören* 'stop', but these verbs were excluded from the corpus study for independent reasons, see Chapter 4.

did observe for example that the verb *versuchen* 'try' shows the most coherent behaviour among subject control verbs, in that it exhibits the best mean coherence rating (i.e. mean rating across all coherent conditions). A finding along the same lines has been reported by Bosch et al. (2021), who investigated word order preferences of four subject control verbs across different tasks and found that *versuchen* 'try' behaves differently from the other verbs in that it allows for the highest degree of variability in both corpus data – including written and spoken German – and in a spoken production task: while the other verbs almost exclusively combine with extraposed infinitives, *versuchen* 'try' is also attested with intraposition and third construction. In light of the discussion about word order variants and coherence behaviour presented in the present chapter, these results also support the idea that *versuchen* 'try' exhibits a particular favourable coherence behaviour.

The peculiarity of *versuchen* 'try' leads us to another important aspect that has not found consideration in this study, namely the role of semantic effects. As Bosch et al. (2021) point out, building on ongoing discussion, the semantics of *versuchen* 'try' differs from that of most control verbs in that it has been claimed to have functional, temporal-aspectual properties which make it more eligible for the instantiation of a mono-clausal structure (Brandner, 2020, Grano, 2011). Grano (2017) further embeds this discussion in the diachronic perspective, proposing that variability in the coherence behaviour depends on the process of semantic bleaching, that is the process by which a verb gradually loses its lexical meaning and eventually reaches the status of functional verb. According to this proposal the degree of coherence compatibility of a verb reflects the degree to which it is semantically bleached: verbs with high coherence compatibility, like *versuchen* 'try', are therefore verbs that are far along in the process of semantic bleaching or even on the path of transition from raising to control verbs (Ibid.: 46-48). If, on the one hand, a temporal-aspectual semantics is associated with higher coherence compatibility, then on the other hand, another semantic class of verbs is typically associated with obligatorily incoherent behaviour. As mentioned in footnote 9 above, factive and propositional verbs are typically counted among the class of obligatorily incoherent

verbs (cf. Haider, 1993, Wurmbrand, 2001). Wurmbrand (2001) shows that factive and propositional verbs do not allow coherent configurations (Ibid.: 286f., 306) and argues that this is due to factivity and propositionality requiring an operator in the C-domain (Ibid.: 305f.). The semantics of the matrix verb thus also seems to play an important role in determining its coherence behaviour. Further empirical research is needed to explore this aspect, how it interacts with the structural factors investigated in the present study and how they affect word order. In particular, more research from the diachronic perspective proposed in Grano (2017) is needed, which aims at tracing the development of individual control verbs, as for example *versuchen* 'try', and possibly identify the process of semantic bleaching that leads towards the emergence of a raising variant similarly to what has been shown for other verbs (cf. Diewald, 2001, Diewald and Stathi, 2019 on *scheinen* 'seem', Jędrzejowski, 2017 on the emergence of temporal-aspectual *versprechen* 'promise' in German and Traugott, 1993 on *promise* and *threaten*). As it was highlighted above however, although a more nuanced or gradient approach to differences among the group of control verbs might possibly prove more appropriate than the simple distinction between two-subgroups, the general decline of intraposition and the increasing preference for extraposed infinitival complements affects both subgroups of control verbs equally, regardless of the degree of coherence compatibility, supporting the hypothesis that extraposition is the least costly option for control verbs.

5.5 Summary

In this chapter I have outlined the diachronic development of word order variants for German infinitival complements, showing how this process can be divided into five different stages, using a data driven method to periodisation, namely the VNC analysis. By analysing the data statistically, I have shown that the type of matrix verb, which is a crucial factor for distinctions in word order preferences in PDG has not always been relevant in older stages of the language but only began to play a role after the end of ENHG, from around

1750 on. The quantitative data has further shown that older ENHG still shows a very low rate of intraposed infinitival complements, in accordance with what had been observed in previous literature (see section 3.2). It confirmed the observations in Demske (2015) in showing an increase of intraposed infinitives from older to late ENHG, regardless of the type of matrix verb. The data further confirmed that, although intraposition is still a possible variant for control verbs, it is infrequent in the youngest period, while it is attested in nearly 100% of the cases with raising verbs. Overall, the distribution path of intraposition took opposite directions for the two groups of matrix verbs starting from 1750, such that after an initial parallel development, intraposition started decreasing for control verbs and further increasing for raising verbs.

The chapter further discussed properties of the two types of matrix verbs separately, asking whether they show variable behaviour in their selection properties from a diachronic perspective. It was shown that, despite word order variation, raising verbs yield mono-clausal construals already in ENHG, while no evidence for bi-clausal construals was found. With regard to raising verbs, the question of whether they instantiate clustering constructions already in the older data was discussed. I argued that the low degree of intraposition in older ENHG does not necessarily exclude the possibility of cluster formation, as long as the verbs are adjacent. Since patterns that are not compatible with a clustering structure are also attested however, this option might have become obligatory only later, probably under the influence of other changes. As for control verbs, it was shown that different sub-groups with respect to coherence compatibility can be attested in older German as well, but that this difference does not affect the overall changes observed for the group of control verbs altogether. With this respect, it was proposed that the diachronic variation might be influenced by additional factors such as prosody and processing factors. If that is the case, the question remains open as to why such factors seem to play a role in some periods but not in others.

In the next chapters I concentrate on the question of why the increase of intraposed infinitives observed from older to late ENHG took place. In Chapter 6, I discuss Demske's (2015) hypothesis that the increase of intraposed infinitives

in ENHG is due to structural changes happening at the end of this period. I will review existing literature and provide further empirical data using part of the corpus under investigation. Finally in Chapter 7, I propose an alternative explanation that takes into account the interaction of multiple factors and that can be extended to explain the development of the word order patterns' distribution in the successive stages as well.

6

Explaining the change: structural change in ENHG?

After having presented the empirical evidence from the diachronic corpus study and having identified the trajectory of change in the distribution of word order patterns of infinitival constructions in the previous chapter, as well as having concluded that the selection properties of raising and control verbs did not undergo change in the history of German, that is to say that raising verbs have always yielded mono-clausal construals, while control verbs could already select clausal infinitives in ENHG, the present chapter discusses one hypothesis that has been proposed to account for the observed word order variability and change in the early periods. Under the assumption that German has always been an OV language, non-clausal constituents, therefore non-clausal infinitives as well, should only appear in intraposed position. As the data from the previous chapter has confirmed however, this expectation is not borne out. Following Haider (2014), Demske (2015) advances the hypothesis that German was not OV from the beginning but rather that earlier stages of the language were of a third type, where the directionality of the verbal head is underspecified. This would account for the variable behaviour of infinitival complements that, although non-clausal, could appear at the right of the matrix verb. Under this account, the change observed in the second half of ENHG, that is the increase of intraposed infinitives is ascribed to the stabilisation of the OV basic order during this period.

The question of the underlying ordering in the history of German is not a

new one and is not confined to the discussion of infinitival complements. While some researchers claim that German has been OV throughout its history and that apparent VO orders are due to more liberal movement phenomena (e.g. Axel 2007, Sapp 2014, Bies 1996, Lenerz, 1984), the high degree of word order variability at the right periphery of the clause has led others to assume that both OV and VO were available in previous stages as base-generated options (Haider 2010b; Haider 2014, Schallert 2010, Demske, 2015), similarly to what has been argued for older English (Pintzuk 1991, Kroch and Taylor 2000)¹. In the rest of the chapter I will review some previous scholarship that has dealt with this question and evaluate whether convincing evidence in support of Demske's (2015) hypothesis can be found. I will refer to the first scenario as the "OV-Hypothesis" and to the second as the "OV/VO-Hypothesis".

6.1 The OV/VO alternation in the history of German

As introduced in section 2.2, older German was more liberal as concerns the order of constituents at the right periphery of the clause. Although the clause-final position of the finite verb was already attested in OHG subordinate clauses, and the sentence bracket principle with the asymmetry between main and subordinate clauses already observed, violations of these principles are also attested more often than in PDG and are less restricted. In OHG, next to cases where the extraposed element is an adjunct PP (1), which is still found in PDG, also accusative (2) and dative (3) objects are found in post-verbal position in subordinate clauses, as well as nominal (4) and adjectival (5) predicates (cf. Axel, 2007).

- (1) Dher selbo infec haerduom dhes israhelischin folches, dhuo ir
 that same received dominion of-the Israeli people when he
 dhes leididh uuardh **after moysises** **ablide**...
 their leader became after Moses' death

¹Note that the work on older English cited here adopts the Double Base Hypothesis, according to which there was a competition between two grammars in Old English (OE) and Middle English (ME), while this is not the case in the work on older German reported here, as I will illustrate later. This however is not relevant for the discussion here.

‘that same one received dominion over the people of Israel, when he became their leader after Moses’ death...’

Hic enim post obitum moysi dux effectus principatum obtenuit...

(I 529; Axel, 2007: 81, (69))

- (2) Endi dhazs mittingart firleizssi **diubilo drugidha**
and that earth up-gave devils’ false-idol-ACC
‘and that the earth might give up false idols of devils’

Omissisque mundus demonum simulacris

(I 507; Axel, 2007: 81, (70b))

- (3) dhazs ir chihoric uuari **gote**
that he obedient was God-DAT
that he was obedient to God

ut esset deo subiectus

(I 491; Axel, 2007: 81, (70c))

- (4) dhazs iesus ist **druhtin**
that Jesus is Lord
that Jesus is the Lord

dominus esse iesum

(I 549; Axel, 2007: 81, (71a))

- (5) oba thin ouga uuiridit **luttar**
if your eye becomes light
‘if your eye is good’

si fuerit oculus tuus simplex

(T 153,22; Axel, 2007: 81, (71c))

Furthermore, as widely discussed for ENHG in the previous chapters, the finite verb can precede the non-finite verb at the right periphery (6-b), instead of appearing in absolute final position (6-a), as in PDG.

- (6) /thaz ih íu thaz **tuon**₂ mugi₁ /
that I you this do can
‘that I am able to do this for you’

/quia possum hoc facere uobis./

(MF IX, 11; Axel, 2007: 84, (75a))

- (7) Daz auuar i{n stein}ac uaarth₁ **gha sait**₂ ...
 what however in stony became sown
 'but what was sown on stony places...'

Qui autem super petrosa s{eminatus₂ est₁}

(T 209, 13; Axel, 2007: 84, (73g))

Proponents of the OV/VO Hypothesis explain this variation by claiming that Old Germanic, including OHG, was neither OV nor VO but rather of a third type, where the directionality of the verbal head is underspecified, that is, the verb can select objects both to the left and to the right, meaning that OV and VO patterns co-exist in those stages of the language. Additionally, in third type languages, VO and OV patterns can also be realised in the same sentence, such that the verb is found between objects as shown in (8) for OE (8-a), Old Icelandic (8-b) and OHG (8-c), (Haider, 2010b; Haider, 2014). In all three sentences the verb selects two objects of which one is realised pre-verbally and the other post-verbally. In (8-a) the indirect object precedes the verb, while the direct object follows it. In (8-b) and (8-c), it is the direct object that precedes the verb, while the indirect object follows.

- (8) a. Se mæssepreost sceal [mannum [bodian þone soþan geleafan]]
 the priest must [people [preach the true faith]]

(Ælet 2 (Wulfstan1) 175; Haider, 2010b: 20, (12a))

- b. hafer þu [þinu lidi [jatat þeim]]
 have you [your help [promised them]]

(Haider, 2010b: 20, (14a))

- c. tãnne sie [búrg-réht [scûofen demo líute]]
 that they civil-right granted the people

(NB 64,13; Haider, 2010b: 20, (14a))

In support of the OV/VO Hypothesis Schallert (2010) provides examples of post-verbal objects in OHG (9), including light pronouns as in (9-a) and (9-b), as well as what are considered typical third type orders, where the one object precedes the verb and the other follows it, as in (10).

- (9) a. therthar giotmotigot **sih**
 who humiliates himself
qui se humiliat
 (T 403,19 Schallert, 2010: 378 (26a))
- b. dhazs iza in salomone uuari₁ **al** arfullit₂
 that it in Salomon was all fulfilled
 (I 632; Schallert, 2010: 379 (28a))
- c. Uuâr-ána mág îoman skéinen **sînen geuuált án demo**
 wodurch mag jemand offenbaren seine Gewalt an dem
lîchamen
 Körper
 (NB 90,20; Schallert, 2010: 378 (26b))
- (10) a. Tár hábet si **îmo** geántuuúrtet **sînero frâgo**
 there has she ihm answered his question
 (NB 219,21 Schallert, 2010: 378 (27a))
- b. tánne sie **búrg-réht** scûofen **demo líute**
 that they city-rights gave the.DAT people
 (NB 64,13 Schallert, 2010: 378 (27b))

Moreover, he finds a parallel example that he claims to be evidence for the co-existence of OV and VO. In (11), next to the typical OV order, where the verbal particle is attached at the left of the verbal head (11-b), we can observe a case of post-verbal particle and post-verbal object in a subordinate clause (11-a), which is only compatible with a VO analysis. As far as I understand, (11-a) is a unique example.

- (11) a. taz er beiz imo selbemo **aba** dia zungûn
 that he bit him self off the tongue
 (NB 91,3; Schallert, 2010: 381, (31a))
- b. ter imo selbemo dia zungûn **aba** beiz
 who him self the tongue off bit
 (NB 16,12; Schallert, 2010: 381, (31b))

Axel (2007) questions the validity of the OV/VO Hypothesis by arguing that, although surface variation exists, no unambiguous evidence for the presence

Axel (2007) additionally discusses the possibility of verb movement to the head of a right-branching sentence medial projection (T or *v*), as has previously been proposed in the literature (see *Ibid.*: 95–104 for a review of the different approaches), thus considering the hypothesis that such a projection was available in older German. Also in this case, she finds that the evidence from the OHG does not sufficiently support the analysis. In fact, the type of examples that suggest verb movement to a sentence medial projection, namely those in which the finite verb precedes the non-finite verb and non-verbal material appears between the verbs, could equally be explained by verb projection raising (VPR), i.e. rightward movement of the verbal projection (14), as it is commonly assumed for modern Germanic, thus maintaining a OV base order (*Ibid.*: 103).

- (14) [...] odho uuir noh t_i sculim [_{VP} siin quhemandes biidan]_i
 or we still should his coming await
 ‘or we should still await his coming’
 [...] *an uenturus adhuc expectetur*

(I 434; Axel, 2007: 99, (100))

Instead, when considering unambiguous diagnostic environments for VO order proposed within the discussion of basic order in historical English (Pintzuk, 1991 for OE, Kroch and Taylor, 2000 for ME), Axel (2007) finds no evidence in favour of the presence of VO patterns. As the discussion so far has shown, since surface variation between OV and VO of the kind presented above is not always a reliable guide to underlying position, due to the availability of movement operations in Germanic, Pintzuk (1991) proposes some diagnostic environments for this distinction, which have later been used for investigations of subsequent stages of historical English (e.g. Kroch and Taylor, 2000). Considering that prosodically light elements do not extrapose in modern (OV) Germanic, Pintzuk (1991) argues that, when found in post-verbal position, pronouns, verbal particles, monosyllabic adverbs and stranded prepositions, are indicative of underlying VO. As to the distribution of verbal particles in OHG Axel (2007) finds that they almost never appear to the right of the verb in dependent clauses, with example (11-b), cited above from Schallert (2010) and

repeated here as (15) being the only cited example in the literature.

- (15) az er beiz imo selbemo **aba** dia zungûn
that he bit him self off the tongue

(NB 91,3; Schallert, 2010: 381, (31a))

On the other hand, in Old English post-verbal particles are frequently found in subordinate clauses (cf. Pintzuk, 1991: 88). An example is illustrated in (17).

- (16) gif Crist scute ða **adun**
if Christ casts then down
'if Christ then casts himself down'

(ÆCHom i. 170.21-22; Pintzuk 1999: 58)²

Similarly, post-verbal pronouns and light adverbs are frequently found in OE but not in OHG, at least not independently of the Latin original (cf. Axel, 2007: 106). (17-a) and (17-b) show examples from OE, in which an object pronoun and a monosyllabic adverb follow the verb, respectively.

- (17) a. swa þ hy asettan **him** uppon æne sið
so that they transported them inland in one journey
'so that they transported themselves inland in one journey'

(ChronA 132.19 (1001); Pintzuk 1999: 50)³

- b. þæt martinus come þa into þære byrig
that Martin came then into the town
'that Martin then came into the town'

(ÆLS 31.490-491; Pintzuk 1993: 17)⁴

In OHG such examples mostly reflect the Latin order, as in (18-a) and (18-b), where the post-verbal pronoun is also found in the Latin source. Independently of the Latin source, Axel (2007), cites (18-c) as the only example, which is the same cited above by Schallert (2010) from Tatian.

²In Axel, 2007: 104, (109a)

³In Axel, 2007: 106, (116a)

⁴In Axel, 2007: 106, (116b)

- (18) a. dhazs uueroðheoda druhtin sendida **mih** zi dhir
 that Hosts' Lord sent me to you
 'that the Lord of Hosts sent me to you'
quia dominus exercituum misit me ad te
 (I 236; Axel, 2007: 106, (117a))
- b. dhazs ih fora sinemo anthlutte hneige **imu** dheodun
 that I before his countenance subdue him nations
 'that I might subdue nations for him under his sight'
ut subiciam ante faciem eius gentes
 (I 153; Axel, 2007: 106, (117b))
- c. Inti therdar giotmotigot **sich**
 and who.REL.PARTCL humbles himself
 'and who humbles himself'
& qui se humiliat
 (T 403,19; Axel, 2007: 106, (117c))

In conclusion, although OHG shows a much higher degree of word order variation than its present-day counterpart, the evidence in favour of the OV/VO Hypothesis is not convincing enough, since most of the phenomena suggesting the presence of VO patterns can be accounted for in the OV scenario by movement operations and what would count as unambiguous evidence for VO, i.e. post-verbal light elements, is rather scarce in the available sources.

Since the database for OHG is relatively restricted, subsequent studies have focused on later stages of German, where it was possible to analyse larger text samples and thus also to reliably quantify the observed variation through statistical inference. Sapp (2014) looks at extraposition in MHG and ENHG, taking into account different factors that have been claimed to influence extraposition⁵. He finds that although extraposition is more frequent in MHG and ENHG than it is in PDG, it is not free but rather favoured in certain contexts. First, as in PDG, PPs are most frequently extraposed⁶. Second, the length of the extraposed constituent also revealed to be a significant factor, showing that

⁵Factors were tested with a logistic regression analysis conducted using the statistics package GoldVarb X (Sankoff et al., 2005).

⁶Clausal complements are not included in the investigation.

longer constituents are more likely to be extraposed. Third, extraposition is favoured if the constituent is focused (both with new information focus and contrastive focus)⁷. In addition, one of the most significant factor groups selected by Sapp's (2014) analysis is Genre. He finds that sermons yield the highest rate of extraposition compared to other text types. Sapp (2014) takes this as a first indication that extraposition might be more typical of spoken than written language. In fact, although sermons are preserved as written texts, they were clearly conceived for oral presentation. Finally, Time was also a significant factor, showing a significant decrease of extraposition in the second half of the 16th century. This effect is reminiscent of what I found for infinitives in the previous chapter: it is around the same time that intraposition of the infinitive increases. This parallel is indeed suggestive of the fact that some changes are happening in German syntax in this period; however, the evidence presented so far rather speaks against structural change. The evidence for mixed order is rather scarce in OHG, and the fact that extraposition is not free but restricted to certain contexts points at the OV-Hypothesis, where extraposition is derived by rightward movement of e.g. heavy or focused constituents. Sapp (2014) also investigates the behaviour of diagnostic elements used in Kroch and Taylor (2000) work on ME (discussed above for OE), and finds further advantage for the OV-Hypothesis. He finds no particles occurring to the right of the verb in his corpus and only one light pronoun (19-a) and three light adverbs, as in (19-b), in post-verbal position, which together represent the 0,2% of the possible extraposition cases (in the remaining 1.825 instances pronouns and adverbs precede the verb).

- (19) a. ... als vor gemelt ist **vns**.
as before said is us
'... as was said to us before.'

(Pillenreuth 15; Sapp, 2014: 150, (13))

⁷Whether focus is a genuine factor or it can be subsumed under a prosodic constraint as in Sapp (2011) is not discussed here.

- b. alsi hie biscríbin ist vorí.
 as here described is before
 ‘as is described here above’

(Mühlhäuser R. 08v; Sapp, 2014: 150, (14))

In addition Sapp (2014) also finds instances of post-verbal subject, as in (20). As Axel (2007) had already shown for OHG, these cases actually speak for the OV-Hypothesis plus rightward movement, since even in cases of head-initial VP the subject cannot be in situ post-verbally and must have moved there. Hence they take these cases as positive evidence for the possibility of movement.

- (20) die nicht phlanczt hat [mein hymelischer vater]
 REL not planted has my heavenly father
 ‘which my heavenly Father has not planted’

(Rationale 9; Sapp, 2014: 151, (16))

Sapp (2014) therefore concludes that “the mere presence of post-verbal constituents in earlier Germanic is not enough to motivate an SVO analysis for MHG and ENHG” (Ibid.: 151), thus he sees no evidence for structural change from MHG to PDG. In his view, the decrease of extraposition might be due to normative pressure, thus while certain conditions (e.g. long or focused constituents) might still be potential triggers for extraposition, they resist it due to the adherence to the prescriptive option.

Sapp’s (2014) findings confirm those of Bies (1996) on ENHG, who investigated the two hypotheses by taking into account the diagnostics proposed in Pintzuk (1991) for English first, and secondly looking closer at three phenomena, namely NP-extraposition, variable order in the verb cluster (including VPR) and PP-extraposition. Similarly to Sapp (2014), Bies (1996) finds no monosyllabic adverbs in post-verbal position and only one post-verbal particle as well as two post-verbal pronouns (respectively 0.6% and 0.1%). As to NP-extraposition, she also claims that this is focus-driven: in her view, NP-extraposition is movement to a focus position that narrows down the focus on the extraposed element only, as opposed to non-extraposed configuration, where the focus can be ambiguous; an operation that is not available anymore

in PDG. Concerning PP-extrapolation and order in the verb cluster, Bies (1996) argues that these phenomena do not represent strong evidence against OV, because they can be derived by a movement operation as well. Furthermore, the investigation of sociolinguistics variables such as register and social class on the variation in verb clusters reveals what according to Bies (1996) is evidence for a “change from above” (Ibid.: 45ff.). In fact, the analysis shows that V(P)R orders are least frequent in formal writing (essays and government writings) than in informal and literary texts. In her view the decrease of V(P)R, and in parallel of NP and PP extrapolation, is due to a process of standardisation that involves the spread of a prestige surface word order template, which in this case corresponds to the verb final order (see also Ebert, 1981 for the same interpretation).

While the data from OHG did not allow to draw strong conclusions due to the scarcity of evidence, data from later stages show, in my opinion, what is a clear advantage of the OV-Hypothesis. First, it has been shown that extrapolation does not occur arbitrarily but is restricted to certain contexts, thus providing a motivation supporting the movement account. Second, thanks to a much larger data base, it can be concluded more confidently that the lack of unambiguous VO environments, i.e. extrapolated light elements such as pronouns, monosyllabic adverbs and verb particles, is indicative of the fact that German was OV in its older attestations too. Thus, no structural change from OV/VO to OV has happened in the course of ENHG. An alternative proposal that has been put forward is that these changes might reflect the emergence of a prescriptive standard.

6.2 Further empirical evidence

In light of the discussion presented in the previous section it seems that the explanation postulated in Demske (2015), that increase in intraposed infinitival complements is to be ascribed to a structural change from OV/VO to fixed OV basic order happening in ENHG cannot be maintained. In the present section, I provide further support for the OV-Hypothesis by showing the results

of a replication of Sapp's (2014) investigation of unambiguous diagnostic environments, conducted on the basis of the Potsdam Treebank of ENHG (Baumbank.UP, Demske, 2019), thus on an additional set of ENHG texts to those used in Sapp (2014). The investigation of these diagnostic environments in such corpus has two major advantages: first, it is of an advantage for the present study of word order variation in infinitival complements, since by using the same underlying corpus (or at least a great part of it) it is possible to establish whether a direct correlation is present between changes in the underlying word order and changes in the linearisation of infinitival complements. Second, it offers a level of syntactic annotation that allows to retrieve the instances of interest in a structured and replicable manner, through a search query that specifically targets the desired contexts.

As for the main study, the search was conducted on the pre-published version of the corpus using TIGERSearch (Lezius, 2002). Search query targeted sentences (cat="S") introduced by a subordinative conjunction (pos="KOUS"), and that contained either of the diagnostic light elements under investigation – object pronouns (pos="PPER") or reflexive pronouns (pos="PRF"), verbal particles (pos="PTKVZ") and monosyllabic adverbs (pos="ADV")⁸ – either preceding or following the verb. An example of the search query for post-verbal direct object pronouns is given in (21)⁹. The first four lines define the elements that have to be present in the targeted examples, while the remaining lines specify the relations between the elements. The syntactic node "S" (sentence) dominates (>), i.e. contains, the parts of speech "KOUS", i.e. subordinative conjunction, "PPER", personal pronoun and a verb "/V.*/" . The edge specification "OA" in the dominance relation between "S" and "PPER" additionally ensures that accusative objects are targeted (for dative objects the specification DA was used). Finally, the bottom line defines precedence relations, in this case it targets pronouns following the verb.

⁸The query only allowed to search for adverbs, as to whether these were monosyllabic was manually filtered.

⁹Note that the exact format of the search query depends on the search tool used.

- (21) #1: [cat="S"] &
 #2: [pos="KOUS"] &
 #3: [pos="PPER"] &
 #4: [pos="/V.*"/]&
 #1 > #2 &
 #1 >OA #3 &
 #1 > #4 &
 #4 . #3

The same search query with the opposite precedence relation was used to find pre-verbal elements. In this case, hits were further filtered manually to include only elements that are considered to be in their base position, that is, that have not been moved to a higher position in the sentence (e.g. in the *Wackernagel*-position), as suggested by Pintzuk (1991). Thus, examples like (22) have been excluded.

- (22) das **mich** niemand sehe
 that me.ACC nobody.NOM sieht

(1430, Karr s1121)

The results of this investigation confirm those of previous studies on ENHG. Out of 616 sentences containing particle verbs, seven have a post-verbal particle, as in (24), that is 1,1% of all possible contexts, whereas in the great majority of the sentences the particle precedes the verb, as in (23).

- (23) ...das das kalt wetter vnd wind Riffen **abe** gieng
 that the cold weather and wind hoarfrost away went
 'that the cold weather, the wind and the hoarfrost go away'

(1445, App s263)

- (24) a. das sye dem pfarrer kamen **vor**
 that they the pastor came before
 'that they preempted the pastor'

(1490, Pfaffe s146)

- b. das ir vns also faret **mit**
 that you us also go with
 ‘that you also go with us’

(1490, Pfaffe s178)

Looking at the cases of post-verbal particles more closely, however, reveals that the two examples in (24) are found in a rhymed portion of text, as shown in (25).

- (25) a. Die päiren eylten mit dem **chor**
 das sye dem pfarrer kamen **vor**

(1490, Pfaffe s146)

- b. Sye sprachen: herr, es ist nit **sitt**
 das ir vns also faret **mit**

(1490, Pfaffe s178)

Once these two examples are excluded, we are left with five cases (0,8%), which do not justify the presence of a mixed – OV/VO – base order. In order to substantiate this claim an Exact test of goodness-of-fit¹⁰ was run using the built-in binom.test function in R (version 3.5.1, R Core Team, 2021) which confirmed that this distribution is not accidental (p<0.001).

A similar picture emerges when looking at the distribution of pronouns. Out of 1166 sentences with an object pronoun, six cases of post-verbal pronouns were found (0,5%). Again, three examples are due to the adherence to a rhyme scheme in the same text cited above, cf. (26) and (27). When these examples are not considered, only three potential cases of VO order are left, which represent 0,3% of all possible contexts. An Exact test of goodness-of-fit again confirmed that the difference in the proportion of the two variants is not random (p<0.001). Moving to the next type of element, namely monosyllabic adverbs, no cases of either pre- or post-verbal positioning were found at all.

¹⁰Exact tests are used to determine whether the distribution of two possible outcomes is randomly distributed, i.e. they test the H₀ that the probability of each outcome is 0.5%, (cf. Gries, 2013: 166).

- (26) a. Das sye do grosschen opffern **dir**
 that they the Groschen sacrifice you
 ‘that they sacrifice the Groschen to you’
 (1490, Pfaffe s326)
- b. Das wir ß zuom altar brachten **im**
 that we it to altar brought him
 ‘that we brought them to the altar to him’
 (1490, Pfaffe s337)
- c. des sie allenhalben neren **siech**
 of.which they everywhere nourish themselves
 ‘of which they nourish themselves everywhere’
 (1490, Pfaffe s914)
- (27) a. Das sye do grosschen opffern **dir**
 das theten nye die meynen **mir**
 (1490, Pfaffe s337)
- b. Das wir ß zuom altar brachten **im**
 O wee allererst ich wol **vernym**
 (1490, Pfaffe s326)
- c. So das dye buren haben **viech**
 des sie allenhalben neren **siech**.
 (1490, Pfaffe s914)

In conclusion, as previously found by other studies, the evidence from the present corpus, i.e. the virtual absence of post-verbal light elements, suggests that ENHG was already an OV language and that no structural change has happened in this period.

6.3 Summary

In the present chapter, Demske’s (2015) hypothesis was discussed, according to which the increase of intraposed infinitives from older to late ENHG is caused by structural changes affecting word order in German more generally, that is,

a development from a third type language with a mixed OV/VO order in the sense of Haider (2010b) to a language with fixed OV basic order. Previous scholarship investigating the OV/VO alternation in the history of German and the possibility of such mixed orders was presented and it was shown that no convincing evidence in favour of the presence of base-generated VO orders could be found in either of the investigated stages (OHG, MHG, ENHG). In order to draw direct a correlation between such a putative change and the changes affecting the ordering of infinitival complements a further study was presented, investigating unambiguous diagnostic patterns for base-generated VO orders on the basis of the Potsdam Treebank of ENHG, the corpus underlying the main study of the present work for the ENHG period. In line with previous studies, no such evidence could be found. In conclusion, the evidence discussed in the present chapter suggests that German has been an OV language throughout its history, thus the increase of intraposition observed in the ENHG period cannot be ascribed to structural changes in the clausal architecture, as proposed in Demske (2015). Therefore the question remains open, how this increase can be explained. In the next chapter I outline an alternative proposal that takes into account different factors to explain the observed increase of intraposed infinitives from older to late ENHG, and further has the advantage of accounting for the development of infinitives' word order distribution in later stages as well.

7

Explaining the change II: a unified, multi-causal account

In the previous chapter I have argued against an explanation for the diachronic variability in the position of the infinitive from older to late ENHG based on the structural changes affecting German basic word order. The present chapter presents an alternative proposal based on the assumption that basic word order in German has always been OV. Previous accounts favouring the OV-Hypothesis have proposed that the decrease of extraposition in German, as well as the stabilisation of the verb order in the so-called verb clusters in favour of OV surface patterns, was due to “normative pressure” (Sapp, 2014: 154) or to “change from above” (Bies, 1996: 45ff.), that is “a change in the linguistic system [...] that involves the adoption of a norm that is external to the speech community” (Bies, 1996: 46) and is driven by a prestige variety, resulting in the “imposition of a standard surface word order template” (Ibid.: 62), in this case OV patterns. If on the one hand, the data supports the sociolinguistic pattern of change from above, with more monitored styles such as administrative documents showing the highest usage of OV surface patterns (cf. Bies, 1996, Sapp, 2014, see also section 3.2.3), this explanation is not fully satisfactory the way it stands currently. First, as Ebert (1980) correctly notes, it does not explain why OV patterns dominate chancery usage. Also note that no normative grammars had been introduced at that point (cf. von Polenz, 2000: 184) and that precursors of grammar textbooks that circulated already from the end of the 15th century were restricted to orthography (Ibid.: 173). Second, it neglects that fact

that the variation was shown to not be as liberal as it was assumed, but restricted to specific contexts. In particular it was shown that NP extraposition was reserved to long or focused constituents (cf. Chapter 6) and that variable order in the verbal complex was strongly influenced by prosodic and rhythmic factors (cf. section 3.2.3). In addition, coming back to *zu*-infinitives, this explanation would only account for the development observed with raising verbs, which are increasingly found adhering to the verb-last rule. However, when considering infinitival constructions with control verbs, the “standard surface word order template” (Bies, 1996: 62) is only partially followed since, as the data presented in the Chapter 5 shows, we observe an increase of intraposition from period 1 to period 2 but a tendency to decrease after period 2, with a significant drop in intraposed infinitives in the last period, i.e. from 1990. In the remaining of the chapter, I argue for an alternative explanation that is largely inspired by the existing one, but also provides a more fine-grained explanation as to why the OV order was typical of chancery, but also of other texts and has the advantage of providing a unified account of word order variation in *zu*-infinitive constructions in the whole investigated period.

I propose that the stabilisation of the OV surface order, therefore intraposition, did not spread in the first place as a consequence of it being used in a prestige variant, or the adoption of a prescriptive norm, but that its spread was rather due to a change in the conception and fruition of the written language as such that then led to the emergence of a written standard. I hereby primarily follow Betten (1987), Betten (2000) in the assumption that in medieval German, writing was still mainly conceived for oral purposes and that starting from the 15th century, the written language gains its independence from orality and I provide an account of how this shift can explain the increase of intraposed infinitives from early to late ENHG. I propose that this results from the interaction of three type of factors, whose influence has been discussed at several points in this work: structural, prosodic and processing factors. In addition, I argue that by also taking into account the notion of specialisation of the variants, the present account has the advantage of explaining the diachronic distribution of infinitival complements' position up to PDG. As a whole, the explanation is

grounded in the development model of the German standard language proposed in Weiß (2005), in which language modality plays a central role.

The present chapter is organised as follows: in section 7.1, I briefly illustrate the four stages of the development model proposed in Weiß (2005) and outline the role of language modality in the standardisation process, which will be of central importance in the whole chapter. Section 7.2 goes back to the beginning of such standardisation process and illustrates how the historical context laid the foundations for the development of a new writing and reading culture and how it favoured the emergence of a written standard. Section 7.3 will further review the role of the different factors that have been found to influence word order in infinitival complementation and discuss how the frequency of intraposition is related to language modality. Section 7.4 and 7.5 investigate the distribution of intraposition in different written genres that are predicted to be influenced by the spoken modality to different degrees and additionally presents data from a corpus of spoken PDG in order to provide further support for this relation. Section 7.6 proposes a formalisation of the interaction in the Gradient Symbolic Computation framework and section 7.7 shows how this explanation can extend to the rest of the investigated period.

7.1 A four-stage model development of the standard German language

As I will show in the rest of the chapter, the diachronic development path I propose for infinitival complements' word order distribution is strictly related to the development model of the German standard language proposed in Weiß (2005). In his account, PDG is the result of a four-stage development in which two aspects play a central role: language acquisition and language modality.

In the first stage, the newly-emerged standard language, which has its origins in the 14th/15th century, is only used in the written modality and is learned as a second language, next to the native dialect. In the second stage, the standard language develops from a language that exists only in writing and is created exclusively for written use, to one that is oriented towards a language

that would be potentially understandable in the spoken modality as well, thus starts to be influenced by the spoken language, but is still mainly written and learned as a second language. It is only in the third stage that the standard language starts to be spoken as well and gradually enters everyday communication but it is still learned as a second language. Finally, it is in the last stage that the standard language becomes a native language that is both written and spoken and the influence of the spoken modality converges into the standard language. According to Weiß (2005), the emergence of a spoken standard language can be traced back to the 19th century and it was favoured by important language-external innovations such as the mobility of the population first caused by the industrialisation and later on by the World Wars, as well as the introduction of mass media such as radio, television and similar, which contributed extensively to bringing the standard language into peoples' homes. However, it is only starting from the second half of the 20th century that the standard language becomes a native language.

Crucially, according to Weiß (2005) the language modality factor has an impact on the development of features of the language, thus according to this model it is possible to make some predictions about what features characterise which stage of the development. In the rest of the chapter I will illustrate how the diachronic distribution of intraposition, and consequently of the competing patterns, can be largely explained on the base of this development model, in other words, by the changing impact that language modality has on the development of the standard language. Before discussing to the development of the standard language, the next section focuses on the factors that led to its emergence and highlights how language modality, in particular the pragmatically conditioned emergence of a new form of writing, also played a crucial role there and how the increase of intraposition follows from it.

7.2 Towards the independence of the written language

The expansion of the writing culture and the way towards the standardisation of a written language is considered by von Polenz (2000) to be one of the distinc-

tive features of the transitional stage between medieval and modern German. Multiple language external factors have been identified in the literature, that have favoured this process. In fact, while this shift is of crucial interest for the development of the standard German language, it is above all a change that was shaped by changing cultural, religious and socio-economic realities. First, the socio-economic organisation of the time had a fundamental impact on the emergence of a new written modality: the rise of towns and the development of trade not only brought people with different dialects together, favouring the emergence of a super-regional standard or at least the need for it, but also created the need for new, pragmatically oriented forms of writing that did not have any precursors in the spoken language (von Polenz, 2000: 115). Furthermore, those new text types such as administrative documents, contracts, law books and similar, were conceived to be kept and consulted, thus for private use rather than for oral transmission (Ibid.: 123). The practice of silent reading was further boosted by the events linked to the Reformation. By challenging the authority of the Church and propagating the delatinisation of religious practices, most importantly through his Bible translation, Martin Luther gave a fundamental contribution to the expansion of German as a written language and the reading practice. In fact the translation of the Bible constituted an invitation for the believers to read the scriptures privately and to self reflection (Hartweg and Wegera, 2005: 80). The school and university reforms that followed from the Reformation also contributed to the spread of literacy, thus expanding the circle of potential consumers of the new written product (von Polenz, 2000: 142). According to von Polenz (2000), the expansion and growth of writing and literacy also went hand in hand with important technical innovations such as the production of paper instead of parchment, the introduction of reading-glasses and later the invention of the printing press with moveable type by Johannes Guternberg around the year 1446. This new system made it possible to print books more rapidly than writing or copying a manuscript and significantly reduced the costs of the process, which favoured the spread of availability and private owning of books. All these factors contributed to a significant shift in the writing and reading culture. While in the middle ages

the fruition of written texts consisted mainly of a social practice, in which these were read aloud for the usually illiterate public, it gradually shifted to the individual, silent dimension (Betten, 2000: 1647).

What this change entails, is of course, a change in the features of the written language, since this no longer serves oral purposes but emerges as an independent system. As a result, newly-emerging text types and academic writing show the typical characteristics of the new written style since the early ENHG period (von Polenz, 2000: 190), while texts that were typically associated with oral traditions still make use of devices oriented to the oral perception (Betten, 2000: 1650). Among the latter text types Betten (2000) mentions religious writings, chronicles, travelogues and novels. It is after 1500 that features of the new writing tradition are increasingly found in all text types (Ibid.: 1651).

This explosion of the written language is a crucial step in the emergence of a standard language: it is in this newly-emerged written modality that the convergence of different early modern varieties towards a super-regional standard takes place and this leads to the first stage of Weiß's (2005) model presented above, in which language modality continues to play a crucial role in shaping features of the language. In the next section I will show how this effect of language modality affects word order variation in infinitival complements.

7.3 Intraposition as a feature of the written language

In the previous section, I gave an overview of the major language external changes that led to the a crucial change in the writing and reading culture and that laid the foundations for the emergence of a written standard. Aim of the present section is to illustrate how this change affects the linearisation of infinitival complements from older to late ENHG. In particular, I argue that intraposition is a typical feature of the new written language and discuss how this results from the interaction of a structural constraint, that is an OV basic order, with processing and prosodic factors.

As widely discussed in the previous chapter, there is no evidence that German clause structure has undergone change from its oldest attestations to PDG,

hence the architecture of the clause discussed in Chapter 2 can be assumed for older stages of the language as well. Under the assumption that German is characterised by a head-final VP, the base position of complements is at the left of the verbal head, hence in intraposed position. However, as also discussed at length in previous chapters, infinitival complements are rarely attested in intraposed position at the beginning of the investigated period, which suggests that this structural constraint competes with others in determining the linearisation of complements relative to the verb. In the following I discuss the role of two factors, processing complexity and prosody, and how their relative importance in the interaction with the structural constraint is predicted to change according to the role of language modality.

7.3.1 Processing complexity

It has often been claimed in the literature that ENHG is characterised by a high degree of syntactic complexity. For example, von Polenz (2000) observes the increasing use of hypotactic structures and the tendency to an hypercorrect conformity to the sentence bracket principle, which often results in the formation of complex nested structures (Ibid.: 190). Complexity does not only concern verbal constituents, but can be observed also in the increasing use of nominal modification and the general increase of the sentence's length, as discussed in Admoni (1967). Demske (2016) addresses the question of complexity in ENHG from a psycholinguistic perspective and following memory-based accounts, she adopts a measure of complexity that is based on the distance between elements that are dependent on each other either syntactically or semantically, the so-called dependency length. According to this principle, nested structures yield higher processing costs since they increase the distance between dependent elements, e.g. the subject and the verb. Among the complex structures that cause elevated processing costs, Demske (2016) includes intraposed infinitives, since these also contribute to the formation of a long middle-field and hence to the increase of dependency length between subject and verb, as in (1) or between the auxiliary in the left sentence bracket and the main verb in the

right sentence bracket, as in (2).

- (1) Obwollen **die von Henegaw** / [dem Herren Cardinal den
although the of Hainaut the.DAT lord Cardinal the
Hundertsten Pfenning vom Wein vnd andern sachen zugeben]
hundredth penny of wine and other things to.give
versprochen
promised
'Although the people of Hainaut promised to give the lord Cardinal the
hundredth penny of wine and other things'

(1597, AC s678)

- (2) Anfangs dieses Monats / **hat** der Herr Cardinal de
In.the.beginning this.GEN month.GEN has the lord Cardinal of
Austria sein Kriegßvolck / [theils nach Arthoys vnd Henegaw vnd
Austria his troops partly to Artois and Hainaut and
theils nach Flandren zuziehen] **verordnet**
partly to Flanders to move ordered
'At the beginning of this month, the Cardinal of Austria ordered his
troops to-move partly to Artois and Hainaut and partly to Flanders.'

(1597, AC s678)

The claim that intraposed infinitives yield higher processing cost does indeed find empirical support as concerns PDG clausal infinitives, as discussed in Chapter 3. Empirical studies have shown that the intraposition of clausal infinitives can be problematic from a processing perspective, not only because they increase the distance between dependent elements, but because they also give rise to structural ambiguity during processing: due to a processing constraint that favours minimal structure building during real-time, incremental parsing, intraposition is claimed to be first associated with a mono-clausal structure. However, as soon as an unambiguous cue for the formation of a clausal boundary is encountered, the initial structural analysis needs to be revised, which leads to increased processing effort. In addition, even when the control verb is optionally compatible with a coherent, mono-clausal structure, cluster formation can also lead to increased processing effort due to argument structure unification. For this reasons it has been argued that extraposition is

the preferred word order variant for clausal infinitives in PDG. Obligatory non-clausal infinitives on the other hand, are not claimed to be affected by the above mentioned processing constraints. In section 5.4, I further showed that a disadvantage for intraposition of obligatorily clausal complements can also be found in the diachronic corpus data: analysing the group of control verbs more closely revealed that accusative object control verbs, which are claimed to resist coherent configurations for structural reasons, show a lower frequency of intraposition compared to the group of optionally coherent control verbs across most of the investigated period.

But how does complexity relate with the changes described above? I hereby follow previous literature in posing that there is a connection between language modality and syntactic complexity intended as processing complexity. Already von Polenz (2000) had argued that the increase in complexity that characterises ENHG is to be ascribed to the expansion of writing and an increasing tendency towards a syntax to be read rather than to be listened to. In newer work this intuition has been rephrased in terms of different processing conditions: while in the spoken modality real-time processing is required, in the written modality the processing time window is larger and can be extended according to the reader's needs (Weiß, 2005, Speyer, 2013, Ortmann and Dipper, 2020). From this it follows that while complex structures may still be a problem from a processing perspective, they are much more so in spoken than in written modality, since in the latter processing is not subject to real-time pressure. Assuming that intraposition is a more costly, or a more complex option from a processing perspective, we may therefore derive the prediction that intraposition is dispreferred in the spoken modality, at least as far as control verbs are concerned. When the spoken modality does not play a major role anymore, due to the expansion of the writing and reading culture and the emergence of a written-only standard, this processing pressure is reduced and hence the usage of intraposition, that from the point of view of the grammar is the unmarked option, adhering to the OV basic order, increases. However, processing factors alone still do not fully account for the observed distributions in the oldest period. As mentioned above, intraposition of non-clausal infinitives is not affected by a

processing disadvantage, hence other factors must have caused the variation. In the next section the role of prosody is discussed.

7.3.2 Prosody

In Chapter 3 I have shown that, next to processing, another factor has been claimed to influence the linearisation of clausal infinitives in PDG, that is to say prosody. It has been proposed that, as other clausal constituents, clausal infinitives form the highest type of prosodic constituent, which embedded into another, smaller prosodic constituent gives rise to an ill-formed prosodic structure. For this reason intraposition of clausal infinitives has been claimed to be highly marked in PDG. While it has been shown that prosody plays a role in written language and in silent reading as well (see Fodor, 2002, Bader, 1998, Speyer, 2010), I believe it is fair to assume that the spoken modality is more prosody-sensitive than the written modality. Thus, similarly to the processing issues discussed in the previous section, we can draw the prediction that intraposition of clausal infinitives is more problematic in the spoken than in the written modality. As for processing constraints, once the influence of the spoken modality on the written language decreases, prosodic optimisation does not play a crucial role anymore and an increasingly adherence to the OV basic word order can be observed.

Prosodic factors have been claimed to play a role not only with regards to clausal infinitives but also in the linearisation of non-clausal infinitival constructions. In particular, in the verb clusters literature rhythmic principles have been identified since the first studies, e.g. Behaghel (1932). As shown in Chapter 3, Sapp (2011) concludes from his empirical evidence, that the attested word order variation can be reduced to one prosodic principle, namely the alternation of stressed and unstressed words. By changing the order of the verbs in the cluster this alternation is guaranteed. As discussed in section 5.3, this reordering can yield both what I identified as extraposed and third construction patterns, depending on whether the non finite verbs selects further arguments. Interestingly, the prosodic effect decreases in time, in particular it has been

shown that, while the effect is quite robust in MHG, it is not always present in ENHG. In addition, while word order variation in verb clusters is not attested in standard PDG anymore, research on non-standard, mainly spoken varieties, also reports similar effects (cf. Schmid and Vogel, 2004, Dubenion-Smith, 2010). Even though the raising verb constructions in the present study were not tested for prosodic effects, it was shown that they behave as typical verb clusters in many respects, both in PDG and diachronically. I believe that the decrease of prosodic effects from MHG to ENHG as found in Sapp (2011) supports the claim made here that a shift from oral-oriented writing to an independent written language can be observed in the course of ENHG. Moreover, the fact that alternative orders are found in modern spoken varieties of Germanic, in my view, further strengthens the claim.

In the next sections I turn once again to the corpus data, and test whether they provide further support for the claim that intraposition is a distinctive feature of the written language.

7.4 The effect of language modality on infinitive placement: analysing genres' differences

In this chapter I proposed that the increase of intraposed infinitives is not due to structural changes affecting basic word order but rather to a change affecting the conception and fruition of the written language from older to late ENHG and the consequent emergence of a written standard. I have argued that intraposition is a feature of the newly emerged written language that has gained its independence from orality, and as such, is more frequent in late ENHG than in the older period. In order to gain further support for the hypothesis that the change is due to a strengthening of the written language, I conducted a further analysis of the data collected in the present corpus study. As introduced in Chapter 4, the analysed corpus contains texts of different genres, but while in the main study in Chapter 5 Genre was treated as a random factor in order to generalise over possible differences among text types, in the present analysis it is those differences that are of interest for our question. According to von

Polenz (2000) and Betten (2000) newly emerging text types such as administrative documents and scientific writing show features of the written language from early on. Texts which are typically associated with an oral tradition on the other hand, initially still show spoken oriented properties and only adapt to the new written style starting from the 16th century (see also section 7.2). Assuming that intraposition is a feature of the written language, it thus should be less frequent for the latter text types than for administrative and scientific writing. No administrative texts were available in the present data, but the corpus includes four genres: informational texts, religious texts, fictional prose and scientific texts. While the latter represent a highly specialised text type and as such are not intended for a broader public but for few, literate experts, the first three correspond to those text types that Betten (2000) considers to have been more spoken oriented (see also Ortmann and Dipper, 2020 for a similar prediction).

7.4.1 Data and analysis

A subset of the data presented in Chapter 5 was analysed for this comparison, namely data from VNC period 1 (1450–1550) and VNC period 2 (1550–1750). The data was again analysed by means of mixed-effects logistic regression, with choice of intraposition as the dependent variable. This time the factor Genre (including the four levels “scientific”, “informational”, “religious” and “fiction”) was included in the analysis as fixed effect next to Time period (VNC period 1 vs VNC period 2) and their interaction. The predictor Verb Type was not included, since as we saw from the first analysis in section 5.2, this did not yield any significant results in the first two periods, that is raising and control verbs did not behave significantly differently until around 1750. Random effects for Verb and Text were considered. As in the previous analyses, the best model was selected via stepwise model comparison and included both predictors and their interaction as well as both random effects. The comparisons of interest were obtained by employing following contrast coding and by releveling factors and refitting the model: in order to compare scientific texts to the

other text types in a given time period default treatment contrast was used for both predictors. For the predictor Genre, scientific texts were set as the baseline, that is the level the other levels are compared to. Main effects were obtained by computing sum contrasts from the generalized inverse function (Schad et al., 2018). Further comparisons were obtained by changing the baseline accordingly. According to the predictions outlined above, scientific texts are expected to yield significantly more intraposition than each of the other text types is expected in period 1. Since scientific texts are set as the baseline, the estimate for each level of the predictor Genre are expected to be negative. However, the probability of intraposition should increase for all text types from period 1 to period 2 thus yielding a main effect of Time and significant interactions, indicating that the difference between scientific texts and other text types decreases over time. Corresponding increase of intraposed infinitive for informational, religious and fictional writing is also expected. In the next section, only the lines of the model output relevant for the discussion are presented. Tables with the full model output for each comparison are provided in the Appendix.

7.4.2 Results

The analysis confirms that scientific writing makes significantly more use of intraposition than informational writing and fictional novels in period 1 (informational vs. scientific: $\beta = -3.6525$, $SE = 1.0672$, $p = 0.000621$; fiction vs. scientific: $\beta = -3.0697$, $SE = 0.9755$, $p = 0.001651$). However, the comparison between scientific writing and religious writing in period 1 failed to reach significance ($\beta = -1.7848$, $SE = 1.2513$, $p = 0.153772$). Still, the negative estimate shows that the trend is as predicted. Moving forward, a main effect of Time confirms the general increase of intraposition from period 1 to period 2 ($\beta = 1.7528$, $SE = 0.4351$, $p < 0.001$). Also, significant interactions of Genre and Time period were found for the comparisons informational writing vs. scientific writing ($\beta = 3.2676$, $SE = 1.1622$, $p = 0.004930$) and fictional writing vs. scientific writing ($\beta = 2.6813$, $SE = 1.1174$, $p = 0.016417$). This indicates that the difference between the compared pairs changed significantly from period 1 to period 2. Looking at the

plotted effects in Figure 7.1, it becomes clear that this is due to an increase of intraposition for the non-scientific texts. This increase is significant for both informational texts ($\beta=3.0859$, $SE=0.6907$, $p<0.001$) and fictional texts ($\beta=2.4996$, $SE=0.6532$, $p=0.00013$). Again, as concerns religious writings no significant interaction was found, indicating that the difference between religious and scientific writing did not change significantly ($\beta=1.7890$, $SE=1.3748$, $p=0.193163$). The predicted probability of intraposition for scientific texts remains stable: the model results show even a negative estimate, but this is by far not significant ($\beta -0.1817$, $SE=0.9171$, $p=0.842919$).

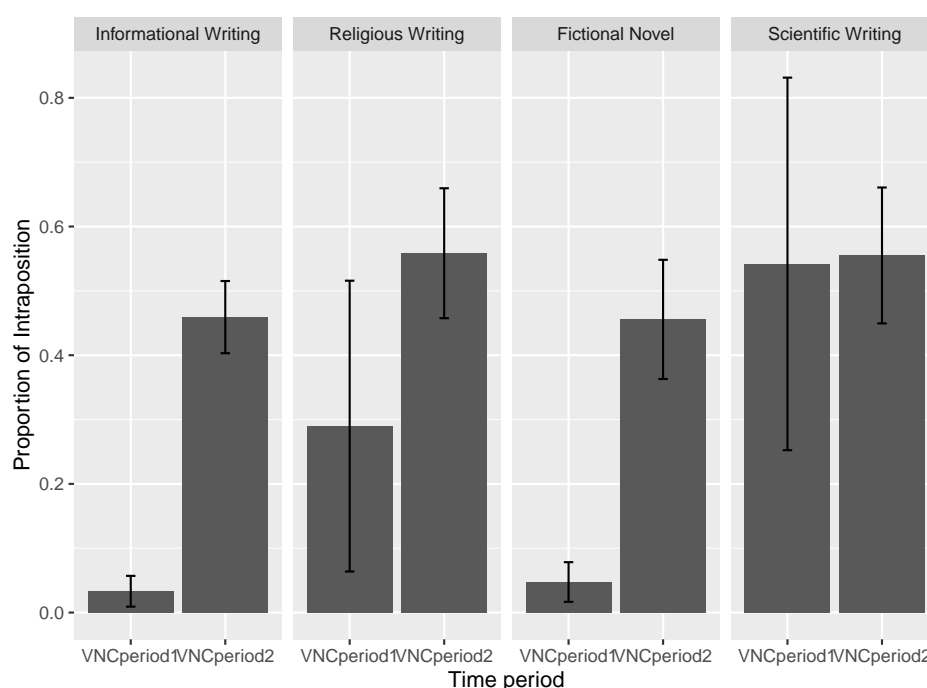


Figure 7.1: Probability of intraposition per Time period and Genre as predicted by model results

7.4.3 Discussion

The aim of the present analysis was to test whether evidence in support of the hypothesis that the increase of intraposition is due to the strengthening of the written language and consequently of a written style. According to this hypothesis we should expect different text types to behave differently especially in period 1, i.e. older ENHG. More precisely, based on the assumption that in-

trapolation is a distinctive feature of the written style, while extrapolation and third construction are more typical of a spoken oriented language, texts associated with an oral tradition should show a lower intraposition frequency than newly emerged text types such as administrative and commercial texts, as well as scientific writing (cf. section 7.2). While no administrative texts could be tested due to the organisation of the corpus, a comparison between scientific writing and informational, fictional and religious texts was conducted.

The results partly confirm the pattern illustrated in von Polenz (2000) and Betten (2000): genres typically associated with oral traditions such as informational texts and fictional prose show a lower rate of intraposition in the older ENHG period, i.e. until around 1550, compared to scientific texts. For the first two, an increase of intraposition after 1550 was observed, as predicted, while for scientific texts the frequency of intraposition remained stable over time. This result supports the idea that due to a strengthening of the writing tradition and reading culture, features of the spoken language gradually disappear from the written language for those texts that were mainly conceived for oral reception in the past. Religious writings on the other hand, which were predicted to behave like informational and fictional texts, were not found to differ significantly from scientific texts, as predicted on the basis of von Polenz (2000) and Betten (2000), although numerical tendencies show that these texts are somehow in between the two groups. One explanation may lie in the nature of the texts analysed in the present study and those considered by previous scholarship. Often, texts subsumed under the category of religious texts include sermons (cf. also Sapp, 2014, Ortmann and Dipper, 2020), which although written, are clearly associated with oral delivery. However, no sermons are included among the religious writings of the present subset of the data, which comprises theological treatises instead. It is thus plausible that this text type is more similar to scientific writing than informational or fictional writing and that it already follows the written style to a higher degree than informational and fictional texts.

7.5 The effect of language modality on infinitive placement: evidence from PDG

In the previous sections I put forward the hypothesis that the increase of intraposition is related to the strengthening of a written style as a consequence of the emergence of a new writing and reading culture. By analysing the ENHG data for Genre differences it was shown that texts associated with an oral tradition such as fictional prose and informational texts exhibit a low frequency of intraposition in the oldest period, but start adapting to the new writing tradition starting from around 1550, where they show an increase of intraposed infinitival complements. Although the data confirms the predictions based on observations found in previous scholarship, independently assessing the degree of spoken influence in written historical texts can be problematic, since spoken data are clearly not available for older stages for comparison. In the rest of the chapter additional evidence will be drawn from PDG data. I test whether the influence of modality has an impact on PDG infinitive placement by looking first at whether different written genres show any differences with respect to the use of intraposition and second, by additionally considering data from a spoken corpus, in order to assess whether this pattern is found in the spoken modality in PDG at all.

7.5.1 Genres' differences in written PDG

The written PDG data gathered in the course of the corpus study presented in Chapter 5, include data from a subcorpus, the Twitter corpus, which can be a valuable resource for the question under investigation. In fact, although the kind of content found on Twitter can be both spontaneously generated by users (especially in replies to other users' posts which can generate real-time discussions) as well as carefully edited (for example on commercial or political profiles), it has been identified as presenting rather "oral-like" characteristics (Scheffler, 2014: 2288). For example, analysing the distribution of causal connectives in the German Twitter corpus, Scheffler (2014) found that it patterns with spoken corpora rather than with written corpora of PDG such that

the causal conjunctions *denn* and *da*, both ‘because’ are more common in the written corpora, while *weil*, also ‘because’, dominates the spoken corpora and Twitter.

Following this observation, and based on the assumptions I have made so far, that is that intraposition is a feature of the written style, it can be hypothesised that intraposition will be less frequent in the Twitter corpus than in other written corpora, which for PDG comprise scientific, fictional and informational (newspapers) texts. In order to test this hypothesis the data set from PDG was analysed separately in a mixed-effects logistic regression using the `glmer` function from the package `lme4` (Bates et al., 2015) in R (version 3.5.1, R Core Team, 2021).

7.5.1.1 Data and analysis

In total 6272 observations were analysed. As in the previous analyses, choice of intraposition was the dependent variable and the categorical predictor Verb Type with the two levels “control” vs “raising” and the categorical predictor Genre (“Twitter” vs. “other” – including newspapers, fiction and scientific texts) were included. Following the model comparison procedure, the best model also included a random effect for Verb. Unlike for the ENHG data, Verb Type was included in this analysis, since it is known from previous literature and the analysis presented in Chapter 5 that raising and control verbs behave differently in PDG, such that raising verbs almost exclusively yield intraposition in PDG, while control verbs strongly prefer extraposed infinitives. The results outlined in Chapter 5, also revealed that some cases of non-intraposed infinitives are still found with raising verbs in PDG. The effect of Genre may nevertheless be different for the two groups, such that raising verbs are not affected by it since intraposition is found in nearly 100% of cases. Hence, by not including Verb Type in the analysis and considering all verbs as one group, we run the risk of failing to find a significant effect of Genre due to half of the dataset being subject to a ceiling effect. However, since we are not interested in the question of whether the predictors Verb Type and Genre interact, the effect

of Genre is not computed as main effect but as a nested effect instead. Testing for it as a nested effect means testing whether the levels of the predictor Genre differ from each other within the each level of the predictor Verb Type, in other words, whether Twitter differs from other written genres in the group of control verbs, and whether it does also in the group of raising verbs. The model results will provide following information: first, whether a main effect of Verb Type could be found, which I expect to be the case, and second whether an effect of Genre can be found for the group of control verbs and the group of raising verbs separately. This is all is needed to test our hypothesis and no further comparisons were computed.

7.5.1.2 Results

The results of the model are shown in Table 7.1. They confirm a significant main effect of Verb Type, as expected: raising verbs yield significantly more intraposition than control verbs. As illustrated in the estimates' visualisation in Figure 7.2, the predicted probability of control verbs is very low altogether, while raising verbs show intraposed infinitives in almost the totality of the cases.

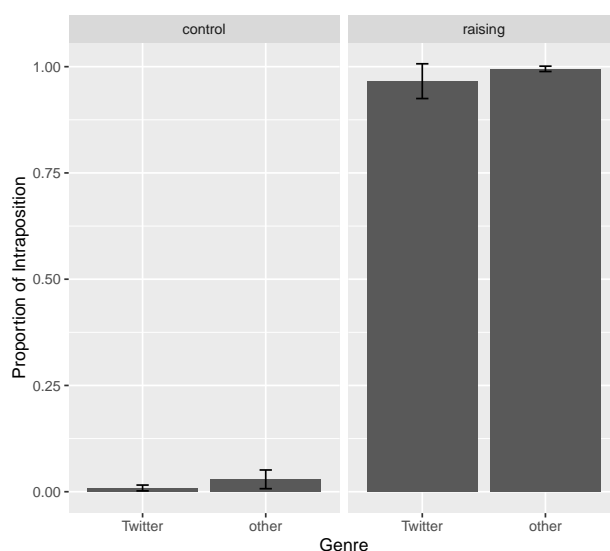


Figure 7.2: Probability of intraposition per Verb Type and Genre in PDG as predicted by model results

The comparison between genres revealed that on Twitter, significantly less intraposed infinitives are attested than in other written genres not only for the group of control verbs but also for the group of raising verbs (cf. Table 7.1). While this difference was expected for control verbs, no difference had been predicted for raising verbs.

Table 7.1: Fixed effects results of the model testing for nested effects of Genre

	Estimate	Std. error	z-value	p-value
(intercept)	-3.5071	0.7789	-4.503	6.71e-06 ***
Verb Type (raising vs control)	8.7858	1.4768	5.949	2.69e-09 ***
Twitter vs. other (Verb Type: control)	-1.2164	0.1013	-12.005	< 2e-16 ***
Twitter vs. other (Verb Type: raising)	-1.9339	0.4435	-4.361	1.30e-05 ***

Model: glmer(complement position == "intra" ~ VerbType / Genre + (1 | Verb), family="binomial")

7.5.1.3 Discussion

The analysis of the corpus data from PDG has shown that intraposition is not distributed equally across written genres. This provides an interesting insight into the question of whether the influence of the language modality has an effect the linearisation of the infinitive in German. Under the assumption that Twitter is characterised by an oral-like style, it was tested whether intraposed infinitives are less frequent in this subcorpus than in other written texts. Since raising verbs are expected to obligatorily select intraposed infinitives in PDG, the effect was only expected for the group of control verbs. The results have shown, however, that Twitter yields significantly less intraposition than other text types not only with respect to control verbs, but also as regards the group of raising verbs. According to our predictions, finding that Twitter yields significantly less intraposition than other text types suggests that intraposition is dispreferred in oral-like styles. The fact that such a difference is found for the group of raising verbs as well could indicate that the effect of Genre, hence of language modality, is even stronger than previously assumed. One might argue, however, that this is still insufficient evidence to claim that it is indeed

the spoken influence that causes the low frequency of intraposed infinitives. In order to provide further, direct support for the claim, I finally turn to spoken German and conduct an additional corpus study that analyses the distribution of infinitives' word order patterns in spoken German.

7.5.2 Searching for direct evidence: spoken German

In addition to the written data collected for the diachronic study, a corpus of spoken PDG was analysed in order to assess whether intraposition is attested in the spoken language or whether, as it follows from the assumptions made so far, it is strongly dispreferred due to both an increased processing and prosodic disadvantage.

Data was extracted from the Tüba-D/S (Hinrichs et al., 2000), and the FOLK corpus (Schmidt, 2014). Both corpora are collections of spontaneous speech and include data from different communicative contexts. For the Tüba-D/S these include appointment negotiations, travel arrangements and personal computer maintenance (Hinrichs et al., 2000), while the FOLK corpus includes interactions that range from private, everyday communication, to institutional (school, university, workplace) and public settings, e.g. panel discussion (Schmidt, 2014). The inclusion of a wide range of communicative contexts makes the overall corpus particularly suitable for the present investigation as it allows to draw more confident conclusions about the spoken language as such, since this way we don't run the risk of mistaking what might have been a particular feature associated with a specific level of (in)formality of the interactions, for a feature of the spoken language more generally, had we only looked at everyday communication, for example. Table 7.2 provides an overview of the corpus size.

Table 7.2: Corpora of spoken German

Corpus	Size (words)
Tüba-D/S	360.000
Folk	2.000.000
<i>Total</i>	2.360.000

The extraction criteria from the spoken corpus were the same as those illustrated in Chapter 5 for the written corpora. Sentences containing a *zu*-infinitive were searched using the POS-tags “PTKZU” (which finds exactly the infinitival marker *zu*) or “VVIZU” (which finds separable verbs where the infinitival marker *zu* is contained in the verb, e.g. *auf-zu-stehen*) and manually filtered in order to include only sentences with a full sentence bracket, that is either with verb final subordinate clauses introduced by a complementiser or main clauses with the matrix verb in the right sentence bracket. Due to the relatively small size of the spoken corpora and to the fact that infinitival complements are not very frequent in the spoken corpus, the query was not restricted to specific matrix verbs, which was the case for the written PDG corpora. As for the written data, however, cases of stative passive, as well as sentences with a matrix verb that was either an aspectual verb (*anfangen* ‘start’, *aufhören* ‘stop’, *beginnen* ‘begin’) and the control verb *wissen* ‘know’ were excluded from the analysis (see section 5.1).

In total 361 observations were collected and analysed. In all sentences the infinitive is governed by a control verb, that is, raising verbs are not attested with an infinitive in the present spoken corpus. The results are fairly straightforward: as Table 7.3 shows, intraposed infinitives virtually disappear from the picture, occurring in only one sentence (0.28%) in the whole dataset. An Exact test of goodness-of-fit confirmed that the distribution is not accidental ($p < 0.001$).

Table 7.3: Distribution of word order patterns (spoken data)

Word order pattern	Count	%
Extrapolation	319	88.37
Third Construction	41	11.36
Intraposition	1	0.28

The fact that intraposition is virtually absent from the spoken corpus supports our hypothesis that this pattern is characteristic of the written language, while it is dispreferred in the spoken language since in the latter modality it is subject

to increased processing and prosodic disadvantage. Extraposition, on the other hand, represents a better option both from a processing and from a prosodic perspective. As to the third construction, although this is also a potentially infelicitous choice from a processing point of view (see Bosch et al., 2021), it might in some cases still represent a better option from a prosodic perspective, as in verb clusters. Building on Cook (2001), Bosch et al. (2021) put forward the hypothesis that the third construction serves particular information structural needs, that in the spoken language can override processing difficulties. Following Sapp (2011) in assuming that information structural effects are also associated with prosodic structure and thus can also be accounted for by a prosodic constraint, their hypothesis is in line with the claims made in the present work.

7.6 Formalising the variation through a constraint-based approach

In the previous sections I have argued that the increase of intraposition observed from older to late ENHG is to be ascribed to a decreasing influence of the spoken language modality on the written language and the stabilisation of the latter as an independent communication system, as a consequence of major extra linguistic changes affecting the German society between the 15th and the 16th century. I claimed that by taking into consideration three type of factors, namely structural, processing and prosodic factors, and how their relative importance differs between the written and the spoken modality, intraposition results as feature of the new written language rather than of spoken-oriented writing. Hence, the stabilisation of the written modality as such brings with it an increase of intraposed infinitives.

In the present section I make an attempt to formalise this kind of interaction on the basis of the Gradient Symbolic Computation (GSC) formalism (Smolensky et al., 2014), as implemented in Goldrick et al. (2016). GSC is a constraint-based approach to grammar that has found application mainly in phonology but has recently been applied to morphological and syntactic variation, especially in bilingualism research (Goldrick et al., 2016, Veríssimo, 2016). What

makes GSC particularly attractive for bilingualism researchers is that it combines the idea that grammars are defined via a set of weighted, violable constraints – an idea that had already characterised Harmonic Grammar (Legendre et al., 1990; Pater, 2009) and Maximum Entropy models (Goldwater and Johnson, 2003; Hayes and Wilson, 2008), with the idea that grammatical representations are not discrete but can be blended representations, resulting from the co-activation of multiple representations in the same position in a linguistic structure (cf. Goldrick et al., 2016: 2). The combination of these principles offers a perfect framework for modelling contexts in which multiple languages are in play. For the purposes of the present work, in what follows I will focus on the first principle.

In GSC, as in its predecessors, the probability of output structures is determined via the interaction of weighted violable constraints. The weight of each constraint indicates its relative importance, thus the higher the weight of the constraint, the greater the penalty in case of its violation. This kind of interaction assigns a well-formedness value (Harmony) to each possible output candidate (Goldrick et al., 2016: 863) on the base of which its probability is computed¹. Crucially, if the weights of the constraints shift, the probability of each candidate will change (Ibid.: 864).

I propose that this is what happens in the course of ENHG: processing and prosodic constraints are assigned higher weights in older ENHG, when the written language was still mainly conceived for oral purposes and thus was more sensitive to real-time processing and prosody. When the written modality establishes itself as such, the weight of these two constraints decreases, since it is not so pressing to favour efficient processing or to optimise prosodic structure. On the other hand, the need for a standard favours the increase of the weight of the syntactic constraint that preserves OV word order. In the following, I sketch an example of how this can be modelled in a constraint-based formalism like that used in GSC. I formulate the relevant constraints and show how they interact, giving rise to different output probabilities. The three con-

¹Following Maximum Entropy grammars, in GSC the probability is computed as an exponential function of its harmony relative to the other candidates (Goldrick et al., 2016: 864)

straints that have been discussed so far are presented in (3).

- (3) a. *MOVE (Avoid move):
The syntactically unmarked order is COMPL-HEAD. For each candidate C, decrease C's harmony by 1 if COMPL is moved.
- b. OPTPROC (Optimise processing):
For each candidate C, decrease C's harmony by 1 if C yields increased processing costs.
- c. OPTPROS (Optimise prosodic structure):
For each candidate C, decrease C's harmony by 1 if C yields an ill-formed structure.

The first constraint *MOVE formalises the structural constraint discussed above, that is the adherence to the OV base order. This type of constraint represents what is usually referred to as a faithfulness constraint in constraint-based approaches, that is one that requires similarity between levels of representation (Pater, 2009, Goldrick et al., 2016). The only candidate that satisfies this constraint is intraposition, regardless of whether a mono- or bi-clausal structure is involved, since this is the only option in which the complement remains entirely at the left of the matrix verb, hence what is externalised corresponds to the underlying base order. Extraposition and third construction, on the other hand, violate *MOVE. The other two constraints are two very general formulations that embody respectively the processing and prosodic factors discussed in the previous sections. They are not intended to be an exhaustive illustration of the respective processing and prosodic constraint that could apply. As to processing constraints for example, at least two were discussed in the previous chapters, e.g. the impact of dependency length and that of local ambiguity. Corresponding constraints could be further specified, as for example as Minimize Dependency Length and Avoid ambiguity. Similarly, as to prosody Féry (2015) discusses a number of constraints whose violation generates the ill-formed structure discussed above, and Sapp (2011) proposes an additional prosodic principle to explain variable verb ordering in verb clusters. However, for the purposes of the sketch proposed here, a general formulation is

sufficient. These two type of constraints represent what are usually referred to as output constraints (Pater, 2009). For these two constraints we have to distinguish between raising and control structures. As it was discussed above, with control structures intraposition violates both OPTPROC and OPTPROS, while it satisfies *MOVE. It violates OPTPROC since it increases the distance between dependent elements (i.e. subject and verb) and gives rise to structural ambiguity which can lead to structural misanalysis, in case the control verb is not compatible with a coherent structure. As to OPTPROS, it was argued that intraposition gives rise to an ill-formed prosodic structure since it would embed the highest type of prosodic constituent into a smaller one. On the contrary, extraposition violates *MOVE but satisfies OPTPROC and OPTPROS. As to the third construction, the only constraint that is satisfies is OPTPROS, while *MOVE and OPTPROC are violated. A summary of the violations is shown in Table 7.4, where each violations is indicated by a 1.

Table 7.4: Violations per output candidate (input = control verb + infinitive)

	*MOVE	OPTPROC	OPTPROS
Intraposition		1	1
Extraposition	1		
Third Construction	1	1	

The situation is slightly different for raising structures: in this case intraposition satisfies both *MOVE and OPTPROC (since no structural misanalysis can occur and no centre-embedding is created due to the small syntactic size of the infinitive), while OPTPROS is violated in certain circumstances, depending for example on the word preceding the non-finite verb or the presence of a stressed prefix, which could create a clash due to two adjacent stressed words or syllables. Extraposition and third construction violate *MOVE, but are potentially felicitous choices for OPTPROS to guarantee that no stress clashes occur, as shown by previous studies. What is more problematic is to evaluate extraposition and third construction with regard to OPTPROC, since these options are ungrammatical in PDG and there is no direct evidence from online processing

studies that we can base the evaluation on. Assuming, as I have so far, that processing works incrementally and that it prefers to build minimal structures, a mono-clausal structure will always be computed first, hence even if the infinitive is extraposed no structural misanalysis can occur. On the other hand, third construction has been claimed to yield increased processing effort because it creates local ambiguity. As shown in Chapter 3, for control verbs Bosch et al. (2021) have proposed that from the point of view of incremental processing, if the object is separated from the infinitive and occurs in the middle-field, it might be analysed as the direct object of the matrix verb, an analysis that would need to be revised when the infinitive is encountered. This might also apply to raising verbs. From an incremental processing perspective a sentence like (4) can be closed when encountering the finite verb *pflegt* ‘is in the habit of’, which in this case would be interpreted as the lexical variant ‘care for’ assigning a theta role to *seine kranke Mutter* ‘his ill mother’ (5). For this reason, a violation is also assigned to the third construction for OPTPROC. A summary of the violations is provided in Table 7.5.

- (4) dass er seine kranke Mutter pflegt zu besuchen
 that he his ill mother is.in.the.habit.of to visit
 ‘that he is in the habit of visiting his ill mother’
- (5) dass er seine kranke Mutter pflegt
 that he his ill mother cares.for
 ‘that he cares for his ill mother’

Table 7.5: Violations per output candidate (input = raising verb + infinitive)

	*MOVE	OPTPROC	OPTPROS
Intrapolition			1
Extrapolition	1		
Third Construction	1	1	

If all constraints held equal weights, the higher harmony value, and consequently the higher probability, would be assigned to the candidate with the least violations. Let us now look what happens if we assign different weights

to the three constraints.

I have proposed that the variability between older ENHG (VNC period 1) and late ENHG (VNC period 2) can be explained by postulating a shift in the constraints' ranking: while processing and prosodic constraints have higher weights than structural constraints in period 1, the situation is reversed in period 2. Table 7.6 shows how the possible output candidates for the input string 'control verb + infinitive' perform by assigning a higher weight to OPTPROC and OPTPROS. For each candidate the violations are multiplied by the weight of the constraint and the resulting values are summed, resulting in the Harmony value. For the purposes of computation constraints weights have negative values, but -2 indicates a higher weight than -1 (cf. Goldrick et al., 2016). On the contrary, a higher Harmony value is the one closer to 0. In the example below, extraposition has the highest Harmony value (-1) compared to the other two candidates and consequently is assigned the highest probability. As to intraposition, the model assigns it a very low probability of occurrence, which is in line with what we observe in the corpus for period 1.

Table 7.6: Control verb plus infinitive in VNC period 1

	*MOVE	OPTPROC	OPTPROS	Harmony	Probability
Intraposition	-1	-2	-2	-4	0,05
Extraposition	-1			-1	0,84
Third Construction	-1	-2		-3	0,11

Coming to the input string 'raising verb + infinitive', the same constraints' weighting similarly yield highest Harmony, hence probability for extraposition, while intraposition is only predicted to occur in 24% of the cases. Again, third construction has the lowest harmony and hence the lowest probability (Table 7.7). Summed together extraposition and third construction represent the majority of cases as opposed to intraposition, as was also the case in the corpus.

Let us now apply the same but with weights that reflect the shift from period 1

Table 7.7: Raising verb plus infinitive in VNC period 1

	*MOVE	OPTPROC	OPTPROS	Harmony	Probability
	-1	-2	-2		
Intraposition			-2	-2	0,24
Extraposition	-1			-1	0,66
Third Construction	-1	-2		-3	0,10

to period 2. I have proposed that the influence of prosodic and processing constraints decreases in period 2 due to the strengthening of the writing and reading culture that is independent from orality. At the same time, grammar gains in importance due to an increasing need for consistency and standardisation. Table 7.8 and 7.9 show the results for the input strings ‘control verb + infinitive’ and ‘raising verb + infinitive’ respectively, following from the adjustment of the weight values. The probability of intraposition increases of about 40% for both groups, an increase similar to that found in the corpus study.

Table 7.8: Control verb plus infinitive in VNC period 2

	*MOVE	OPTPROC	OPTPROS	Harmony (H)	Probability
	-2	-1	-1		
Intraposition		-1	-1	-2	0,42
Extraposition	-2			-2	0,42
Third Construction	-2	-1		-3	0,16

Table 7.9: Raising verb plus infinitive in VNC period 2

	*MOVE	OPTPROC	OPTPROS	Harmony (H)	Probability
	-2	-1	-1		
Intraposition			-1	-1	0,66
Extraposition	-2			-2	0,24
Third Construction	-2	-1		-3	0,10

In conclusion, the approach presented in the present section allows us to formalise the hypothesis that the variation in the linearisation of infinitival com-

plements results from the interaction of different factors and further to quantitatively derive the increase of intraposition observed from older to late ENHG via the shift of these factors' importance, which I have claimed is caused by a strengthening of the written modality as an independent system from orality that as such loses spoken-oriented features. In the next section I argue that this kind of approach can explain the variation observed in the subsequent stages as well, if one additionally considers that word order variants are undergoing a process of specialisation.

7.7 Beyond ENHG: specialisation of the variants

Following a multiple-constraints approach, I have proposed that synchronic as well as diachronic word order variation in infinitival constructions is caused by the interaction between different factors. I have shown how according to the relative importance of each factor, some variants will be preferred over others and that a shift in the weights of these constraints, caused by language-external factors can account for the observed increase of intraposed infinitival complements from older ENHG to late ENHG. In the present section I show how the same line of reasoning can be applied to the later stages as well, following the development of the standard language and the role of language modality outlined in Weiß (2005).

Concerning the early stages, I have argued in the previous sections that prescriptive pressure is not yet a major factor but that the stabilisation and standardisation of the written language that can be observed starting from the end of the 16th century rather follows from new pragmatic needs and is not intentional or regulated (see also von Polenz, 2013: 148). Once a written standard has emerged, however, this becomes increasingly subject to normative pressure. According to Weiß's (2005) model, this follows from the fact that at this stage the language is not acquired in natural environments but rather learned as a second language, and as such it is more subject to the explicit imposition of norms. Starting from the end of the 17th through the 18th/19th century an ideology of the correct written language and an educational language pol-

icy become reality (von Polenz, 2013: 144) and the figure of the grammarian and of grammar books gain considerable importance. As von Polenz (2013) points out however, the importance of their work, especially figures like Justus Georg Schottelius (1612–1676) and Johann Christoph Adelung (1732–1806), lies above all in having systematically observed and described the properties of the written language and having indirectly contributed to their dissemination, rather than having prescriptively imposed new rules (Ibid.: 159). These books were mainly intended for teachers and other educated people, who through their professional activities and interactions, contributed to the consolidation of such properties (Ibid.: 179). In the domain of syntax, this means increasingly strict adherence to the OV order and the sentence bracket principle (Ibid.: 292). Both in the works of Schottelius and Adelung is made explicit reference to the position of the verb at the end of the clause and the ordering of verbs, as the following passages show:

“Es lautet wol und schleust sich orderdtlich in Teutscher Sprache wen man (...) die Spruchrede (...) mit dem hauptzeitworte (...) schliessen oder endigen kann” [It sounds wellformed and proper in the German language, when the sentence can be closed with the finite verb] (Schottelius, 1663: 755). Similarly, referring about subordinate clauses, Adelung (1782) writes: “Diese Art der Wortfolge, welche man auch die verbindende zu nennen pflegt, wirft das Verbum ... bis an das Ende der Rede, daher dasselbe seine Bestimmungen in diesem Falle nicht nach, sondern vor sich hat” [This kind of word order, which is also called the connecting word order, puts the verb (...) at the end of the speech, so that in this case it has its arguments not after but before it] (Adelung, 1782: 467).

A few pages later he also makes explicit reference to infinitives and gives some examples:

Da das Verbum hier alle seine Bestimmungswörter vor sich hat, so treten selbige in der obigen natürlichen Ordnung vor demselben her, daher nicht allein das Adverbium, das Participium, und **der Infinitiv** vor dem selben stehen – *weil ich dich gewarnet habe, wenn du*

mir kommen wirst – sondern auch die trennbare Partikel der zusammengesetzten Zeitwörter sich wieder unmittelbar an dieselben anschließt. [Since the verb here has all its arguments before it, they precede it in the above natural order, hence not only the adverb, the participle, and the infinitive stand before it, but also the separable particles of the compound tense words are again directly attached to it] (Adelung, 1782: 469, emphasis added).

With respect to infinitival complements, as the weight of structural factors increases due to the external influence of normative pressure, intraposition is bound to become the dominant pattern at the expenses of extraposition and third construction. Let us again illustrate this by calculating the probability of the three variants as a results of the interaction of the three constraints in play. Table 7.10 and Table 7.11 show the results for the input string ‘control verb + infinitive’ and ‘raising verb + infinitive’ respectively. As the tables show, by increasing the weight of the *MOVE, the constraint that ensures that basic OV word order is maintained, intraposition gets the highest Harmony values, hence the highest probability, for both groups.

Table 7.10: Control verb plus infinitive after VNC period 2

	*MOVE	OPTPROC	OPTPROS	Harmony (H)	Probability
	-7	-1	-1		
Intraposition		-1	-1	-2	0,991
Extraposition	-7			-7	0,007
Third Construction	-7	-1		-8	0,002

Table 7.11: Raising verb plus infinitive after VNC period 2

	*MOVE	OPTPROC	OPTPROS	Harmony (H)	Probability
	-7	-1	-1		
Intraposition			-1	-1	0,997
Extraposition	-7			-7	0,002
Third Construction	-7	-1		-8	0,001

This increasing influence of the grammar is reflected only partly in the development of intraposition of infinitival complements, however. As we have seen in Chapter 5, intraposition of the infinitive continues increasing for raising verbs with time passing, reaching already almost 100% of the cases after 1750. However, the rate of intraposition for control verbs remains stable and then decreases significantly in the youngest period. With this respect, I propose that the younger history suggests that word order patterns are undergoing a process of specialisation, in the sense of Wallenberg (2019).

Building on Clark's (1987, 1990) Principle of Contrast, which was originally proposed for children lexical learning and states that during acquisition children assign contrasting forms to contrastive meanings, Wallenberg (2019) proposes that this principle can be generalised to other linguistic modules and that it is responsible for the specialisation of forms that are in competition with each other. In cases of variants competition, two scenarios are usually possible: the first is that one variant eventually wins out over the other and the second is that the competition disappears and both variants survive (Ibid.: 247, see also Kroch, 1994). The latter scenario is possible when there is a dimension of specialisation, that is the two variants each find a context in which they can specialise. The direction of specialisation, that is the choice of which variant specialises in which context can be either driven by an advantage of one variant in one context or by a random process (Wallenberg, 2019). As an example Wallenberg (2019) presents the case of the morphological doublet *melted* / *molton* in English, which arose as participle forms in OE from West Saxon and Anglian respectively (Ibid.: 251). Over time, the two forms found a dimension of specialisation such that *melted* kept being used in participial constructions, while *molton* became a pre-nominal adjective.

- (6) a. The gold was melted / *molten by the fire. (passive partic. context)
 b. The fire has melted / *molten the gold. (perfect partic. context)
 c. She shaped the ?melted / molten gold into a ring. (adject. context)

(Wallenberg, 2019: 246, (1)–(3))

In the case at hand, I propose that the competing word order variants find a

dimension of specialisation in two superficially identical but structurally different construction types, namely clausal and non-clausal infinitives and that it is due to this process that more than one pattern has a chance to survive. Furthermore, I claim that in the case of infinitival complements, the direction of specialisation is not random but is driven by an advantage of non-clausal infinitives in intraposed position: as we have seen above, intraposition of clausal infinitives violates both the processing and the prosodic constraints, while intraposition of non-clausal infinitives only potentially violates prosody. This is also reflected in the higher harmony value and resulting higher probability for intraposition with raising verbs (Table 7.11) compared to control verbs (Table 7.10). Thus as intraposition has found a context to specialise into, i.e. non-clausal infinitives, extraposition and third construction still compete with each other for clausal infinitives. Again, the variant with more advantage wins: third construction violates both grammar and processing constraints, while extraposition only violates grammar and thus has an advantage over third construction. This is again reflected in the Harmony values and in the lower probability for third construction.

As we have seen in the present data this is reflected in the diachronic distribution of intraposed infinitives with raising and control verbs. Raising verbs select non-clausal infinitives and are thus consistently found with intraposition starting from period 3 onwards, i.e. from 1750, while in the same period control verbs, which select clausal infinitives, start showing a numerical decreasing trend, although this decrease was not found significant until period 5, i.e. PDG. This development also supports Wallenberg's (2019) solution to what he calls Yang's paradox, that is the fact that unlike in experimental settings, where children are shown to generalise the Principle of Contrast in very short time windows, specialisation in diachrony is much slower. With this respect, Wallenberg (2019) proposes that, while for individual speakers finding a dimension of specialisation can be a fast process, for the effect of specialisation in diachrony to be observable, many different speakers have to coordinate and converge to the same dimension and direction of specialisation, which could take several generations. Different speakers can differ in their preferences for a pattern or

the other independently of the context, thus not specialising the patterns at all, and even if they eventually converge on the dimension of specialisation, they might still diverge in the direction, as Wallenberg (2019) shows for the case of *molten/melded* by looking at the individual variation between and within authors. In the case of infinitival complements, specialisation could have also be influenced, or rather hindered, by language-external factors, for example some speakers may resist specialisation since they see the observance of the OV order and hence intraposition of clausal infinitives as a sign of high education and prestige (see von Polenz, 2013: 294, 305) and thus still use it. In addition to this, it comes that the group of control verbs is not homogeneous as regards coherence properties, i.e. some verbs can only embed clausal infinitives, while other are also optionally compatible with a mono-clausal construal, and that as we have shown in section 5.4 this also has an influence on the probability of intraposition. Also, it was discussed that the extent to which a mono-clausal construal is possible does not only depend on discrete syntactic factors that characterise different sub-groups of verbs but might be dependent on individual verbs and their semantics. This might imply that the dimension of specialisation, i.e. the infinitive type, is not categorical after all (clausal vs non-clausal), which would eventually lead to a complete specialisation (cf. Wallenberg and Fruehwald, 2013), but rather continuous, which would explain the kind of stable variation that is observed for control verbs for around 200 years (see also Wallenberg, 2016 for a discussion of extraposition of relative clauses in English). Nevertheless, a significant decrease of intraposition in favour of extraposed infinitival complements, hence a further step in the specialisation process, can be observed in the youngest investigated period, which finally results in the dichotomous distribution of word order patterns often discussed for PDG, and that was the starting point of this thesis. With respect to the specialisation account, this still cannot be considered completed, since intraposition is in principle still a possible option for clausal infinitives or control verbs more generally. I believe that this further step in the specialisation process is again strictly connected to the relation between standard language and language modality. As we have seen above, for a long period of time a German standard language had

existed in writing only, giving rise to a functional diglossia such that a written standard and spoken dialects co-existed. It is only later on that the need for a standard extends to the spoken modality and that a spoken standard emerges. As a result, features that characterise the spoken modality start appearing in the standard language. As the influence of the spoken language increases again the disadvantage for intraposed clausal infinitives becomes more pressing, despite normative pressure, and hence intraposition decreases again. Since word order patterns are on the way of specialisation, however, and intraposition has specialised for non-clausal infinitives, these are not as heavily affected by the spoken influence as they had been in the past. Still, as the Twitter data has shown, cases of non-intraposed non-clausal infinitives are still attested in PDG, suggesting that they do not resist the influence of spoken-sensitive constraints completely.

7.8 Summary and discussion

In this chapter, I have outlined first, an explanation for the increase of intraposed infinitival complements that has been observed from older to late ENHG (Chapter 5). Unlike previous accounts, I have argued that the increase is not due to a structural change in German basic word order, that is from a mixed OV/VO type to OV, but can be partly ascribed to language-external factors. I have considered the hypothesis that language modality or the influence thereof on the written product analysed in the present diachronic study plays a crucial role in determining word order variation and I have proposed that this can be accounted for by considering word order variation as the result of three interacting factors, whose relative importance changes between the spoken or spoken-oriented language and the written language. Under this rationale intraposition is a feature of the written modality, while it is dispreferred or completely avoided in the spoken language. In order to support this claim I conducted additional analyses of the corpus data specifically looking at differences between written genres that are predicted to be affected from the spoken influence to different degrees, and additionally considering a corpus of spoken

German, which confirmed that this is indeed the case. Further, I sketched a formalisation of the proposal in a constraint-based approach and systematically showed how by means of this interaction the low frequency of intraposition in period 1, which is assumed to be still highly influenced by the spoken modality, can be derived and how by changing the relative weights of the factors such that spoken-sensitivity is reduced, the increase in period 2 results.

The explanation for the change in the distribution of intraposition through this multi-causal approach has also the advantage of accounting not only for the changes in usage frequencies in the early periods, but also for what we observe beyond period 2. In fact, following the development path of the German standard language proposed in Weiß (2005) and additionally taking into account that word order variants have specialised for different infinitive types, I have argued that the influence of the language modality on the emerging standard language is also reflected in the changes observed in the younger periods: after the written language has gained its independence from orality, mainly due to pragmatic needs and other language external changes, a written standard gradually emerges, which is increasingly subject to normative pressure and further favours the increase of intraposition. At this point, however, the increase of intraposition is observed only in one of the investigated groups of verbs, namely raising verbs, while the frequency of intraposition with control verbs remains stable and successively decreases again. I have argued that the existence of different infinitive types, namely clausal and non-clausal infinitives offers a dimension of specialisation for competing word order variants and that intraposition specialises for non-clausal infinitives, while extraposition specialises for clausal infinitives, a direction I claimed is at least partly biased by processing factors. The increasing influence of the spoken language in the younger history of the German language is again reflected in the significant decrease of intraposed infinitival complements within the group of control verbs, a decrease that did not affect the group of raising verbs to the same degree, probably as a consequence of the specialisation process.

In summary the findings from the present chapter suggest that as concerns infinitival complements, word order variability cannot be accounted for by

taking into consideration structural factors alone but that different language-internal and language external factors play a role both in synchronic and diachronic variation. Sensitivity for prosodic constraints suggests that narrow syntax, as defined in the minimalist grammar model presented in Chapter 2, is not solely responsible for the variation, thus providing further support for accounts posing a syntax-prosody interaction, rather than assuming a unidirectional relation from syntax to prosody. As it also became clear from this chapter however, interaction of language-internal modules is also subject to language-external influence, such as normative pressure and processing principles. Above I have presented a possible formalisation of this multiple-factor interaction, based on a constraint based-approach that evaluates the harmony and consequent probability of possible output candidates. Following previous proposals, I believe that constraint-based approaches can be well integrated into the minimalist grammar architecture introduced in Chapter 2, such that narrow syntax provides possible candidate outputs, thus restricting them to those allowed by the operations that can take place there, which are then evaluated in a constraint-based fashion (Féry, 2015, Broekhuis, 2008). In other words, as proposed in Broekhuis (2008), the evaluator, i.e. the step at which the constraints apply, can be seen as the “formalisation of the interface conditions” (Ibid. 35), whose growing importance in minimalism was addressed in Chapter 2.

The constraint-based approach adopted in the works cited here (Féry, 2015, Broekhuis, 2008), Optimality Theory (OT), is a different one from that used above, but the main assumptions hold. GSC, as Harmonic Grammar, on which it is based, differs from OT in that the constraints are not ranked but are assigned numerical weights, but previous work has shown that both approaches yield similar results (cf. Pater, 2009). The inclusion of weighted constraints has the advantage of being better suited for the integration of gradient variation in grammar (Ibid.: 1021), which we have seen from both studies on PDG as well as from the historical data, might play a role for the phenomenon under investigation here, and furthermore it has the advantage of making the framework better suited for the integration within more general cognitive models because

it can be tested using learning algorithms (Ibid.: 1001, 1021).

The version of the GSC approach presented above is of course only a simplified version of a possible implementation. Firstly, as already pointed out above, the sketch was not intended to include an exhaustive inventory of the possible constraints, whose identification for each type of factor, including structural, syntactic ones, clearly needs further research (but see e.g. Broekhuis, 2008 for a first illustration). Secondly, the constraints' weights were determined arbitrarily for illustrative purposes. In the framework however, it is assumed that these are acquired by speakers on the basis of the probability distribution in their linguistic experience (Goldrick et al., 2016) – another aspect that can be easily reconciled with the Minimalist Program and the role of the primary linguistic data in language variation and change. Constraints' weights can be calculated on the basis of learning algorithms, as mentioned above, for example using the MaxEnt Grammar Tool (Hayes, 2009) to simulate a possible acquisition scenario. A more in depth investigation of these aspect of the GSC models, that is a more detailed identification of the constraints involved and the acquisition simulations through such learning algorithms, is needed to provide a better understanding of the mechanisms that led to change. Another aspect of the GSC framework that could be explored with respect to the diachronic development of word order patterns in the context of standardisation, is the principle according to which grammars can also result from a blend of multiple representations, an aspect that has proven fruitful in modelling bilingual speakers' behaviour (cf. section 7.6). As discussed in previous sections, PDG is the result of a standardisation process which for a long time involved the acquisition of a newly-emerged standard as a second language, thus by also implementing the notion of blends, that is the co-activation of two sets of constraints, e.g. one for the native dialect and one for the standard language, it might be possible to formalise the influence of the native dialect more precisely than proposed above. To conclude, I believe that the integration of a constraint-based formalism such as GSC in the architecture of grammar represents a valuable approach to the study of language, in particular of language variation and change.

Conclusions

The present work was concerned with the investigation of diachronic variability in the linearisation of infinitival complements. Based on the observation that word order in infinitival constructions was much less restricted in older German compared to PDG and that word order correlates with the type of infinitival complement in PDG, which in turn is determined by the type of governing verb, the aim of the present work was to investigate when and how this correlation between infinitive type, hence of type of matrix verb, and word order pattern emerged in the history of German. Building on previous studies showing that this correlation was not yet available in ENHG, but that crucial changes regarding word order more generally can be observed in this period, the investigation started in ENHG and covered the whole period up to PDG.

In the first part of the study I aimed at tracing the emergence of the dichotomy by providing a descriptive generalisation of the diachronic distribution of word order variants for two groups of verbs that show opposite behaviour in PDG, namely control verbs and raising verbs. By adopting a quantitative perspective I tested, by means of the combination of a data-driven approach to periodisation and a regression analysis, whether the observation found in previous literature could be confirmed, that a general increase of intraposed infinitives is found in the course of ENHG, regardless of the matrix verb. Based on the assumption that in older German raising and control verbs do not behave differently as regards intraposition of the infinitive, a further aim of this analysis was to find out at which point in time intraposition became the only option for raising verbs, and what the development path for control

verbs was, considering that they strongly disprefer intraposition in PDG, or in other words when the PDG dichotomy emerged. Results from this quantitative analysis confirmed that the frequency of intraposed infinitives did indeed increase from older to late ENHG and that raising and control verbs did not differ significantly in these early changes, i.e. both verb groups are affected by this increase. The analysis further revealed that it is only after around 1750 that the two groups start showing a distinctive behaviour as regards intraposition: by this time raising verbs select an intraposed infinitive already in almost the totality of cases, while the relative frequency of intraposition with control verbs remains stable at around 50% of the cases. The emergence of the dichotomous distribution observed in PDG thus has its origins in the second half of the 18th century. It was not until recently however, that the relative frequency of intraposed infinitives with control verbs has drastically decreased again, giving rise to the opposite distribution pattern that characterises PDG.

While the focus of the first part of the study was on the *when* part of the overall research question, the second part of the study was concerned with the *how*, investigating and discussing possible causes for the observed changes in the distribution of word order patterns. First, it aimed at assessing whether the selection properties of the two groups of matrix verbs changed over time, such that they were not restricted as to the type of infinitival complement they can combine with in older German, thus explaining why patterns that are not possible today were attested. Second, it aimed at testing the hypothesis, previously posed in the literature, according to which the increase of intraposed infinitives observed in the course of ENHG could be ascribed to structural changes in the architecture of the German clause, that is a change from a language where the directionality of the VP was underspecified, thus allowing both base-generated VO and OV orders, to a language with a head-final VP. In order to answer the first question, the two groups of matrix verbs were analysed separately to establish whether evidence for their (in)coherence behaviour could be found independently from word order. A qualitative assessment of the patterns with raising verbs revealed that their behaviour is compatible with that of monoclausal construals throughout the investigated period. Unlike PDG however,

cluster formation was not obligatory for raising verbs in ENHG. I have argued that speakers might have started reanalysing recursive VPs into clusters as soon as they were exposed to adjacent clause final verbs, regardless of the order, but that this process was only completed when infinitives consistently appear in intraposed position. As to the group of control verbs it was shown that, as in PDG, different sub-groups with regards to their coherence behaviour could be identified already in ENHG, but that the presence of such differences has not affected the overall development for the group of control verbs. In sum, no changes in the selection properties of the matrix verbs were found. The investigation then turned to the hypothesis that changes in the distribution of infinitival word order patterns from older to late ENHG, in particular the increase of intraposition, were due to changes affecting German clause structure more generally. However, no convincing evidence in favour of this hypothesis could be found. Instead, under the assumption that basic word order in German has always been OV, I proposed that the diachronic variability in the linearisation of infinitival complements can be better accounted for by the interaction of multiple language-internal and language-external factors and in particular by taking into account the role of language modality in the development path of the German standard language. Finally, I have argued that the emergence of the correlation between word order patterns on the one hand, and infinitive type and matrix verb on the other, and the consequent reduction of variability, is the result of a process of specialisation of variants in which different word order patterns have specialised for different infinitive types, probably driven by processing factors.

In summary, the present thesis has come to the conclusion that word order variation and change in German infinitival complements does not represent a case of syntactic change in the narrow sense, but rather that syntax interacts both with other language modules and language-external principles, a conclusion which is in line with recent developments in diachronic syntax studies.

To conclude, as also pointed out at different points within the thesis, while the approach adopted in the present work has focused on the overall development, generalising over possible individual differences between, for example,

particular verbs and their semantics or between individual authors, future research on such individual aspects would surely enrich our understanding of the diachronic processes that drive word order variation and change in infinitival complementation.

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[115SH] Herberstein, Sigmund von. Moscouia der Hauptstat in Reissen / durch Herrn Sigmunden Freyherrn zu Herberstain / Neyperg vnd Guetenhag Obristen Erbcamrer / und obristen Erbtruckhsessen in Kärntn / Römischer zu Hungern und Behaim Khü. May. ec. Rat / vnd Presidenten der Niderösterreichischen Camer zusammen getragen. Michael Zimmermann: Wien. 1557.

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PRESENT-DAY GERMAN (SPOKEN)

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Appendix

A. Model results from the main study (Chapter 5)

Formula: PositionComplement == “intra” ~ Verb Type * VNC period + (1 | Text) + (1 | Verb) + (1 | Genre)

Table 8.1: Model output showing main effects and their interaction

	Estimate	Std. error	z-value	p-value
(intercept)	0.4608	0.3922	1.175	0.240076
Verb Type (raising vs control)	3.4113	0.6783	5.029	4.93e-07 ***
VNCperiod (2 vs 1)	2.9350	0.6149	4.773	1.82e-06 ***
VNCperiod (3 vs 2)	1.2821	0.3827	3.350	0.000809 ***
VNCperiod (4 vs 3)	2.1061	0.4541	4.638	3.53e-06 ***
VNCperiod (5 vs 4)	-1.3483	0.3189	-4.228	2.35e-05 ***
Verb Type * VNCperiod (2 vs 1)	1.0909	1.1184	0.975	0.329373
Verb Type * VNCperiod (3 vs 2)	3.1714	0.6313	5.024	5.06e-07 ***
Verb Type * VNCperiod (4 vs 3)	5.1845	0.8305	6.243	4.30e-10 ***
Verb Type * VNCperiod (5 vs 4)	-0.9158	0.5341	-1.715	0.086402

Table 8.2: Model output showing the effect of time period with control verbs as the baseline

	Estimate	Std. error	z-value	p-value
(Intercept)	-1.2449	0.2480	-5.021	5.15e-07 ***
Verb Type (main effect: raising vs control)	3.4114	0.6780	5.032	4.86e-07 ***
VNCperiod (control verbs: 2 vs 1)	2.3896	0.4601	5.194	2.06e-07 ***
VNCperiod (control verbs: 3 vs 2)	-0.3036	0.2775	-1.094	0.2739
VNCperiod (control verbs: 4 vs 3)	-0.4861	0.2741	-1.774	0.0761 .
VNCperiod (control verbs: 5 vs 4)	-0.8904	0.1886	-4.721	2.35e-06 ***
Verb Type * VNCperiod (2 vs 1)	1.0906	1.1176	0.976	0.3291
Verb Type * VNCperiod (3 vs 2)	3.1716	0.6297	5.036	4.74e-07 ***
Verb Type * VNCperiod (4 vs 3)	5.1842	0.8335	6.220	4.99e-10 ***
Verb Type * VNCperiod (5 vs 4)	-0.9157	0.5330	-1.718	0.0858 .

Table 8.3: Model output showing the effect of time period with raising verbs as the baseline

	Estimate	Std. error	z-value	p-value
(Intercept)	2.1662	0.6706	3.230	0.001236 **
Verb Type (main effect: control vs raising)	-3.4111	0.6586	-5.179	2.23e-07 ***
VNCperiod (raising verbs: 2 vs 1)	3.4808	1.0395	3.349	0.000813 ***
VNCperiod (raising verbs: 3 vs 2)	2.8679	0.6304	4.550	5.37e-06 ***
VNCperiod (raising verbs: 4 vs 3)	4.6982	0.8198	5.731	9.99e-09 ***
VNCperiod (raising verbs: 5 vs 4)	-1.8062	0.5552	-3.253	0.001142 **
Verb Type * VNCperiod (2 vs 1)	-1.0913	1.0801	-1.010	0.312331
Verb Type * VNCperiod (3 vs 2)	-3.1715	0.6184	-5.129	2.92e-07 ***
Verb Type * VNCperiod (4 vs 3)	-5.1844	0.8252	-6.283	3.33e-10 ***
Verb Type * VNCperiod (5 vs 4)	0.9158	0.5327	1.719	0.085582 .

Table 8.4: Model output showing effects of treatment contrast with VNC period 1 as the baseline

	Estimate	Std. error	z-value	p-value
(Intercept)	-2.6018	0.4713	-5.520	3.38e-08 ***
Verb Type (raising vs control in VNCperiod 1)	-1.2549	1.1236	-1.117	0.264065
VNCperiod (2 vs 1)	2.3895	0.4504	5.306	1.12e-07 ***
VNCperiod (3 vs 1)	2.0859	0.4754	4.387	1.15e-05 ***
VNCperiod (4 vs 1)	1.5998	0.4530	3.532	0.000413 ***
VNCperiod (5 vs 1)	0.7094	0.4751	1.493	0.135390
Verb Type * VNCperiod (2 vs 1)	1.0908	0.9770	1.117	0.264177
Verb Type * VNCperiod (3 vs 1)	4.2623	1.1067	3.851	0.000117 ***
Verb Type * VNCperiod (4 vs 1)	9.4468	1.1442	8.256	< 2e-16 ***
Verb Type * VNCperiod (5 vs 1)	8.5309	1.0762	7.927	2.25e-15 ***

Table 8.5: Model output showing effects of treatment contrast with VNC period 2 as the baseline

	Estimate	Std. error	z-value	p-value
(Intercept)	-0.2123	0.2701	-0.786	0.431903
Verb Type (raising vs control in VNCperiod 2)	-0.1639	0.6866	-0.239	0.811293
VNCperiod (1 vs 2)	-2.3896	0.4615	-5.177	2.25e-07 ***
VNCperiod (3 vs 2)	-0.3036	0.2782	-1.091	0.275243
VNCperiod (4 vs 2)	-0.7897	0.2364	-3.341	0.000834 ***
VNCperiod (5 vs 2)	-1.6801	0.2801	-5.999	1.99e-09 ***
Verb Type * VNCperiod (1 vs 2)	-1.0909	1.1184	-0.975	0.329349
Verb Type * VNCperiod (3 vs 2)	3.1714	0.6360	4.986	6.15e-07 ***
Verb Type * VNCperiod (4 vs 2)	8.3558	0.7054	11.845	< 2e-16 ***
Verb Type * VNCperiod (5 vs 2)	7.4400	0.5739	12.963	< 2e-16 ***

Table 8.6: Model output showing effects of treatment contrast with VNC period 3 as the baseline

	Estimate	Std. error	z-value	p-value
(Intercept)	-0.5159	0.3077	-1.677	0.093623 .
Verb Type (raising vs control in VNCperiod 3)	3.0076	0.8313	3.618	0.000297 ***
VNCperiod (2 vs 3)	0.3036	0.2767	1.097	0.272601
VNCperiod (1 vs 3)	-2.0859	0.4841	-4.309	1.64e-05 ***
VNCperiod (4 vs 3)	-0.4861	0.2730	-1.781	0.074928 .
VNCperiod (5 vs 3)	-1.3765	0.3103	-4.436	9.15e-06 ***
Verb Type * VNCperiod (2 vs 3)	-3.1715	0.6125	-5.178	2.25e-07 ***
Verb Type * VNCperiod (1 vs 3)	-4.2624	1.2629	-3.375	0.000738 ***
Verb Type * VNCperiod (4 vs 3)	5.1844	0.8028	6.458	1.06e-10 ***
Verb Type * VNCperiod (5 vs 3)	4.2685	0.6940	6.151	7.72e-10 ***

Table 8.7: Model output showing effects of treatment contrast with VNC period 4 as the baseline

	Estimate	Std. error	z-value	p-value
(Intercept)	-1.0020	0.2774	-3.612	0.000303 ***
Verb Type (raising vs control in VNCperiod 4)	8.1918	0.8227	9.957	< 2e-16 ***
VNCperiod (3 vs 4)	0.4861	0.2749	1.768	0.077032 .
VNCperiod (2 vs 4)	0.7897	0.2364	3.341	0.000836 ***
VNCperiod (1 vs 4)	-1.5999	0.4654	-3.437	0.000587 ***
VNCperiod (5 vs 4)	-0.8904	0.1887	-4.718	2.39e-06 ***
Verb Type * VNCperiod (3 vs 4)	-5.1844	0.8304	-6.243	4.29e-10 ***
Verb Type * VNCperiod (2 vs 4)	-8.3558	0.6922	-12.071	< 2e-16 ***
Verb Type * VNCperiod (1 vs 4)	-9.4465	1.2463	-7.580	3.46e-14 ***
Verb Type * VNCperiod (5 vs 4)	-0.9158	0.5312	-1.724	0.084697 .

Table 8.8: Model output showing effects of treatment contrast with VNC period 5 as the baseline

	Estimate	Std. error	z-value	p-value
(Intercept)	-1.8924	0.3066	-6.172	6.75e-10 ***
Verb Type (raising vs control in VNCperiod 5)	7.2760	0.7105	10.240	< 2e-16 ***
VNCperiod (4 vs 5)	0.8904	0.1882	4.730	2.25e-06 ***
VNCperiod (3 vs 5)	1.3765	0.3103	4.436	9.17e-06 ***
VNCperiod (2 vs 5)	1.6801	0.2792	6.018	1.77e-09 ***
VNCperiod (1 vs 5)	-0.7094	0.4843	-1.465	0.1430
Verb Type * VNCperiod (4 vs 5)	0.9158	0.5417	1.691	0.0909 .
Verb Type * VNCperiod (3 vs 5)	-4.2685	0.7176	-5.949	2.71e-09 ***
Verb Type * VNCperiod (2 vs 5)	-7.4401	0.5651	-13.167	< 2e-16 ***
Verb Type * VNCperiod (1 vs 5)	-8.5310	1.2133	-7.031	2.04e-12 ***

B. Model results for genres' differences in ENHG (Chapter 7)

Formula: PositionComplement == "intra" ~ Genre * VNCperiod +
(1 + VNCperiod | Verb) + (1 + VNCperiod | Text)

Table 8.9: Model output showing main effect of time

	Estimate	Std. error	z-value	p-value
(Intercept)	-1.7145	0.3732	-4.594	4.35e-06 ***
Genre (main effect: religious)	0.3419	0.7234	0.473	0.6364
Genre (main effect: fiction)	-0.9429	0.5139	-1.835	0.0665 .
Genre (main effect: scientific)	2.1267	0.7165	2.968	0.0030 **
VNCperiod (main effect: 2 vs 1)	1.7528	0.4351	4.029	5.61e-05 ***
Genre * VNCperiod	-0.1454	0.7964	-0.183	0.8551
Genre * VNCperiod	0.7468	0.6001	1.245	0.2133
Genre * VNCperiod	-1.9345	0.7917	-2.444	0.0145 *

Table 8.10: Model output showing effects of treatment contrast with scientific texts as the baseline

	Estimate	Std. error	z-value	p-value
(Intercept)	0.4123	0.8110	0.508	0.611195
Genre (informational vs scientific in VNC period 1)	-3.6525	1.0672	-3.422	0.000621 ***
Genre (religious vs scientific in VNC period 1)	-1.7848	1.2513	-1.426	0.153772
Genre (fictional vs scientific in VNC period 1)	-3.0697	0.9755	-3.147	0.001651 **
VNCperiod (scientific: 2 vs 1)	-0.1817	0.9171	-0.198	0.842919
Genre * VNCperiod (informational vs scientific)	3.2677	1.1606	2.816	0.004868 **
Genre * VNCperiod (religious vs scientific)	1.7891	1.3735	1.303	0.192727
Genre * VNCperiod (fictional vs scientific)	2.6813	1.1164	2.402	0.016312 *

Table 8.11: Model output showing effects of treatment contrast with fictional texts as the baseline

	Estimate	Std. error	z-value	p-value
(Intercept)	-2.6574	0.5280	-5.033	4.83e-07 ***
Genre (religious vs fictional in VNC period 1)	1.2849	1.0268	1.251	0.21079
Genre (scientific vs fictional in VNC period 1)	3.0697	0.9761	3.145	0.00166 **
Genre (informational vs fictional in VNC period 1)	-0.5828	0.8135	-0.716	0.47375
VNCperiod (fictional: 2 vs 1)	2.4996	0.6532	3.827	0.00013 ***
Genre * VNCperiod (religious vs fictional)	-0.8923	1.1599	-0.769	0.44173
Genre * VNCperiod (scientific vs fictional)	-2.6813	1.1167	-2.401	0.01635 *
Genre * VNCperiod (informational vs fictional)	0.5864	0.9113	0.643	0.51993

Table 8.12: Model output showing effects of treatment contrast with informational texts as the baseline

	Estimate	Std. error	z-value	p-value
(Intercept)	-3.2402	0.6452	-5.022	5.12e-07 ***
Genre (religious vs informational in VNC period 1)	1.8676	1.0397	1.796	0.072434 .
Genre (fictional vs informational in VNC period 1)	0.5828	0.8139	0.716	0.473958
Genre (scientific vs informational VNC period 1)	3.6525	1.0686	3.418	0.000631 ***
VNCperiod (informational: 2 vs 1)	3.0859	0.6907	4.468	7.90e-06 ***
Genre * VNCperiod (religious vs informational)	-1.4786	1.1328	-1.305	0.191826
Genre * VNCperiod (fictional vs informational)	-0.5864	0.9118	-0.643	0.520154
Genre * VNCperiod (scientific vs informational)	-3.2677	1.1620	-2.812	0.004921 **