This was published in *English Language and Linguistics*.

Please cite as:
Van linden, An. 2010. The rise of the *to*-infinitive: Evidence from adjectival complementation. *English Language and Linguistics* 4 (1): 19-51.

The rise of the *to*-infinitive: Evidence from adjectival complementation[1]

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(Submitted 28 November 2008; revised 4 August 2009)

ABSTRACT

This article presents a diachronic corpus-based study of the distribution of mandative *that*- and *to*-clauses complementing deontic adjectival matrices in the extraposition construction, as in *It is essential to work upwards from easier workloads* (CB). It shows that the *to*-infinitive encroaches on the *that*-clause from Early Middle English onwards and comes to predominate in Late Middle English. It thus adduces evidence for Los's (2005) account of the rise of the *to*-infinitive as verbal complement: against the generally held view that the *to*-infinitive replaced the bare infinitive, Los (2005) shows that it spread at the expense of the subjunctive *that*-clause in Middle English, e.g. after intention verbs and manipulative verbs. After considering various factors such as the distribution of the *to*-infinitive in the adjectival complementation system, the tense of the matrix of the adjectival constructions and the Anglo-Saxon versus Romance origin of the adjectives, I conclude that the rise of the *to*-infinitive with adjectival matrices in Middle English has to be explained by analogy between verbal and adjectival mandative constructions. In addition, this study shows that – unlike with the verbal constructions – the *to*-infinitive with adjectival matrices stabilizes at roughly a 3:1 ratio to the *that*-clause from Early Modern English onwards. For these later periods, finally, it is proposed that the clausal variation may be motivated by lexical determination, discourse factors such as information structure, and stylistic preferences.

[1] The research reported on in this article has been made possible by research grants OT/03/20/TBA and OT/04/12 of the Research Council of the University of Leuven, as well as the Interuniversity Attraction Poles (IAP) Programme – Belgian State – Belgian Science Policy, project P6/44 Grammaticalization and (inter)subjectification. In addition, it has been supported by the Spanish Ministry of Education and Science (grant no. HUM2007-60706/FILO) and the European Regional Development Fund. I would also like to thank Hendrik De Smet and Kristin Davidse for their helpful comments on earlier versions of this article. Finally, I am indebted to David Denison and the two anonymous referees for their very generous and insightful remarks.

1 INTRODUCTION

The rise of the *to*-infinitive has featured in many diachronic studies of the English complementation system. The majority have concentrated on the complementation patterns found with verbal matrices. The present article, however, focuses on the patterns found with adjectival matrices, more precisely in the extraposition construction. It does so on the basis of qualitative and quantitative analyses of diachronic and synchronic corpus data, such as (1) with anticipatory *it* and (2) without *it*.

(1) Herbert Daniels, the group's founder, believes that it is **essential** to overcome the social stigma of Aids, which often means that people with the virus lose their homes, jobs and families, and are effectively condemned to death by society. (CB, bbc)

(2) Þonne is swiðe **rihtlic**, þæt Godes ciricgrið binnon wagum & then is very fitting, that God.GEN sanctuary within walls and Cristenes ciningces handgrið stande ærfre unwemme Christian.GEN king.GEN personal.protection stand.PRES.SUBJ ever unblemished 'Then it is very fitting that God's sanctuary and the Christian king's personal protection should ever stand/remain unblemished inside the walls.' (YCOE 1040–1060 LawICn 2.2)

In both examples, the complement clauses of the deontic adjectival matrices refer to a potential state of affairs (SoA), which is evaluated as desirable (cf. Wierzbicka 1988: 139). Following Huddleston & Pullum (2002: 996) I will refer to this semantic type of complement as 'mandative'. However, the two examples differ in the formal coding of the complement, which in (1) is a *to*-clause and in (2) a subjunctive *that*-clause. This last pattern constitutes the most common coding of mandative complements in Old English. I will show that in the Middle English period the *to*-infinitive supersedes the subjunctive *that*-clause in the adjectival mandative construction, as has been established for mandative complements of verbal matrices by Los (1999, 2005). I will also point out that this process of supersession has never been completed. Rather, the *to*-infinitive has been keeping roughly a 3:1 ratio to the *that*-clause from Early Modern up to Present-day English.

Explanations for this major change in the complementation system have generally been proposed from a language-internal perspective. Thus, many authors have argued that the *to*-infinitive spread at the expense of the bare infinitive (e.g., Sweet 1903: 118; Callaway 1913; Jespersen 1940: 10–11; Mustanoja 1960: 514; Visser 1972: §897; Lightfoot 1979: 190; Jarad 1997: 32). In their view, the two infinitives are in competition in a number of environments in Old English, with the *to*-infinitive winning out over the bare infinitive.[2] However, Los (2005) has convincingly argued that it is necessary to consider the entire complementation system to explain distributional changes of its members. By presenting a clear description of the various syntactic environments and the expressive devices that compete in them, she has been able to show that the *to*-infinitive did not replace the bare infinitive, but rather the subjunctive *that*-clause (Los 2005: ch. 2–7). Regarding the *to*-infinitive complementing adjectives in the mandative construction, we will see that it also took over from the subjunctive *that*-clause. In addition to the change in distribution of these two complement types, I will also investigate the role of another language-internal factor, viz. the tense of the matrix clause, and a language-external factor, viz. the Anglo-Saxon versus Romance origin of the adjectival matrices.

[2] For example, this view is clearly expressed in Callaway's (1913) influential monograph. However, Los (2000: 12–17) has pointed out that his description does not offer a coherent picture of the distribution of the two infinitives.

The structure of this article is as follows. Section 2 specifies which corpora were used and how the data were collected. Section 3 presents and compares the data bearing out the rise of the *to*-infinitive with both adjectival and verbal matrices in the Old and Middle English period. The focus in this article is on the findings for adjectival complements, but they are compared to Los's (2005: 185–9) findings for verbal complementation. In section 4, I will look more closely at Los's (2005) account of what motivated the rise of the *to*-infinitive, and I will indicate to what extent this applies to the adjectival data. In addition, I will discuss the role played by the temporal location of the matrix and, as the Middle English data include many adjectives of Romance origin, I will also concentrate on whether language contact has had an effect on the increasing frequency of the *to*-infinitive. Finally, I will argue that the rise of the *to*-infinitive with deontic adjectives should ultimately be explained by analogy between verbal and adjectival complementation. In section 5, I will detail the further development of the distribution of mandative *to*- and *that*-clauses. As noted above, it will be found that the relative share of the *to*-infinitive stabilizes around 72% in the Modern English period. This in turn requires an explanation, by way of which I will consider the role of distinct adjective classes and information structure. Section 6 summarizes the main findings and formulates questions for further research.

2 DATA AND METHODS

As mentioned above, this study investigates deontic adjectives that take mandative clausal complements across the various historical periods. In general, such adjectives denote different degrees of goodness, properness, desirability or necessity. The Present-day English dataset given in the bottom row of Table 2 served as a starting point for the diachronic onomasiological inquiry, i.e. the study of which lexical items across time express the concepts of the semantic domain described above. I used these adjectives in several thesaurus environments to find their historical counterparts. For Old and Middle English I used the online *Thesaurus of Old English* and the *Middle English Dictionary*. From the Modern period onwards, I used *Roget's Thesaurus* (1970) along with the online *Oxford English Dictionary*. The adjectives thus found were subsequently searched for in five corpora (taking into account spelling variants), which are listed in Table 1.

Subperiod of English	Time span	Corpus	Number of tokens (millions)
Old English (OE)	750–1150	*York-Toronto-Helsinki Parsed Corpus of Old English Prose* (YCOE)	1.45
Middle English (ME)	1150–1500	*Penn-Helsinki Parsed Corpus of Middle English, Second Edition* (PPCME)	1.16
Early Modern English (EModE)	1500–1710	*Penn-Helsinki Parsed Corpus of Early Modern English* (PPCEME)	1.79
Late Modern English (LModE)	1710–1920	*Corpus of Late Modern English texts (Extended version)* (CLMETEV) (De Smet 2005, 2008)	15.01

Present-day English (PDE)	roughly 1990–1995	*Collins COBUILD Corpus* (CB) (only British subcorpora)[3]	42.10

Table 1
The corpora used for each subperiod

The results of the corpus searches are given in Table 2, which shows the adjectives that were investigated per period, with the number of tokens between brackets.[4] It can be seen that the table also distinguishes between semantically weak and strong adjectives. This distinction can be made on intuitive grounds in the sense that *essential* in (1), for example, expresses a stronger degree of desirability than *rihtlic* in (2) (cf. Övergaard 1995: 85; Huddleston & Pullum 2002: 997). The two classes also differ in terms of the semantic complement type they can occur with.[5] Strong adjectives only pattern with mandative complements in deontic constructions, as in (1), whereas weak adjectives are found with both mandative complements, as in (2), and propositional complements, as in (3) below. Such complements refer to propositions presupposed to be true, rather than to SoAs that are still potential. The meaning of the construction as a whole is purely evaluative, rather than deontic (cf. Van linden & Davidse 2009).

(3) It is **important** Mr Dorrell has identified community care as a top priority for improvement. It is perfectly obvious it has been grossly under-resourced. (CB, today)

In this example, the evaluation denoted by the adjectival matrix applies to a situation (viz. the identification of community care as a top priority for improvement) that has already taken place at the moment of the evaluative judgement. As the focus of this article is on mandative constructions, examples such as (3) have been excluded from analysis. I will return to the distinction between weak and strong adjectives in the following sections.

Period	Strength	Adjectives
OE (2,335)	weak (2,220)	andfenge (23), arlic (5), (ge)beorh(lic) (7), bryce (3), (ge)cop(lic) (3), (ge)cweme (61), (ge)cynde(lic) (65), cynn (7), (ge)dafen(lic) (35), (ge)defe(lic) (5), fremgendlic (3), fremful(lic) (12), geornlic (5), god (1,733), (ge)limplic (17), (ge)mæte (4), medeme (15), (ge)met(lic) (13), nyt(t)(lic) (35), nyttol (1), nytweorð(e)(lic) (35), (ge)radlic (3), rædlic (1), rihtlic (53), (ge)risen(lic) (28), (ge)screpe (4), (ge)tæse (1), til (4), þæslic (14), (ge)þungen (25)
	strong (115)	behef(e)(lic) (7), neadwis (1), niedbehæfdlic (1), niedbe(hefe/hof) (18), (ge)niededlic (1), niedþearf(lic) (43), þearf(lic) (44)

[3] The British COBUILD data include 42,099,593 words from the following subcorpora: ukephem (3,124,354), ukbooks (5,354,262), ukmags (4,901,990), ukspok (9,272,579), bbc (2,609,869), times (5,763,761), today (5,248,302), and sunnow (5,824,476).

[4] It is clear from Table 2 that up to EModE the adjective *good* is far more frequent than all the other adjectives. However, its occurrence in the construction looked at here is not so frequent compared to the total amount of attestations. Its distributional development of *that*- and *to*-clauses is also comparable to that found with the other adjectives (see Van linden 2008b). We can thus safely conclude that the data for *good* do not distort the overall picture.

[5] The two classes of adjectives also differ in terms of the matrix verb form and the formal types of complement they pattern with. For instance, weak adjectives may occur with hypothetical matrices and *when*- or *if*-clauses (e.g., *It would now be good if John Collins stayed too* (CB, today)), whereas strong ones cannot (see Van linden 2009: 59–62).

ME (3,187)	weak (3,067)	**able** (33), aise (3), bicumelich (28), comely (3), **commendable** (2), **competent** (3), **convenient** (8), **covenable** (30), **desiderable** (5), **desirable** (1), **expedient** (5), fremful (6), good (2,525), goodly (29), helply (2), **just** (30), kendeli (37), lele (2), limplich (1), medeme (3), (i)mete (5), **profitable** (42), **proper** (4), (i)queme (62), rightful (133), semeli (18), **servisable** (2), skilful (11), **vertuous** (34)
	strong (120)	behef(e)lic (20), behofsam (1), behoveful (1), behovely (4), **necessarie** (23), needly (1), niedful (69)
EModE (4,640)	weak (3,756)	**advantageable** (1), **appropriate** (8), **commendable** (13), **commodious** (15), **competent** (14), **convenient** (192), **covenable** (2), **desirable** (13), **expedient** (27), fit (288), fitting (11), good (2,438), **important** (9), **just** (186), meet (120), **pertinent** (3), **profitable** (61), **proper** (137), rightful (4), **servisable** (9), shapely (1), skilful (32), **suitable** (27), useful (38), **virtuous** (107)
	strong (884)	**critical** (6), **essential** (51), **indispensable** (3), **necessary** (802), needful (16), **vital** (6)
LModE (10,780)	weak (7,593)	**appropriate** (189), **convenient** (420), **desirable** (415), **expedient** (93), fit (951), fitting (81), good (685), **important** (1,784), meet (51), **profitable** (172), **proper** (2,361), **suitable** (391)
	strong (3,187)	**critical** (380), **crucial** (6), **essential** (553), **indispensable** (222), **necessary** (1,623), needful (194), **vital** (209)
PDE (7,454)	weak (5,150)	**appropriate** (323), **convenient** (162), **desirable** (84), **expedient** (13), fit (306), fitting (78), good (1,241), **important** (2,598), **profitable** (40), **proper** (150), **suitable** (155)
	strong (2,304)	**critical** (120), **crucial** (193), **essential** (478), **indispensable** (16), **necessary** (1,032), needful (41), **vital** (439)

Table 2
The adjectives under investigation

As can be seen in Table 2, the set of adjectives is rather different for the first three periods. In general, these periods witness many changes in the whole lexicon, with the Middle English period as hinge point. Lexical studies have shown that in that period, the original Old English word stock decreases steadily, whereas at the same time the lexicon is enriched with loans, especially from the Romance family, and also new word formations on the basis of Middle English lexical elements (see e.g., Dekeyser 1986, Burnley 1992, Rothwell 1998). With regard to the semantic domain studied here, it can be noted that some adjectives disappeared, such as *niedpearf*, others underwent semantic change, such as *rightful*, and yet others entered into the language due to word formation, such as *needful* and *behofsam*, or language contact, such as *essential*, *necessary*, *convenient* and *proper*. Adjectives of this last type have been marked in boldface in the table above. In fact, they make up a large share of the data studied here, which prompted the research question concerning the possible influence of language contact on the rise of the *to*-infinitive (see section 4.3). In addition, it can be seen that the set of Early Modern English adjectives is much larger than that of Present-day English ones, which can be explained by semantic changes and concomitant stricter selection restrictions. The adjectives *competent* and *skilful*, for instance, are still used in Present-day English, but they are only predicated of humans and they are not used in the mandative construction anymore.

In what follows, I will use all the data presented in Table 2.[6] As the data are not distributed evenly throughout the various periods and as the corpora used differ in size, I will provide normalized frequencies per 100,000 words in addition to the absolute frequencies.

3 THE RISE OF THE *TO*-INFINITIVE IN OLD AND MIDDLE ENGLISH

In Old English adjectival constructions, mandative complements are typically coded by *that*-clauses, and only marginally by *to*-clauses. In this section, I will show that a major change occurs in the distribution of the clausal complements during the Middle English period, as has been observed for verbal matrices (Los 2005). The data bear out that with adjectival matrices the *to*-clause encroaches on the *that*-clause from Early Middle English onwards and comes to predominate in Late Middle English.

First it should be noted that, whereas mandative complements in Present-day expressions such as in (1) are generally held to function as subject clauses in an extraposition construction with dummy or expletive *it* (cf. Kaltenböck 2000), the syntactic analysis of the Old and Middle English mandative constructions is more controversial. In Elmer's (1981) view, for example, the *that*- and *to*-clauses are complements of a subjectless construction with an optional dative Experiencer (a human referent) and a genitive Theme (viz. the clause). Others regard the clauses as subject clauses as in PDE (e.g. Callaway (1913: 7) for *to*-clauses in OE; Warner (1982: 108–9) for both *that*- and *to*-clauses in ME; Mitchell (1985b: §1963) for *that*-clauses in OE, while *to*-clauses can in Mitchell's view be either subjects or subject complements (1985a: §1540); cf. also later formal approaches (Fischer et al. 2000: 71, 95)). Thirdly, Visser (1972: §863, §903) somehow assumes both analyses, as he deals with the clauses under the heading of subject clauses, but describes them as complements of 'impersonal phrases'. Traugott (1992: 235) and Denison (1993: 64), finally, state that the discussion is undecidable.

However, OE examples with mandative *that*-clauses and anticipatory *that* in the matrix cataphorically referring to the post-verbal *that*-clause can be viewed as containing evidence for the subject clause analysis (Van linden 2009: 119–20). The invariable post-verbal position of the OE clauses has led some formal linguists to posit an expletive subject in the matrix which may be overt, as in (4) below, or non-overt ('null'), as in (5) (cf. Hulk & van Kemenade 1993).[7] In this sense, the term 'extraposition' can be argued to apply to the OE and ME mandative constructions as well.[8] In the course of ME, the surface subject (*h*)*it* became obligatory through the loss of verb-second and the rise of rigid SVO word order (cf. Allen 1995). The examples below illustrate the two formal types of mandative complement, viz. a subjunctive *that*-clause in (4) and a *to*-infinitival clause in (5).

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[6] It should be noted that in LModE the queries for *good* and *necessary* were limited to the adjectives immediately followed by *that*, *to* and *for*, as the total number of tokens would otherwise have become unmanageable. For the PDE data, I used a query including anticipatory *it* to avoid as much noise as possible.

[7] The question of the surface subjects brings up the question of the complement or adjunct status of the mandative clauses. As suggested by one of the referees, in the examples with cataphoric *that* in the matrix, this deictic pronoun arguably carries a thematic role and is an argument of the adjectival matrix predicate, which implies that the post-verbal *that*-clause functions as adjunct rather than as argument/complement (cf. Bennis 1986). The form (*h*)*it*, by contrast, is generally held not to carry a thematic role, so that the clauses in constructions like (4) are true complements of the adjectival matrix (cf. Hulk & van Kemenade 1993). However, the OE and ME data do not include the specific extraction phenomena typically used as evidence for the syntactic status of the clauses.

[8] I thank Bettelou Los (p.c.) and one of the referees for suggesting this analysis.

(4) Forðon hit is **neodþearf**, þæture spræc eft hi sylfe gebige
Therefore it is necessary thatour speech afterwards it self turn.PRES.SUBJ to
þam gemetfæstumarwyrðum fæderum, þara lif ascean &
to the reasonable honourable fathers, whose life shone.forth and
mære gewearþ geond Suþlangbeardna land.
famous becamethroughout of.Southern.Lombards land.
'Therefore, it is necessary that our speech should afterwards turn itself to the reasonable and honourable fathers, whose life shone forth and became famous throughout the land of the Southern Lombards.' (YCOE 1050–99 GDPref and 3 (C) 25.229.3)

(5) & þonne him **ðearf** sie ma manna up mid him to
And when them.DAT necessary be.PRES.SUBJ more men.GEN up with them to
habbanne on hiora fore, gecyðe symle, swa oft swa
have on their expedition, make.known.PRES.SUBJ always, as often as
him ðearf sie, in gemotes gewitnesse cyninges gerefan.
them.DAT necessary be.PRES.SUBJ, in council.GEN testimony king.GEN reeve.GEN
'When it is necessary to them to have more men with them on their expedition, they should always make it known, as often as it is necessary to them, in testimony of the council (and) of the king's reeve.' (YCOE 890–999 LawAf 1 34.1)

The two examples have similar impersonal phrases as matrix, and their complements refer to a potential SoA, which is assessed as highly desirable or necessary. We can thus conclude that the two formal complement types are functionally equivalent, that is, their distributions have at least one syntactic environment in common.

The diachronic data show that during the Middle English period, the *to*-infinitive started to replace the subjunctive *that*-clause in the constructions illustrated above. In Table 3 below, I present the absolute frequencies (n) and relative shares (%) of the two formal types in Old and Middle English. In Table 4, I present their normalized frequencies per 100,000 words, which have been rounded to one decimal place or at least two significant digits. As the *that*-clauses found in the corpora invariably occur in extraposed position, I only included *to*-infinitives found in this same position, thus excluding (ME) *to*-clauses occurring in the canonical subject position (i.e., preposed clauses).

Type of adj	Type of compl	EOE 750–950		LOE 950–1150		EME 1150–1350		LME 1350–1500	
		n	%	n	%	n	%	n	%
strong	*that*	22	81.5	21	95.5	1	100	5	23.8
	to	5	18.5	1	4.5	0	0	16	76.2
	total	27	100	22	100	1	100	21	100
weak	*that*	17	73.9	47	97.9	9	47.4	24	41.4
	to	6	26.1	1	2.1	10	52.6	34	58.6
	total	23	100	48	100	19	100	58	100
total	*that*	39	78.0	68	97.1	10	50.0	29	36.7
	to	11	22.0	2	2.9	10	50.0	50	63.3
	total	50	100	70	100	20	100	79	100

Table 3
The development of the distribution of that- *and* to-*clauses in Old and Middle English (absolute and relative frequencies)*

Type of adj	Type of compl	EOE 750–950	LOE 950–1150	EME 1150–1350	LME 1350–1500
strong	*that*	7.2	1.9	0.28	0.62
	to	1.7	0.088	0.00	2.0
	total	8.9	1.9	0.28	2.6
weak	*that*	5.6	4.1	2.6	3.0
	to	2.0	0.088	2.8	4.2
	total	7.6	4.2	5.4	7.2
total	*that*	12.8	6.0	2.8	3.6
	to	3.6	0.18	2.8	6.2
	total	16.5	6.2	5.7	9.8

Table 4
The development of the distribution of that- *and* to-*clauses in Old and Middle English (normalized frequencies per 100,000 words)*

Tables 3 and 4 show that the overall predominance of *that*-clauses in Old English changes to an almost equal distribution in Early Middle English, and a predominance of *to*-clauses in Late Middle English. Fisher's exact tests (cf. Pedersen 1996) indicate that the increase of *to*-infinitives from LOE to EME is highly statistically significant (p=1.672e-06), whereas their increase from EME to LME is not (p=0.3125). Of the two lexical classes distinguished here, the weak adjectives present us with the most nuanced picture, in part because they are much more frequent than strong adjectives from LOE to LME. The rise of the *to*-infinitive is evidenced by the following examples, in which (6) dates from LOE and is construed with a subjunctive *that*-clause, whereas (7) dates from LME and is construed with a *to*-clause.

(6) He andwyrde; Nis na **god** þæt man nyme his bearna hlaf.
He answered; not.is not good thatone take.PRES.SUBJ his children.GEN bread
and awurpe hundum;
and throw.PRES.SUBJ dogs.DAT
'He answered: "It is not good that one should take the bread of his children and throw it to the dogs"' (YCOE 990–1010 ÆCHom II, 8 67.16)

(7) And Crist answeride and seyde 'Hit is not **good** to take þe breed þat
And Christ answered and said 'It is not good to take the bread that
falluþ to children, and ȝyuen hit to howndes to ete fro þese children.'
belongs to children, and give it to dogs to eat from these children
'And Christ answered and said: "It is not good to take the bread that belongs to children from these children and give it to dogs to eat."' (PPCME ?*a*1425 Wycl.Serm. (Add 40672) 401)

Both examples are mandative constructions – they are even translations of the same Bible verse, but they are construed with a different formal type of complement. Examples like these thus illustrate that the *to*-infinitive replaces the *that*-clause in the ME period.

The same change in relative frequency of *that*- and *to*-clauses has been found with verbal matrices by Los (2005). Showing that the *to*-infinitive gains in frequency after intention and manipulative verbs at the cost of the subjunctive *that*-clause (for examples of these verbs, see Figure 2), Los (2005: 185–9) counters the previously held view that the *to*-infinitive replaced the bare infinitive. The change is illustrated by the following examples from two manuscripts of Gregory's *Dialogues* (Los 2005: 179–85).

(8) Forþon þe he **gewilnode**, þæt he hæfde lof &
because that he desired, that he have[.PAST.IND/SUBJ] glory and
herenesse þæs clænan lifes
praise the.GEN clean life.GEN
'because he desired that he might have glory and praise for a clean life' (GD 8.117.30, C [870–90], cited in Los 2005: 181 (49))

(9) forþam þe he **gewilnode** to hæbbenne þæt lof & herunge his
because that he desired to have the glory and praise his.DAT
mæran drohtnunge
excellent conduct.DAT
'because he desired to have the glory and praise for his excellent conduct' (GD 8.117.30, H [950–1050], cited in Los 2005: 182 (50))

(10) þæt hi **wæron genydede** […], þæt hi scoldenniwe wisan hycgan &
that they were forced […], that they should new ways consider and
smeagean
think
'that they were forced that they should consider and adopt new ways' (GD 2 (C) 3.104.20 [870–90], cited in Los 2005: 183 (52))

(11) Þæt hi […] **wæron geneadode** niwe þing to smeagenne
that they […] were forced new things to think
'that they […] were forced to adopt new things' (GD 2 (H) 3.104.16 [950–1050], cited in Los 2005: 183 (53))

Examples (8) and (9) have the intention verb *gewilnian*, while (10) and (11) contain *niedan/neadian*, a verb of persuading and urging. As the clausal argument of both verb classes, the earlier manuscript (C) has a subjunctive *that*-clause, cf. (8) and (10), whereas the later manuscript (H) contains *to*-clauses, cf. (9) and (11). Besides comparison of manuscripts, Los (2005) also gives quantitative evidence for the replacement of the *that*-clause by the *to*-infinitive. Her data, drawn from the Brooklyn-Geneva-Amsterdam-Helsinki Parsed Corpus of Old English and the PPCME (Los 2005: 185), are presented in Table 5 below. In this table, I have only included Los's (2005) findings about the *to*-infinitive functioning as complement of intention and manipulative verbs, the latter including verbs of persuading and urging as well as verbs of commanding and permitting.[9] It can be seen that these complements show a rather 'abrupt jump in the ratio of *to*-infinitives to subjunctive clauses' (Los 2005: 188), viz. from 14.4% in OE to 62.8% in EME. The adjectival complements, however, show a slightly less abrupt development, viz. from 10.8% in OE to 50.0% in EME (this rise is also statistically significant: Fisher's exact p=0.0001381). As the complements of the verbal matrices are semantically very similar to the mandative complements of deontic adjectives, we can conclude that, although the adjectival complements have a much lower frequency than the verbal ones, they are nevertheless very comparable to Los's (2005) findings, and

[9] It should be noted that Los's (2005: 185–6) data include 'only subjunctive *that*-clauses in which the subject is identical to the subject of the matrix clause in the case of the intention group ('subject control'), or to the object of the matrix in the manipulatives ('object control'), and in that sense compatible with *to*-infinitives, which are always controlled.'

together these data bear witness to an important ongoing change in the clausal complementation system.

Type of matrix	Type of compl	EOE 750–950		LOE 950–1150		Total OE		EME 1150–1350	
		n	%	n	%	n	%	n	%
verb	*that*	352	85.4	492	85.7	844	85.6	160	37.2
	to	60	14.6	82	14.3	142	14.4	270	62.8
	total	412	100	574	100	986	100	430	100
adj	*that*	39	78.0	68	97.1	107	89.2	10	50.0
	to	11	22.0	2	2.9	13	10.8	10	50.0
	total	50	100	70	100	120	100	20	100

Table 5

The distribution of mandative that- *and* to-*clauses with verbal and adjectival matrices in Old English and Early Middle English (data on verbal complements from Los 2005: 186, Table 7.6)*

4 EXPLANATIONS FOR THE RISE OF THE *TO*-INFINITIVE

In the literature the rise of the *to*-infinitive as complement to verbal matrices has generally received language-internal explanations. In this section, I will first focus on the account proposed by Los (2005), which encompasses the entire complementation system, and I will investigate whether it also applies to adjectival mandative complements (section 4.1). As her account suggests that the tense of the matrix may have played a role in the replacement of the *that*-clause by the *to*-infinitive, I will also examine this language-internal factor for the adjectival complements (section 4.2). Thirdly, I will verify whether the influx of Romance items in the Middle English period (cf. Table 2) has had corollaries in the formal coding of the mandative complements (section 4.3). Having considered all these factors, I will conclude that the rise of the *to*-infinitive with adjectival matrices in Middle English has to be explained by analogy between verbal and adjectival mandative constructions (section 4.4). I will argue that this process of analogy has to be understood as functioning paradigmatically as well as syntagmatically (cf. De Smet 2008: 102–27).

4.1 The changing distribution of the to-*infinitive*

According to Los (2005), the supersession of the *that*-clause by the *to*-infinitive is motivated by the changing distribution of the latter form. Whereas the *to*-infinitive originally competed with the purposive *to*-prepositional phrase (PP), it started to mirror the distribution of the subjunctive *that*-clause already before the Old English period. Eventually, it ended up replacing this competitor in all its syntactic environments within the verbal complementation system. However, I will show that the adjectival complementation system is not fully comparable to the verbal one discussed by Los (2005), and that analogy between the two comes into play.

It is generally agreed that the *to*-infinitive clause originates in a PP with the allative preposition *to* and a dative-inflected verbal noun, a view dating back to the work of early Indo-Europeanists such as Bopp (1871 [1833–52]: iii, §849–86) (see Los 2005: 4–9, 153–7 for an overview). Whereas the origin of the *to*-infinitive as a *to*-PP has led many authors to assume that its categorial status in Old English was still PP, Los (2005: ch. 7) adduces various types of evidence showing that the *to*-

infinitive was a clause in Old English already.[10] In this development from PP to clause, the allative meaning of prepositional *to* ('towards a goal') played a crucial role in that infinitival *to* typically refers to goals in time, adding 'prospective relative time reference' (Los 2005: 197). According to Los (2005: ch. 2–3), the distribution of the *to*-infinitive originally followed that of the purposive *to*-PP, competing in three environments in Old English: (i) as purpose adjunct to a verb phrase (VP), (ii) as purpose adjunct[11] to a noun phrase (NP) (e.g., *anweald* 'power', *tima* 'time') or adjectival phrase (AP) (e.g., *gearu* 'ready'), and (iii) as Goal-argument after conative verbs (with meanings like 'try'), and verbs of persuading and urging (Los 2005: 198–9).

Apart from the *to*-PP and *to*-infinitive, another expression could of old occur in the three purposive environments as well, viz. the subjunctive *that*-clause.[12] In fact, the purposive function must have been its original use (also in Gothic, cf. Los 2005: 30). However, by the beginning of the Old English period it had already spread to various other environments (e.g. Mitchell 1985b: §2033), so that its purposive meaning was often reinforced by *to ðon þæt* or *to ðy þæt* (Los 2005: 41–2). Importantly, Los (2005: ch. 4–6) contends that the subjunctive *that*-clause set the example for the *to*-infinitive in the prehistoric period, so that the latter is also found in non-purposive environments in Old English, such as the Theme-argument function. She argues that the following changes must have taken place before the Old English period. First, the *to*-infinitive combining with conative verbs and verbs of persuading and urging was reanalysed from purposive adjunct to Goal-argument (Los 2005: 67, 99). Later, the *to*-infinitive spread to intention verbs other than the conative verbs through reanalysis[13] and analogy with the subjunctive *that*-clause, which was already established as Theme-argument of these verbs (Los 2005: 99). Likewise, the use of the *to*-infinitive with verbs of persuading and urging extended to verbs of commanding and permitting (Los 2005: 137) and some types of commissives (Los 2005: 140–6), both taking Theme-arguments. In Early Middle English, then, the *to*-infinitive won out over the *that*-clause in most environments, as shown in Table 5 above.[14]

If we try to apply Los's (2005) account of the changing distribution of the *to*-infinitive with verbal matrices to the adjectival data, it becomes clear that we cannot posit a development of the *to*-infinitive from purposive adjunct to Theme-argument within the adjectival complementation system. The main reason for this lies in the lack of a competing expression shared by these two environments. The purposive *to*-infinitival construction found with the adjectives studied, most

[10] Los's evidence against a PP-analysis comes from the occurrence of *to*-infinitives in conjoined structures, the strict adjacency of *to* and infinitive, the fossilized nature of the dativa l ending of the *to*-infinitive, its non-occurrence with determiners or 'inherited objects' in the genitive or in an *of*-PP, and its positioning to the right of the matrix (unlike that of bare infinitives, which can precede or follow the matrix) (2005: 157–70) (cf. Miller 2002: 237–8). The most important evidence in favour of a clausal analysis comes from the spread of the *to*-infinitive to contexts other than those found with purposive *to*-PPs, the similarity of object position in *to*-clauses and subjunctive *that*-clauses, and the preposition stranding facts in OE *to*-infinitival relatives (Los 2005: 171–7).

[11] Although Los makes a clear difference between adjuncts and complements (2005: 34–5), she calls the purposive expressions with NPs and APs in some places adjuncts (2005: 29, 199), but in other places complements (2005: 164, 171).

[12] With the term 'subjunctive *that*-clauses' Los refers to clauses that have a subjunctive finite verb form, a 'neutralized' form 'that can be expected to be subjunctive because of the putative nature of the clause', or a modal auxiliary (either indicative or subjunctive) (Los 2005: 24).

[13] More specifically, Bock (1931) proposes that *to*-infinitival adjuncts after nominal objects were reanalyzed as Theme-argument of the verb (Los 2005: 99).

[14] In fact, Los's figures show that the *to*-infinitive 'has made the greatest inroads on the domain of the subjunctive *that*-clause in the function of the purpose adjunct', which ties in with the finding that this was the earliest environment of the *to*-infinitive (Los 2005: 188). However, these data are not included in Table 5.

probably the original use of the *to*-clause with the adjectives, is illustrated in (12). Example (13) shows that this *to*-clause is in competition with a purposive *to*-PP. [15]

(12) Cuþ ys eac þæthis hydis **bryce** hundum & eallum fiþerfetum
known is also thathis skin is useful dogs.DAT and all quadruped.DAT
nytenum wið woles gewinne on to donne.
animals.DAT against pestilence.GEN hardship on to do
'It is also known that its skin [i.e., of a badger, AVL] is useful for dogs and all quadruped animals to put on (them) against the hardship of pestilence' (YCOE 1000–50 Med 1.1 (de Vriend) 1.8)

(13) hiora hydbið swiðe **god** to sciprapum.
their skin is very good to ship's.ropes
'Their skin [i.e., of walruses, AVL] is very good for ship's ropes.' (YCOE 900–50 Or 1 1.14.30)

In these examples, the skin of an animal is said to be useful or good for a specific purpose. In (12), the purpose is expressed by a *to*-infinitive (*on to donne*), whereas in (13), it is expressed by a *to*-PP (*to sciprapum*). It can be argued, however, that this *to*-PP implies an action: the skin of a walrus is good 'for the manufacture of ship's ropes' or good 'to make ship's ropes with'. Syntactically, the construction in (12) consists of a subject (no surface form, such as, for example, *hit*), a copular finite, an adjectival subject complement, and a *to*-infinitive with a non-subject gap (viz. an object gap in (12): the syntactic subject (*his hyd*) is coreferential with the notional object of the *to*-infinitive) (cf. Callaway 1913: 149–59; Visser 1972: §940; Mitchell 1985a: §928–31; Traugott 1992: 249). Crucially, the fact that the *to*-clause has a non-subject gap implies that it does not compete with a *that*-clause (cf. Van der Wurff 1990; Los 2005: 204, 266–70).[16]

The only other *to*-infinitival construction with deontic adjectives occurring in Old English is the mandative construction that I am concerned with in this article (cf. Mitchell 1985a: §1537–42, 1544–7; Visser 1972: §903, 908; Traugott 1992: 244). Importantly, in this construction, the *to*-infinitive is in variation with the subjunctive *that*-clause, both of which function as Theme-arguments of an impersonal adjectival phrase (see examples (4) and (5) above), but not with the purposive *to*-PP. We therefore have to conclude that with deontic adjectives – unlike with verbal matrices – we cannot assume a developmental relation between the purposive function of the *to*-infinitive (in the *bryce*-construction) and its function as Theme-argument (in the mandative construction), as in these functions it never competed with the same types of expression. (Remember that with verbs, the subjunctive *that*-clause with the conative verbs and verbs of persuading and urging formed the middle ground.) Hence, the conclusion imposes itself that in the distribution of the *to*-infinitive with adjectival predicates, at some stage analogy with verbal

[15] However, it should be noted that this competition between the *to*-infinitive and the *to*-PP only applies to the weak adjectives studied here. With the strong ones, which express necessity, a purposive paraphrase is not felicitous. More generally, a construction such as (12) with a weak adjective is a characteristic-oriented construction, whereas those with strong adjectives are activity-oriented constructions (Van linden 2008a). It is only in the characteristic-oriented type that the *to*-infinitive competes with the purposive *to*-PP.

[16] I gratefully acknowledge that this generalization was pointed out by one of the two referees. It should also be noted that these adjectival constructions differ from those with adjectives such as *gearu* ('ready'), in which the *to*-infinitive has a subject gap, and competes with the purposive *to*-PP and the subjunctive *that*-clause (see above, cf. Los 2005: 172). Unlike the adjectives studied, the *gearu*-type adjectives do not occur in the extraposition construction (cf. **It is **eager** to prepare dinner*).

matrices has played a role: deontic adjectives began to favour *to*-infinitives by analogy with the increased frequency of *to*-complements with intention and manipulative verbs.

By way of conclusion, I present the distribution of the *to*-infinitive and the expressions it competes with in Figure 1 below. The full arrows indicate its development from Goal-argument to Theme-argument, as discussed above. The boxes of the adjectival constructions have been put in boldface. The arrow linking the two boxes is dashed and crossed out, reflecting the assumption that we cannot posit a developmental relation between the *bryce*-construction and the mandative construction.

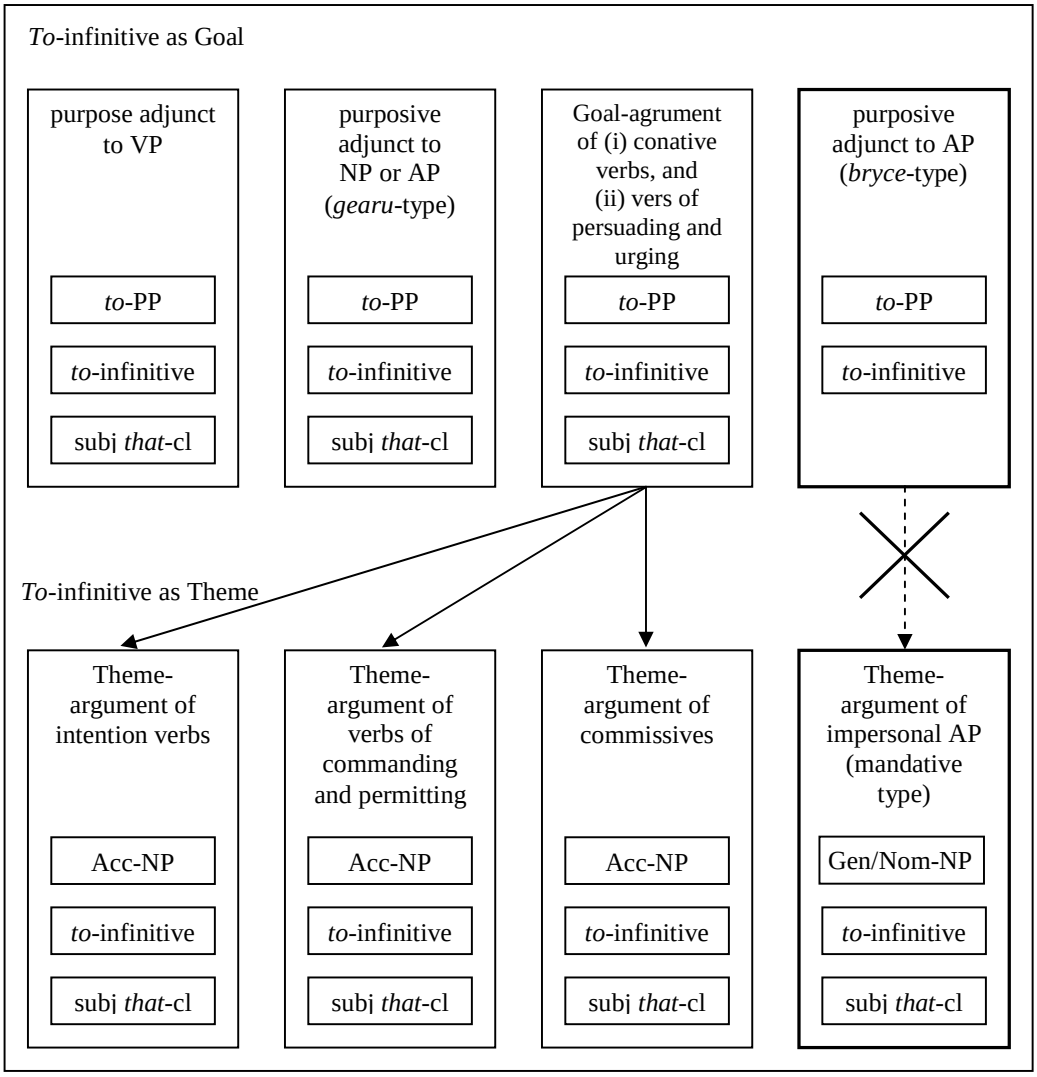

Figure 1
The distribution of the to*-infinitive and its competitors in its development from expression of Goal to Theme-argument*

4.2 The role of the tense of the matrix

In this section, the development of the *to*-infinitive will be linked to a well-described development of its competitor in the mandative construction, viz. the decrease of subjunctive forms in the so-called subjunctive *that*-clause. It is hypothesized that the loss of subjunctive forms, which began in past environments, may have promoted the use of the *to*-infinitive in these environments especially.

The loss in frequency of the subjunctive or 'modally marked' forms (Visser 1972: ch. 7) has received considerable attention in the diachronic literature. In general, this change has been attributed to the attrition of inflectional morphology and the availability of alternative expressive devices, such as modal auxiliaries (e.g. Visser 1972: ch. 7, Plank 1984).[17] As the locus of change, a number of authors have pointed to past contexts, as the past subjunctive paradigm was affected first (e.g. Visser 1972: §836; Traugott 1972: 150; Plank 1984: 346). (However, none of these authors provides details about the data this finding is based on.) The data on the mandative *that*-clauses complementing the adjectives studied here confirm the past context hypothesis, as shown in Table 6.

Tense of matrix	Coding of finite in *that*-clause	Freq	OE 750–1150	ME 1150–1500	EModE 1500–1710	LModE 1710–1920
present	subjunctive forms (not periphrastic)	n	80	18	15	10
		N	5.6	1.6	0.84	0.067
		%	**89.9**	**62.1**	**20.5**	**3.9**
	periphrastic forms (subj/ambig/indic)	n	2	2	42	236
		N	0.14	0.17	2.3	1.6
		%	**2.2**	**6.9**	**57.5**	**92.2**
	ambiguous forms	n	6	8	16	9
		N	0.42	0.69	0.89	0.060
		%	6.7	27.6	21.9	3.5
	indicative forms	n	11	1	0	1
		N	0.070	0.087	0	0.0067
		%	1.1	3.4	-	0.4
	total	n	89	29	73	256
		N	6.2	2.5	4.1	1.7
		%	100	100	100	100
past	subjunctive forms (not periphrastic)	n	12	1	5	1
		N	0.83	0.087	0.28	0.0067
		%	**66.7**	**10.0**	**16.7**	**0.8**
	periphrastic forms (subj/ambig/indic)	n	1	6	21	120
		N	0.070	0.52	1.2	0.80
		%	**5.6**	**60.0**	**70.0**	**97.6**

[17] The attrition of inflectional endings can be explained by phonological changes that started in Old English already. The vowels in final unstressed syllables were increasingly reduced to /ə/ (Lass 2006: 61–2), so that the past indicative (*–on*) and subjunctive plural endings (*–en*) became homophonous (Turner 1980: 272). In fact, weak verbs kept a distinctive subjunctive form in the past only for the second person singular (with subject *thou*), and strong verbs (and *be*) did so for the first and third person singular (Fischer 1992: 247). These singular forms of strong verbs gradually became homophonous both through grade reduction and final schwa-deletion (Lass 2006: 77). This process started in the Northern dialects and slowly spread south throughout the Middle English period (Mustanoja 1960: 452; Lass 1992: 132).

ambiguous forms	n	2	3	2	1
	N	0.14	0.26	0.11	0.0067
	%	11.1	30.0	6.7	0.8
indicative forms	n	3	0	2	1
	N	0.21	0	0.11	0.0067
	%	16.7	-	6.7	0.8
total	n	18	10	30	123
	N	1.3	0.87	1.7	0.82
	%	100	100	100	100

Table 6

The types of finite forms in mandative that*-clauses in present and past contexts*

Table 6 bears out the overall decrease in frequency of the unambiguous subjunctive forms in mandative *that*-clauses from Old English up to Late Modern English (all statistically significant falls with Fisher's exact p-values ranging from p=8.627e-08 up to p=0.001271). It also clearly shows that the tense of the matrix has played a crucial role in the Middle English period, with subjunctive forms occurring in 62.1% of the present context data, but only in 10% of the past context data (Fisher's exact p=0.008362).[18] The overall development is matched by a steady increase of modal auxiliaries or 'periphrastic alternants' (Övergaard 1995) (all significant increases with 3.455e-15<p<0.0007903 (again Fischer's exact p)).[19] In addition, the difference in relative shares of these forms in present contexts as opposed to past ones is most pronounced for the Middle English period, viz. 6.9% versus 60% respectively (Fisher's exact p=0.001443).[20] The shares of indicative forms and morphologically ambiguous or 'neutralized forms' (López Couso & Méndez Naya 1996), finally, do not show significant differences for ME (with Fisher's exact p=1 in both cases). Although the loss of the subjunctive forms was thus, if not promoted (cf. Plank 1984: 346), 'remedied' by the modal auxiliaries, the decline of subjunctive forms in *that*-clauses may have played some role in the increased use of *to*-infinitives in past contexts.

Unfortunately, the data do not give clear indications of the role of the temporal location of the main clause. Table 7 presents the distribution of *that*- and *to*-clauses across present and past matrices. In addition to Old and Middle English data, it also includes Early Modern English data so as to detect any belated effects.

Tense of matrix	Type of comp	Freq	EOE 750–950	LOE 950–1150	EME 1150–1350	LME 1350–1500	EModE 1500–1710
present	*that*	n	36	53	8	21	73
		N	11.9	4.7	2.3	2.6	4.1
		%	80.0	96.4	53.3	33.3	38.4
	to	n	9	2	7	42	117
		N	3.0	0.18	2.0	5.2	6.5
		%	20.0	3.6	46.7	66.7	61.6

[18] The only other period in which the frequency of subjunctive forms is significantly higher in present than in past contexts is Old English, albeit to a lesser degree than in ME (OE Fisher's exact p=0.01907).

[19] In the three Old English examples and in two (out of eight) Middle English ones, the modal auxiliaries are themselves marked for the subjunctive mood.

[20] The only other period in which the frequency of periphrastic forms is significantly lower in present than in past contexts is Late Modern English, albeit to a lesser degree than in ME (LModE Fisher's exact p=0.04060).

	total	n	45	55	15	63	190
		N	14.8	4.8	4.3	7.8	10.6
		%	100	100	100	100	100
past	*that*	n	3	15	2	8	30
		N	0.99	1.3	0.57	1.0	1.7
		%	60.0	100.0	40.0	50.0	26.5
	to	n	2	0	3	8	83
		N	0.66	0.00	0.85	1.0	4.6
		%	40.0	0.00	60.0	50.0	73.5
	total	n	5	15	5	16	113
		N	1.6	1.3	1.4	2.0	6.3
		%	100	100	100	100	100

Table 7
The distribution of that- *and* to-*clauses in present and past contexts*

Table 7 shows that in Early Middle English the share of *to*-infinitives in past contexts is higher than that in present contexts, but the figures are very small, and in fact the difference is not statistically significant (Fisher's exact p=1). In Late Middle English, the share of *to*-clauses in past contexts is even lower than that in present contexts (viz. 50.0% versus 66.7%), but again the difference is not statistically significant (Fisher's exact p=0.2530). The Early Modern English data, finally, yield a weakly significant result, with the portion of *to*-clauses in past contexts (73.5%) exceeding that in present contexts (61.6%) (Fisher's exact p=0.04454). We can thus conclude that the adjectival data do not point in a clear direction as to the role of the tense of the matrix; they do not plainly indicate that subjunctive *that*-clauses were replaced more readily in past contexts than in present ones in Middle English, the period in which the past paradigm of the subjunctive mood disappeared.

4.3 The role of language contact

Whereas the previous two sections discussed language-internal factors, this section investigates a language-external factor that may be invoked to account for the rise of the *to*-infinitive, viz. language contact.

As discussed in section 2, the Middle English period witnesses considerable changes in the lexicon, such as the arrival of many Romance loans. As the data studied here include quite a few borrowed items, the question arises whether the increase of the *to*-infinitive may also have been influenced by these items bringing with them a preference for *to*-infinitives from their source language.

However, study of the data shows that this is not the case. Table 8 summarizes the results of the analysis: it is set up in much the same way as Table 7, but the data are split up according to the origin of the adjectives.

Origin of adjective	Type of comp	Freq	EOE 750–950	LOE 950–1150	EME 1150–1350	LME 1350–1500	EModE 1500–1710
Anglo-Saxon	*that*	n	39	68	10	22	51
		N	12.8	6.0	2.8	2.7	2.8
		%	78.0	97.1	50.0	37.3	32.3
	to	n	11	2	10	37	107
		N	3.6	0.18	2.8	4.6	6.0

		%	22.0	2.9	50.0	62.7	67.7
	total	n	50	70	20	59	158
		N	16.5	6.2	5.7	7.3	8.8
		%	100	100	100	100	100
Romance	*that*	n	—	—	—	7	52
		N	—	—	—	0.87	2.9
		%	—	—	—	35.0	35.9
	to	n	—	—	—	13	93
		N	—	—	—	1.6	5.2
		%	—	—	—	65.0	64.1
	total	n	—	—	—	20	145
		N	—	—	—	2.5	8.1
		%	—	—	—	100	100

Table 8

The distribution of that- *and* to-*clauses with Anglo-Saxon and Romance adjectives*

Table 8 indicates that the Anglo-Saxon versus Romance origin of the adjectives does not correlate with the rise of the *to*-infinitive. On the one hand, there are no data for borrowed adjectives for the critical period, viz. EME. On the other, the figures for the later periods show that the distribution of *that*- and *to*-clauses with Romance adjectives is very similar to that with Anglo-Saxon ones; Fisher's exact tests indicate that the differences are not significant (LME p=1; EModE p=0.5449). We can therefore safely exclude the origin of the adjectival matrix as an explanatory factor in the development of the *to*-infinitive.

4.4 Conclusion

The discussions of the factors that may explain the rise of the *to*-infinitive seem to point ultimately to analogy between verbal and adjectival mandative complement constructions. The factor of language contact could be ruled out, and the study of the tense of the matrix did not present us with an obvious conclusion. Moreover, the distribution of the *to*-infinitive would be hard to explain if only the adjectival data were taken into account. As argued in section 4.1, the two *to*-infinitival constructions found with the adjectives studied do not share competing expressions, so that we could not hypothesize a developmental relation between them. All this confirms the conclusion proposed in section 4.1, viz. that the *to*-infinitive has come to function as a Theme-argument with adjectival matrices through analogy with the much more frequent verbal matrices, for which a clear development from Goal-argument to Theme-argument has been established by Los (2005). Both types of matrices are attested with *to*-infinitives functioning as Theme-argument in Old English already, and are the locus of large-scale replacement from Early Middle English onwards. The finding that the adjectival constructions manifest a less abrupt replacement by *to*-infinitives than the verbal ones (cf. section 3) serves as corroborating evidence for the claim that the latter constructions served as the models of analogical extension.

The data also suggest that the influence of the verbal matrices can be viewed as functioning both paradigmatically and syntagmatically (cf. De Smet 2008: 102–27). On the one hand, we can identify the spread of the *to*-infinitive as an example of paradigmatic analogy (De Smet 2008: 119–20), that is, 'the extension of a construction from one environment to another on the basis of a link between the spreading construction and some other paradigmatically related construction' (De Smet 2008: 118). In this case, the *to*-infinitive spread from the intention and manipulative verb constructions (the source syntagm(s)) to the adjectival mandative construction (the target syntagm)

with the subjunctive *that*-clause as the paradigmatically related construction. On the other hand, the *to*-infinitive can also be argued to 'extend its range of application on the basis of semantic similarity between the source environment [or source syntagm, AVL] and the target environment of extension [or target syntagm, AVL]' (De Smet 2008: 103), in this case the semantic similarity between intention and manipulative verb constructions and the adjectival mandative construction. In fact, the semantic similarity between these two constructions resides in their mandative meaning: their semantics includes an element of will emanating from a human source. In the case of intention and manipulative verbs, this human source appears as a referential agent participant, viz. the matrix subject.[21] In the case of the adjectival constructions, the source is typically left implicit, but retrievable from the context, for instance as the (reported) speaker. The rise of the *to*-infinitive in the adjectival mandative construction can thus in my view be explained by both paradigmatic and syntagmatic analogy with verbal matrices, as visualized in Figure 2 (in which analogy is symbolized by ~).

[21] This is invariably the case with intention verb constructions, cf. (8)–(9) above. With manipulative verb constructions, it is only in active clauses that the matrix subject is coreferential with the source of will. In passive clauses, as in (10)–(11) above, by contrast, the identity of the source has to be inferred from the context.

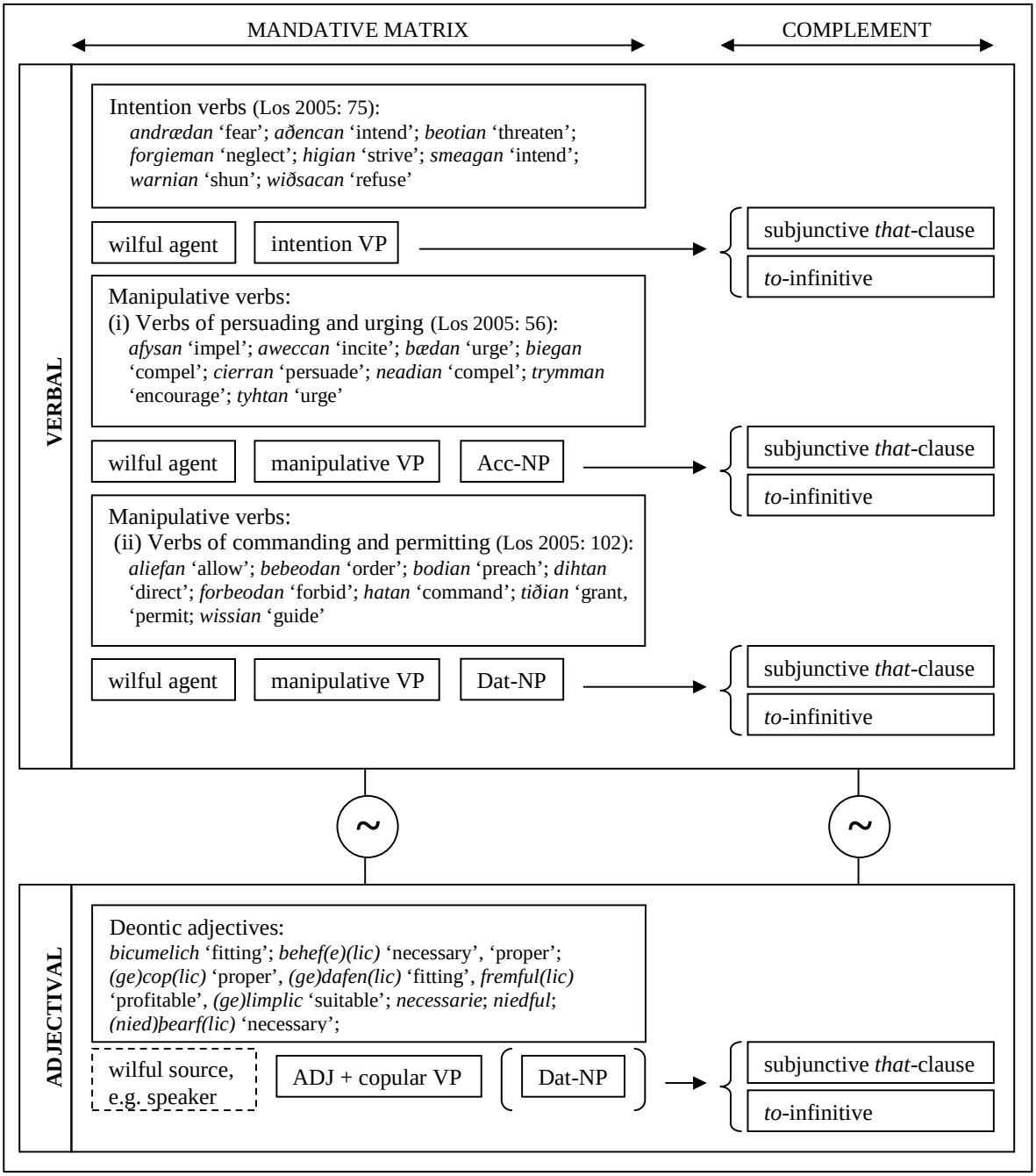

Figure 2
Paradigmatic and syntagmatic analogy between verbal and adjectival mandative constructions

5 THE DISTRIBUTION OF *THAT*- AND *TO*-CLAUSES IN MODERN ENGLISH

Analysis of adjectival data from later periods than Middle English reveals that after the major reversal of distribution in the Middle English period, the *to*-infinitive did not continue to increase in

frequency so as to oust the *that*-clause completely. Rather, the mandative *that*-clause stabilized around 28% in Early Modern, Late Modern and Present-day English. This requires us to look for explanations for this new type of distribution.

Whereas with verbal matrices mandative *to*-clauses kept gaining in frequency at the expense of the *that*-clause up to 1800 (Rohdenburg 1995), no comparable continuous frequency loss of the *that*-clause is found in the adjectival data. Table 9 details the distribution of *that*- and *to*-clauses with weak and strong adjectives from 1500 up to the present.

Type of adj	Type of compl	EModE 1500–1710			LModE 1710–1920			PDE 1990–1995		
		n	N	%	n	N	%	n	N	%
strong	*that*	30	1.7	36.6	171	1.1	18.1	331	0.79	31.6
	to	52	2.9	63.4	776	5.2	81.9	718	1.7	68.4
	total	82	4.6	100	947	6.3	100	1049	2.5	100
weak	*that*	73	4.1	33.0	208	1.4	22.3	475	1.1	26.4
	to	148	8.3	67.0	725	4.8	77.7	1321	3.1	73.6
	total	221	12.3	100	933	6.2	100	1796	4.3	100
total	*that*	103	5.7	34.0	379	2.5	20.2	806	1.9	28.3
	to	200	11.2	66.0	1501	10.0	79.8	2039	4.8	71.7
	total	303	16.9	100	1880	12.6	100	2845	6.8	100

Table 9

The development of the distribution of that- *and* to-*clauses in Early Modern, Late Modern, and Present-day English*

If we compare the Early Modern English data to the Late Middle English data in Table 3 above, we can note only small differences (*that*-clauses: LME 37.2%, EModE 34.0%; *to*-clauses: LME 62.8%, EModE 66.0%; Fisher's exact p=0.6909). In Late Modern English, the share of the *to*-infinitive reaches its highest value with about 80% (a significant increase from EModE with Fisher's exact p=3.068e-07). However, in Present-day English, it has decreased to about 72% (a significant fall with Fisher's exact p=1.699e-10). In short, after its rise in Middle English the *to*-infinitive stabilized at roughly a 3:1 ratio to the *that*-clause, with only a small peak movement in Late Modern English.

The finding that in these later stages the mandative *that*-clause is not lost completely but continues to be a (minor) option suggests that the modern distribution may be determined by other factors than those that brought about the rise of the *to*-infinitive. In the literature on variation in clausal complements of verbal matrices, explanations have been formulated which relate to semantic integration and discourse factors. The iconic principle of semantic clause integration was originally introduced by Givón (1980, 1990: ch. 13) and states that 'the stronger the *semantic bond* is between the two events, the more intimately is the *syntactic integration* of the two propositions into a single clause' (1990: 516; italics his). He provides cross-linguistic evidence, showing that manipulative verbs, which have a strong semantic bond with their dependent SoA, tend to be coded by non-finite structures such as infinitives, whereas utterance verbs, which have a much weaker semantic bond with their dependent SoA, tend to be coded by 'more' finite structures such as *that*-clauses. The strength of the semantic bond between two SoAs is partly determined by the presence of an element of will (Givón 1990: 528–30). Applied to the data presented in Table 9, the principle of clause integration would predict that strong adjectival matrices have higher shares of mandative

to-clauses than weak matrices, as the first ones involve a stronger element of will than the second ones. However, Table 9 shows that this is only the case in Late Modern English.[22]

If we look at the data for each adjective of the dataset separately, we can more definitively conclude that the principle of semantic integration does not hold. There are strong adjectives which prefer *that*-clauses to *to*-clauses, such as *vital* and *crucial*, or with which both clause types are almost equally frequent, such as *essential*. For these adjectives, the current distribution of mandative clauses is given in Table 10 below. The table also includes the data of another strong adjective, viz. *necessary*, for the sake of comparison.

Type of compl	*vital*			*crucial*			*essential*			*necessary*		
	n	N	%	n	N	%	n	N	%	n	N	%
that	144	0.34	64.6	27	0.064	54.0	116	0.28	48.9	25	0.059	5.0
to	79	0.19	35.4	23	0.055	46.0	121	0.29	51.1	478	1.1	95.0
total	223	0.53	100	50	0.12	100	237	0.56	100	503	1.2	100

Table 10
The distribution of mandative that- *and* to-*clauses in PDE with* vital, crucial, essential *and* necessary

Although all four adjectives express a strong degree of desirability or necessity and thus should be able to establish an equally strong semantic bond with their dependent SoA, they clearly differ as to types of clausal complement they prefer. *Necessary*, for example, combines in an overwhelming majority of cases with the *to*-infinitive (about 95%). As noted above, *vital*, by contrast, prefers *that*-clauses to *to*-infinitives (64.6% to 35.4%), and *crucial* does so as well, though less markedly (54% to 46%). The distribution of *essential*, finally, is almost 50-50. We thus have to conclude that the principle of semantic integration as defined by Givón (1990: 516) does not explain the adjectival data. Rather, these data suggest that the distribution of *that*- and *to*-clauses may be, to a large extent, lexically determined, understood here as applying to the adjectives individually.[23]

A second type of explanation for distributional patterns of complements relates to discourse factors, such as information structure. In his article on the variation between accusative-and-infinitive-constructions and *that*-clauses after verbs such as *believe*, *think*, and *judge*, Noël (2003: 365), for instance, cites Borkin (1984: 60-1), who argues that infinitival clauses 'rely on previous discourse to complete their function', while *that*-clauses do not (cf. Kuno 1972). Before we focus on the role of information structure in the variation between *that*- and *to*-clauses in extraposition constructions, it should be noted that these are both semantically and syntactically distinct from the constructions studied in Noël (2003) and Los (2005). Crucially, the non-finite variants differ in terms of control. Traditionally, control has been defined as an intrasentential phenomenon, referring to the interpretation of an unexpressed argument of a verbal form in a dependent clause (cf. Joseph 2002). The constructions examined in Noël (2003) and Los (2005) all have controlled *to*-infinitives,

[22] However, the notion of an element of will is not unproblematic. As argued by Cristofaro (2003: 121), SoAs take place independently of the condition of desire, 'so in principle the fact that somebody wants some SoA to occur need not have any effect on the actual occurrence of that SoA'. In her view, constructions with weak or strong adjectives involve the same type of complement relation. The involvement of an element of will does play a role, though, in the cross-linguistic coding of the relevant complement relations (Cristofaro 2003: ch. 9).

[23] As noted by one of the referees, the clausal variation and lexical determination may also be linked to register, with strong adjectives preferring *that*-clauses in political rhetoric or more pompous registers. This possible correlation is certainly worth further investigation.

whereas mandative extraposition constructions do not. In the accusative-and-infinitive-constructions studied in Noël (2003) the *to*-infinitives are preceded by (oblique) NPs expressing their subjects. It is together with this NP that they form the object clause of the matrix verb. In the following example, the subject of the *to*-infinitive is marked in bold.

(14) Some unions have been suspicious of ewcs [i.e. European Works Councils, AVL] because they believe **them** likely to concentrate on small-scale issues. (CB, times)

The *to*-infinitive constructions with intention and manipulative verbs discussed in Los (2005) also have controlled *to*-infinitives, as their agents are coreferential with the matrix subject (cf. (8)–(9)) and matrix object respectively. When manipulative verb constructions are passivized, as in (10)–(11), they involve subject control as well. Extraposition constructions, by contrast, typically do not have controlled *to*-infinitives. In example (15) below, for instance, the speaker/writer gives us no clue as to who is supposed to educate young people about the dangers of drugs; in (15) the implicit agent has generic or arbitrary reference, or in generative terms 'arbitrary PRO' (cf. Los 2005: 292).

(15) With the scourge of illegal narcotics infecting every part of the world, it is **crucial** to educate young people about the dangers of drugs. (CB, sunnow)

This difference in control relations suggests that the factors motivating the distribution of clausal complements with intention, manipulative, (acquisition of) knowledge and propositional attitude verbs cannot simply be extrapolated to mandative extraposition constructions with adjectival matrices.

Nevertheless, there are indications that information structure does play a role in the distribution of mandative *that*- and *to*-clauses. In particular, a closer look at the informational salience of the subjects of mandative *that*-clauses in the Old and Late Modern English data shows that LModE has twice as many prominent or heavy subjects as OE, as shown in Table 11 below (53.3% versus 24.3%, a highly significant increase with Fisher's exact p=9.504e-08). This finding may (at least partly) explain why the mandative *that*-clause has resisted total supersession by the *to*-clause. Whereas the latter "does not easily accommodate a large amount of information" (Noël 2003: 370), the *that*-clause is well suited to holding heavy or complex subjects. This observation is nicely captured by Rohdenburg's (1995, 1996) Complexity principle, which states that 'the more complex the dependent clause turns out to be, the greater is the need to make its sentential status more explicit' (1995: 368). An example of a *that*-clause with a 'complex' subject is given below.

(16) It is obvious that, for such narratives to possess any real force and validity, it is **essential** that their character and authorship should be placed beyond all doubt. (CLMETEV 1889 Cassels, *A reply to dr. Lightfoot's essay*)

Informational salience	OE 750–1150		LModE 1710–1920	
	n	%	n	%
generic *man*	18	16.8	0	0.0
generic: other expression	4	3.7	3	0.8
personal pronoun + coreferential Experiencer in matrix clause	35	32.7	5	1.3
personal pronoun	24	22.4	169	44.6
total informationally low subjects	**81**	**75.7**	**177**	**46.7**
personal pronoun + apposition/vocative	1	0.9	1	0.3
pronoun + contrast	0	0.0	3	0.8
nominal NP	15	14.0	167	44.1
nominal or pronominal NP + clause (relative or adverbial clause)	10	9.3	27	7.1
dummy subjects + actual subjects	0	0.0	4	1.1
total informationally salient subjects	**26**	**24.3**	**202**	**53.3**
total subjects	107	100.0	379	100.0

Table 11

The informational salience of subjects of mandative that*-clauses in Old and Late Modern English*

The table also shows which type of *that*-clause was replaced by *to*-infinitival clauses, viz. the one with the indefinite pronoun *man* as subject (cf. (6)–(7) above; see also Los (2005: 290–3) on verbal matrices). Because *man* has generic or arbitrary reference, these *that*-clauses can be substituted by non-controlled *to*-clauses, as in (7) and (15), without a loss of information, as least as regards the subject. Table 11 confirms that *that*-clauses with *man* have disappeared by Late Modern English.

Of course, the rise of the *to*-infinitive was not restricted to non-controlled *to*-clauses taking over *that*-clauses with the indefinite pronoun *man*. In fact, the data call for a broader definition of control in the sense of De Smet (2007: 91), referring to 'a primarily interpretative relation of correspondence between some text participant and the agent implicitly invoked by any form referring to an action' (cf. Kortmann 1991, 1995; Duffley 2000). It is in this – not necessarily intrasentential – sense that *to*-clauses in examples such as (17) with dummy *it* as anticipatory matrix subject can be regarded as controlled.

(17) Before I conclude, it is **proper** to mention that the kirk-bell, which had to this time, from time immemorial, hung on an ash-tree, was one stormy night cast down by the breaking of the branch. (CLMETEV 1821 Galt, *Annals of the parish*)

(18) This Marloe, we are told, presuming upon his own little wit, thought **proper** to practise the most epicurean indulgence, and openly profess'd atheism; he denied God, Our Saviour; he blasphemed the adorable Trinity […] (CLMETEV 1753 Cibber, *The lives of poets of Great Britain and Ireland* (Vol 1))

(19) Be assured, whenever it may seem **fitting** for me to take so long a journey, I shall come to you with as cordial a feeling of unchanged and unabated friendship as that with which you I know will receive me. (CLMETEV 1847 Cottle, *Reminiscences of Samuel Taylor Coleridge and Robert Southey*)

(20) American State Department officials say that in his meeting with Secretary of State Baker, Mr Shevardnadze made clear that neutrality was not the answer and that Moscow also considered it **important** to keep American troops in Europe. (CB, bbc)

In (17), the implicit agent of the *to*-infinitive *to mention* clearly is the *I*-persona, who is explicitly mentioned in the temporal subclause preceding the mandative construction. The *that*-clause functioning as object of *to mention* shows that the *I*-persona does carry out the activity of mentioning. In the complex transitive construction (*to think something proper*) in (18), the context makes it clear that the subject of the matrix clause (viz. *this Marloe*) is coreferential with the agent of the *to*-infinitive *to practise*. It is the poet Christopher Marlowe, who practised the most epicurean indulgence and openly professed atheism. In (19), the agent of the *to*-infinitive *to take* is explicitly mentioned in the *for*-PP preceding the *to*-clause, viz. *for me*, and repeated as the matrix subject *I*. The examples in (18) and (19) illustrate the most typical control relations in complex transitive and *for...to*-infinitive constructions, but these patterns cannot be generalized. Example (20), for instance, is also a complex transitive construction, but the context suggests that the matrix subject *Moscow* is not the implicit agent of the *to*-infinitive *to keep*, as the Soviet Union has no say in NATO resolutions, let alone in US decisions. The examples thus show that the *to*-infinitive in the mandative construction can have a controlled interpretation, and hence that it was also able to replace non-generic *that*-clauses.

Even if the contrast with Old English in terms of information structure is striking, LModE *that*-clauses still include a considerable portion of complements with informationally low subjects (46.70%), especially pronominal subjects (44.59%), as in (21) below. Of course, pronouns can also be used in contrastive contexts, as in (22), but in those cases they were analysed as informationally salient subjects (0.79%).

(21) The young adventurer is not to expect to have every difficulty smoothed for him by the hand of another. This were to teach him a lesson of effeminacy and cowardice. On the contrary it is **necessary** that he should learn that human life is a state of hardship, […]. (CLMETEV 1831 Godwin, *Thoughts on man*)

(22) With these words he gave him a letter directed, as he had said, but not sealed, which Horatio, after he had manifested the sense he had of so unhoped an obligation, reminded him of. As it concerns only yourself, said the baron, it is **proper** <u>you</u> should read it first, and <u>I</u> will then put on my signet. (CLMETEV 1744 Haywood, *The fortunate foundlings*)

The relatively large share of pronominal subjects in LModE *that*-clauses suggests that the informational salience of the subject cannot be the only factor motivating the use of finite complements. In what follows, I will mention two other factors that may be relevant, though neither has been examined systematically.

A first additional factor pertains to the modal relation established by the verbal form. A finite clause enables the speaker to specify the type of modal relation the mandative clause has to the matrix event. In (22), for instance, we find both *should* and *will* as finite forms in the *that*-clause, each expressing a different type of modal meaning, whereas this meaning is left unspecified in *to*-clause complements.[24] Emphasis on the modal relation is also found with non-contrastive pronominal subjects, as in (23) below, in which the main verb of the finite *should* (viz. *convince*) has been elided.

(23) Never maintain an argument with heat and clamor, though you think or know yourself to be in the right: but give your opinion modestly and coolly, which is the only way to convince;

[24] As noted by one of the referees, Los (2005: 146–9) argues that subjunctive forms are semantically as underspecified as *to*-infinitives (cf. Ogawa 1989: 155–8). She also invokes the more specific meaning of modal auxiliaries to explain the relatively high share of *that*-clauses after commissives in Middle English; the modals serve to distinguish between a promise to perform an action and a promise of permission.

and, if that does not do, try to change the conversation, by saying, with good humor, "We shall hardly convince one another, nor is it **necessary** that we should, so let us talk of something else." (CLMETEV 1747 Chesterfield, *Letters to his son*)

Secondly, *that*-clauses (even with pronominal subjects) may also be preferred for stylistic reasons. By using a *that*-clause the speaker/writer can avoid the use of a split infinitive, as in (24), or the immediate succession of *to*-infinitives, as in (25). The preference for a *that*-clause in examples such as (25) can be explained by the *horror aequi* principle (Rudanko 1998; Rohdenburg 2003; Vosberg 2003), i.e. 'the widespread (and presumably universal) tendency to avoid the use of formally (near-)identical and (near-) adjacent grammatical elements or structures' (Rohdenburg 2003: 236).

(24) He at once perceived their danger, so they held a council, and came to the following resolutions: That it would be **necessary** that they should immediately stockade the storehouse, so as to render it impossible for any one to get in; (CLMETEV 1841 Marryat, *Masterman ready*)

(25) There was a considerable difference between the ages of my parents, but this circumstance seemed to unite them only closer in bonds of devoted affection. There was a sense of justice in my father's upright mind which rendered it **necessary** that he should approve highly to love strongly. (CLMETEV 1818 Shelley, *Frankenstein*)

More generally, then, the role of information structure in the distribution of mandative *that*- and *to*-clauses can be linked to the distinct grounding properties of the two competing expressions, i.e. properties indicating the relation of the complement to the speech event or 'ground' (Langacker 1991: 193–200). While *to*-clauses do not need an overt subject and depend on the matrix for their temporal anchoring, *that*-clauses require an overt subject (which may be informationally salient) and offer the possibility of explicitly coding the modal relation of the complement to the matrix (cf. Halliday 1994: 75–7).[25]

In conclusion, the Modern English data present us with a different type of distributional pattern than the Old and Middle English data, as here the clausal variation cannot be thought of as replacement of an original type by a new competing expression. Therefore, the discussion above proposed other types of explanations than those presented in section 4. The principle of semantic integration (Givón 1990: 516) was shown not to apply. The factor of information structure, however, proved more useful: I showed that in Late Modern English, the share of informationally salient subjects is twice as high as that in Old English. More generally, it was shown that the distinct grounding properties of finite and non-finite clauses play an important part. In addition, I invoked stylistic preferences to account for the clausal variation studied here.

6 CONCLUSION

This article has concentrated on the rise of the *to*-infinitive with deontic adjectival matrices. The development of the distribution of *that*- and *to*-clauses across the various historical periods is summarized in the figures below. Figure 3 is based on the normalized frequencies given in Tables 4

[25] Remember that mandative clauses in general express potential meaning, so both *to*-clauses and *that*-clauses are time-reference dependent (Noonan 2007: 102): their 'time reference is a necessary consequence of the meaning of the CTP [complement-taking predicate, AVL]'.

and 9 above and distinguishes between weak and strong adjectives; Figure 4 is based on the relative shares of the *that*- and *to*-clauses given in Tables 3 and 9 above, and covers the whole dataset.

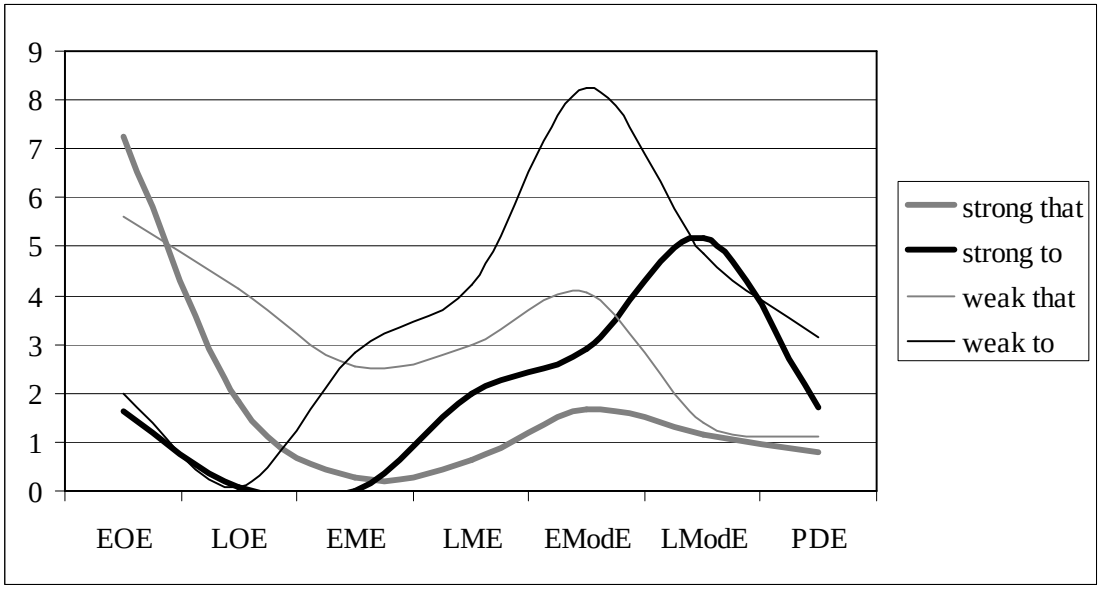

Figure 3
The development of the distribution of mandative that- *and* to-*clauses with strong and weak adjectives (normalized frequencies)*

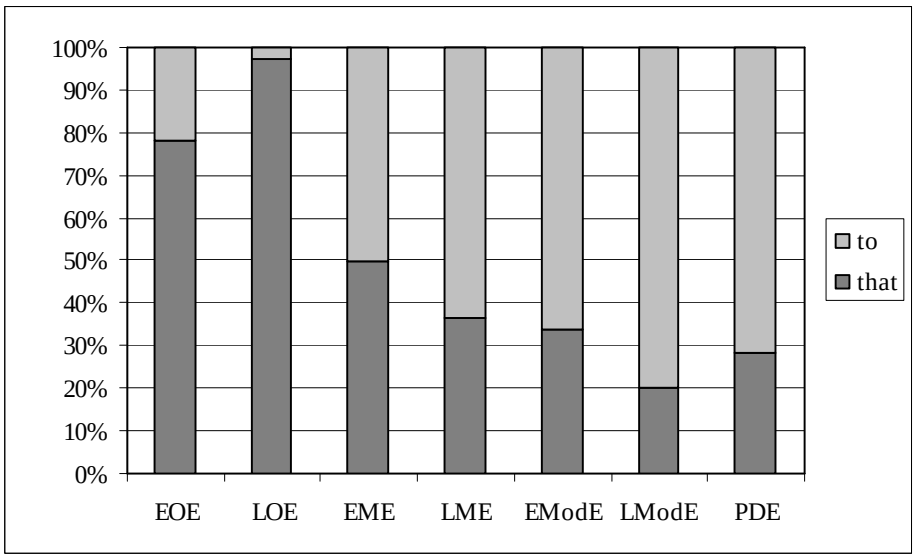

Figure 4
The development of the distribution of mandative that- *and* to-*clauses (relative shares)*

It is clear from Figure 3 that the frequencies of the *that*-clauses (in grey lines) show a general downward movement, whereas the innovative *to*-infinitives (in black lines) show a steep climb in the ME period (here, the weak adjectives precede the strong ones). It could thus be concluded that

the complementation of adjectival matrices showed a similar development as was observed for verbal matrices by Los (2005: 185–9). The EModE data show peaks for all lines in the graph, which has to be attributed to the high frequency of the clausal complements in the data. In terms of relative shares of the formal types, the EModE data fit in with a smooth line of development between the LME and LModE data, as can be seen in Figure 4. Figure 4 shows particularly clearly that the major reversal in distribution occurs in the EME period (cf. Los 2005: 185–9). However, the *that*-clause remains available as a mandative complement expression, which may even be the preferred option for certain adjectives, such as *vital* and *crucial* (see Table 10).

The rise of the *to*-infinitive in adjectival constructions has been explained by analogy with changes that Los (2005) observed in the verbal complementation system. It was found that her account of the changing distribution of the *to*-infinitive for intention and manipulative verbs could not be readily applied to the adjectives studied. In the case of the verbal matrices, the *to*-infinitive spread from the purposive environment to the Theme-complement environment, on the basis of the semantic similarity between these two syntagms (syntagmatic analogy, cf. De Smet 2008: 103, 119–20) and the presence of a paradigmatically related construction, viz. the subjunctive *that*-clause (paradigmatic analogy, cf. De Smet 2008: 118–20). Within the system of adjectival complementation, however, no such development could be established, as the purposive *bryce*-construction and the Theme-complement mandative construction did not share competing expressions. One additional language-external factor, viz. the impact of borrowed adjectives, was shown not to have played any role. Regarding the factor of the tense of the matrix, no clear picture emerged from the data, but it could not be ruled out that the loss of the past subjunctive paradigm may have promoted the use of *to*-infinitives in past contexts. In any case, it would be interesting to see whether the tense of the matrix has had any influence on the complements of verbal matrices. In view of all this, I have therefore made a case that the mechanism of analogical extension was at work between the complementation of adjectival and verbal matrices in the period from Old to Middle English. Mandative constructions with adjectives started favouring the *to*-infinitive by analogy with the rise of the *to*-infinitive in mandative constructions with intention and manipulative verbs. I have argued that this distributional change could take place because of the semantic similarity between the verbal and adjectival syntagms as well as the availability of the subjunctive *that*-clause in both syntagms, i.e. through syntagmatic as well as paradigmatic analogy.

For the later data, however, I proposed that different types of explanations are required. Although the variation in clausal complements of adjectives was seen to be lexically determined to a certain extent, discourse-functional factors proposed in the literature on verbal complementation were shown to also play some role. In general, *to*-clauses are used when there is no need to express the agent overtly.[26] Either the speaker has no specific agent in mind (arbitrary reference; non-controlled interpretation of the *to*-clause), or the context enables us to infer the identity of the agent (controlled interpretation of the *to*-clause). *That*-clauses, by contrast, invariably have an overt subject, and as such they are most suited to accommodating informationally salient subjects. They also allow the speaker to specify the modal relation between the finite verb of the SoA in the complement and the matrix. Stylistic motivations such as the *horror aequi* principle are another factor bearing on the choice of clausal complement. Future research will certainly have to include a more detailed investigation of discourse factors such as information structure and referential continuity, as well as tactic relations (cf. Noël 2003). These may well provide us with a better understanding of the principles governing the current distribution of clausal complements with mandative adjectives.

[26] This may be different for *for…to*-infinitive constructions, in which the subject of the *to*-infinitive can be easily coded by the *for*-PP preceding the *to*-clause.

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