The ancestor of the Present-Day English (PDE) necessity modal *must, Old English (OE) modal *motan, was not a necessity modal. Historical linguists commonly describe OE *motan and Middle English (ME) *moten as ambiguous between a possibility and a necessity reading. When they try to identify which modal force OE *motan or ME *moten had in individual examples in the historical texts, they usually conclude that either the possibility reading fits, but the necessity one doesn’t, or vice versa. Possibility is believed to have been predominant in Early Old English, and necessity, to have become the predominant meaning of the modal at some point during the Middle English period. It is only by the late 15th–early 16th century that ME *moten/Early Modern English must becomes a pure necessity modal that it is today.

1The star in *motan and *moten indicates that that particular form is constructed from the known stem and inflectional ending, but was not observed directly: there are no instances of the infinitive of the modal in either OE or ME.

The orthography of OE and ME shows significant variation, and I use the following convention throughout the paper. When referring to OE and ME lexemes, I use the primary dictionary form from Bosworth and Toller (1898) and MED (2002), respectively. However, when citing a particular form from a specific example, I use the same orthography as in the example. Thus in the main text I write weorþ for the lexeme, but wyrðne when referring to the instance of that same word in.

2The project reported in this paper has benefitted from discussions with Cleo Condoravdi, Antonette di Paolo Healey, Daniel Donoghue, Regine Eckardt, Kai von Fintel, Olga Fischer, Martin Hackl, Irene Heim, Sabine Iatridou, Natasha Korotkova, Ian MacDougall, Lisa Matthewson, Paul Portner, Katrina Przyjemska, Donca Steriade, Sali Tagliamonte, and Elizabeth Traugott. Earlier stages of this work were presented at University of Ottawa, Georgetown University, Rutgers University, NYU, at the workshop on Systematic Semantic Change at UT Austin, at SALT at UC Santa Cruz. Needless to say, the work enormously benefitted from the comments made there.
I propose a different account of the early historic stages of the semantic evolution of *motan/*moten/*must. On the basis of a primary analysis of Early OE *motan in the Alfredian prose, I argue that around the late 9th century it was an unambiguous modal with a meaning different from either that of (plain) possibility or that of (plain) necessity. Instead, it was an instance of what may be descriptively called *variable-force modality*. In the recent formal-semantic research, starting from [Rullmann et al. (2008)], that term was introduced to refer to modals that are unambiguous in the source language, but due to the lack of a perfect correlate in languages like English, would sometimes be rendered in translation by possibility, and other times by necessity modals. (The term *variable force* thus may be somewhat misleading: it carries no assumption that the modal force truly varies. On the contrary, the term is reserved for modals that show no lexical ambiguity.)

Variable-force modality of different subkinds was recently described in several languages of the North-American Pacific Northwest, namely St’àt’ímcets ([Rullmann et al. (2008)]), Gitksan ([Peterson (2010)]) and Nez Perce ([Deal (2011)]). The meaning I propose for Early OE *motan*, however, is different from any of those proposed for the Pacific Northwest modals. I argue that in the Alfredian prose, a statement of the form *motan*(p) 1) asserted that situation *p* is an open possibility, and 2) presupposed that if *p* is an open possibility, then that possibility will get actualized. Later in the paper, the terms used in this informal definition will be made formal and precise within a framework based on [Condoravdi (2002)].

Section 1 reviews the literature on the semantics of OE *motan* and ME *moten*. Section 2 describes the distribution of Early OE *motan* in a subset of the Alfredian prose (namely *CP, Bo and Sol*), and proposes a new analysis of the semantics of the modal. I argue that Alfredian *motan* was unambiguous, and derive the variable-force effect from the

Without the York-Toronto-Helsinki Parsed Corpus of Old English prose (YCOE) and the Penn Parsed Corpus of Early Middle English (PPCEME), it would have become close to impossible to create the samples used in this chapter. The extensive commentary to *Boethius* in [Godden and Irvine (2009)] was of great help in identifying the correspondences between the Latin original and the OE translation for that book. For advice on and data from Norse, Finno-Baltic and Baltic languages, I am very grateful to Peter Arkadiev, Anna Daugavet, Johannes Dellert, Atle Gronn, Andres Karjus and Lauri Karttunen.
presupposition that causes a collapse of possibility and necessity. In Section 3 I contrast
the Alfredian OE distribution of *motan with that of its descendant, Early Middle English
*moten. The latter is no longer variable-force, but is truly ambiguous between necessity
and possibility. Section 4 compares Alfredian variable-force *motan to the variable-force
modals of the Pacific Northwest, and concludes that empirically, the Alfredian OE modal
was a different creature. Section 5 discusses three further empirical phenomena, which
require semantic components similar to the ones used in my analysis for *motan: (i) ac-
tuality entailments of root modalities, (ii) “either-or” entailments of ability modal, and
(iii) possibility-necessity-ambiguous get-based modal around the Baltic Sea (using data
from Norwegian, Swedish, Finnish and Estonian). It turns out that in all three cases those
similar semantic components are put together rather differently than in the semantics of
Alfredian *motan. Section 6 concludes.

1. Earlier accounts of the semantics of Old English *motan and Middle
    English *moten

The Oxford English Dictionary \[OED\] (2002) lists OE *motan under \[mote\]:\(^1\) with “possi-
bility or permission” as the first meaning, and “necessity or obligation” as the second one.
For both meanings, the oldest OED examples are from Beowulf, one of the earliest Old
English texts of substantial length.\(^3\)

(1) Listed under OED sense 1, “expressing possibility or permission”:

    Gif he us geunnan wile, þæt we hine swa godne gretan moton.
    if he us grant will that we him so good greet mot.PRS.PL

    ‘If he will grant to us that we moton greet him, the good one.’ (Beo:347)

\(^1\)I aim to minimize by-morpheme glosses, and thus gloss with wordforms of modern English whenever
possible. \[prs\] stands for present, \[pst\] for past, \[ind\] for indicative, \[sbj\] for subjunctive.
For modals other than *motan I provide the modern descendant of the modal in the gloss, even though in
many cases the modern modal is no longer capable of expressing the meaning conveyed by its OE ancestor.
In translations, I aim to keep the structure of the sentence close to that of the original OE example, rather
than provide a smooth Present-Day English translation. I leave *motan untranslated, in order not to
smuggle in my analysis.
(2) *Listed under OED sense 2, “expressing necessity or obligation”: *

Londrihtes mot þære mægburge monna æghwylc idel hweorfan.
of.landright mot.PRS.IND.3SG of.that kin of.men each idle wander

‘Every man of that kin mot wander without the rights of the rightful residents.’

(Heo:2886)

It is easy to see what logic is behind OED’s characterization of 1 as an example where *motan conveys possibility (which, in the logical tradition, we will mark with ♦ below), and of 2 as one where it conveys necessity (marked □). If we substitute *moton in 1 with modern ♦-modal *may or *can, the example makes sense, but if we use *have to or *must, the result does not sound very natural:

(3) a. OK ‘If he will grant to us that we *may/*can greet him’

b. * ‘If he will grant to us that we *must/*have to greet him’

But if we apply the same substitutions to mot in 2 the pattern is the opposite, cf. 1 the passage from which this sentence is taken describes a disastrous situation after the death of Beowulf, with many terrible things for “that kin” which have just became inevitable. In that context, simply *being able to wander without rights is clearly not what the speaker is talking about.

(4) a. * ‘Every man of that kin *may/*can wander without the rights of the rightful residents.’

b. OK ‘Every man of that kin *must/*has to wander without the rights of the rightful residents.’

Viewed from the perspective of the modern English modal system, the meanings of *motan in 1 and 2 may appear irreconcilably different: it looks like the modal is lexically ambiguous between ♦ and □. This ambiguity analysis is expressed by OED, other historical dictionaries of English, and most scholarly works on the subject as well. For example, the
standard Old English dictionary \textit{Bosworth and Toller} (1898) lists “to be allowed, may, mote” as sense I for OE \(*\text{motan}\), and “to be obliged, must” as sense II. (A smaller number of examples is listed under sense II than under sense I both in the original dictionary and in its supplement \textit{Toller} (1921), which indicates in part the authors’ judgement as to which meaning was more frequent.) The \textit{Middle English Dictionary} \textit{MED} (2002) lists a wide range of both possibility and necessity senses for ME \(*\text{moten}\), but the number of necessity examples recorded in \textit{MED} (2002) for this later period is greater that that of possibility examples. Moreover, there are very few possibility examples from the 15th century recorded in \textit{MED} (2002).

The near-consensus view on the semantics of OE \(*\text{motan}\) and ME \(*\text{moten}\) is thus as follows: 1) in OE, \(*\text{motan}\) was predominantly a possibility modal; 2) at some point it started to have necessity uses as well (most researchers argue that it already happens in the earliest OE texts, cf. the position of \textit{OED} (2002) regarding 2 from \textit{Beowulf}); 3) from around the 10th century, the percentage of necessity uses grew slowly but steadily, so that by the end of the Middle English period in the 15th century, possibility uses became very marginal, and disappeared completely in the 16th century.

The above description in terms of the relative frequency of possibility vs. necessity readings presupposes that each instance of the modal belongs to one of the two categories. For instance, \textit{Ono} (1958) studies the ratio of possibility to necessity uses of \(*\text{motan}\) starting from \textit{Beowulf} through \textit{Ancrene Wisse} to Chaucer and Malory. In \textit{Beowulf}, Ono finds 31 instance of possibility \(*\text{motan}\), 1 instance of necessity \(*\text{motan}\), namely example 2, and one “doubtful” use for which Ono could not decide which interpretation makes better sense. 13th-century \textit{Ancrene Wisse} is the earliest text considered by Ono where, according to him, necessity uses become more numerous than possibility uses. In late 14th-century Chaucer, Ono finds

\footnote{The modern \textit{Dictionary of Old English} \textit{DOE} (2007), which is to eventually replace \textit{Bosworth and Toller} (1898) as the new standard dictionary, is currently in progress, and the entry on \(*\text{motan}\) was not in the works yet at the time of preparation of this paper.}
the necessity meaning in 84% of all instances of ME *moten, and in late 15th-century *The Tale of King Arthur* by Malory, he finds no possibility uses at all.

Tellier (1962) paints a very similar picture. Having examined the poetry of *Beowulf, Andreas, Judith* and *Elene*, and the prose of roughly the first half of king Alfred’s *Cura Pastoralis*, Tellier argues that in Early OE the sense of necessity for *motan* is “rarissime et exceptionnel par rapport au sens de pouvoir”. Tellier describes the primary meaning of *motan* in this period as that of possibility created by “circumstances, fate, or divine grace”. Tracking the further development of *motan*, Tellier argues that in the 10th century, the modal “develops an ambiguity”, with the necessity sense becoming “well attested”. For the (late entries of the) *Peterborough Chronicle* (the 12th cent.), Tellier argues that the majority of uses are still possibility ones, but in *Ancrene Wisse* (the 13th cent.), the possibility sense “se fixe dans des propositions où cette signification ne risque pas d’être ambiguë.” The two types of contexts in *Ancrene Wisse* where there is no such risk, according to Tellier, are complements of verbs of asking, and prayers to God. Regarding the language of Chaucer’s *Canterbury Tales*, Tellier argues that the possibility sense of *moten* is similarly restricted to several particular environments, namely to matrix wishes, complements of verbs of asking, and the collocation *mot as wel*. Finally, in Malory’s 15-century works, Tellier does not find any examples of *moten* conveying possibility, just as the extensive study of Malory’s language by Visser (1946) did not.

Most other studies either address the semantics of *motan* during a shorter period (e.g., Solo (1977) or Goossens (1987)), or contain more general descriptions of the semantic evolution of *motan*/*moten* (e.g., Visser (1963-1973 §1689, 1693), Warner (1993 Ch. 7), Traugott and Dasher (2002 Ch. 3)). They generally support the picture sketched above. That is not to say that there are no disagreements, be such about the interpretation of individual examples or about the precise timing of particular developments. For instance, Solo (1977) argues, against the more popular position, that before year 1000, the sense
of necessity/Obligation for *motan is hardly attested. But on the whole, there is a wide consensus about the general lines of the development.

It is important for the argument I am going to make, however, that side by side with this general analysis, there are also numerous statements in the cited literature that suggest a more nuanced semantics for the modal than that of pure necessity or pure possibility. A more complex view is explicitly and extensively advocated for by Standop (1957), who proposes that in addition to the meaning of possibility, and perhaps that of necessity, OE *motan also had a third meaning, which he paraphrases as “mir ist vergönnt, mir wird zuteil” (p. 69), “mir est bestimmt” (p. 75), “mir ist zugemessen” (p. 169) (“it is granted to me, it is bestowed upon me”, “it is determined for me”, “it is measured out for me”). Standop argues that the meanings of possibility and necessity in the case of *motan both developed from that initial general meaning which combined possibility and necessity into an “Einheit”, where “Rechte und Pflichten” (“rights and duties”) coincide. Other informal characterizations of Standop’s third meaning for *motan include: “expression of human dependence (Ausdruck menschlicher Abhängigkeit)” (Standop’s p. 68), “it is destined (beschieden)” (pp. 70, 78), “what is measured out (geschrifan) by fate (wyrd)” (p. 77). Standop argues that even though “no dictionary gives [it]”, his third meaning “falls into one’s eyes” as soon as one notices how the distribution of *motan differs from that of any other modal (p. 68).

Standop writes that “die Belege sind so zahlreich — vor allem weil viele nach unserer Deutung in neuem Licht erscheinen —, daß man nur recht wahllos einige Beispiele herausgreifen kann” (Standop 1957, p. 70). Once my formal analysis of Alfredian *motan is defined in the next section, I will return to Standop’s characterizations of his “third reading”.

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5It is hard to interpret Standop’s position on the presence of the necessity sense in OE. On the one hand, he says on pp. 169–170 that OE *motan lacked the meaning of pure, abstract necessity. On the other, on pp. 75-76 he calls the meaning of abstract necessity “rare” rather than completely absent, and provides an example where motan “ist fast normales müssen”.

6“Examples are so numerous — mainly because our interpretation sheds new light on many — that one can quite indiscriminately pick out some.”
Some of the later scholars also acknowledge the complexity of the meaning that OE *motan conveyed. (Visser, 1963-1973, p. 1794), citing Standop, mentions paraphrases for *motan such as “Fate has allotted to me to do this” (Standop’s third meaning) and “Fate has granted me the freedom to do this” (the possibility/permission meaning), and writes that “all these shades of meaning may have been present in Old English mote”. (Warner, 1993, p. 160) briefly suggests that Standop’s meaning could still have been present in the Alfredian-prose Gregory’s Dialogues, translated into OE by Wærferth in the late 9th/early 10th cent., and in Wulfstan’s Homilies from the early 11th century. Solo (1977), not mentioning Standop’s work, writes in the conclusion of his paper: “In none of these instances, except, perhaps, in very late Old English prose, does the verb [i.e. *motan — IY] signify necessity or obligation in and of itself, although the contexts in which it appears at times imply necessity or duty as well as permission” [emphasis the present author’s].

In my analysis of *motan in the Alfredian prose, I will capture those intuitions formally by assigning to the modal a “variable-force” meaning that asserts openness of a possibility, and at the same time presupposes that if that possibility gets a chance to be actualized, it will. My proposal will differ from the proposals from the historical literature cited above in two respects: first, I restrict its scope to a particular, relatively narrow time period, and to a particular genre of texts; second, for that time period and for the corpus of texts considered, I argue that rather than having a range of different available readings, *motan was an unambiguous modal.

2. ALFREDIAN *MOTAN AS A VARIABLE-FORCE MODAL

My conclusion that Early OE *motan was an unambiguous variable-force modal with a particular semantics is based on the examination of all 72 instances of *motan in three

7 However, for the particular example from Wulfstan that is provided by Warner, Standop’s meaning is hardly appropriate.
8 Throughout the paper, I use the term “Early OE” to refer to the early OE prose. This differs from common usage wherein Early OE refers only to the early poetry, and the Alfredian prose is considered to belong to late, or at least middle OE rather than to early OE.
books: the prose translations into OE of Gregory’s *Cura Pastoralis* (*CP*), Boethius’s *Consolatio Philosophiae* (*Bo*), and Augustine’s *Soliloquies* (*Sol*). All three books in the main sample are translations from Latin, but made with such freedom that they may be considered independent texts. Those texts form a part of the corpus of “Alfredian prose”, after king Alfred the Great, who in the late 9th century initiated an impressive program of translation from Latin into the Anglo-Saxon vernacular. The three books chosen are as good a shot at a dialectally and temporally consistent dataset as possible: *Bo* and *Sol* were most likely translated into Old English by the same person; moreover, the translators of Alfredian books, presumably, were from relatively close circles. There are linguistic differences between *Bo* and *Sol* on the one hand and *CP* on the other, but I did not detect any difference regarding the use of *motan*. Online Appendix ?? features all Old English examples from this sample, together with their philological translations and the original Latin passages for *CP* and *Bo*.

2.1. **Examples motivating the analysis.** Examples in [5][11] illustrate the pattern common for all instances of *motan* in the selected Alfredian books *Bo*, *Sol* and *CP*: the context surrounding the examples is always such that if it is possible for the argument situation of the modal to actualize, it is assumed in the context that it will inevitably do so.

Specifically, in [5], if it becomes possible for the person involved to live on, they will, of course, continue to live.

(5) Ac se se ðe unwærlice ðone wuda hiewð, & sua his freond ofslicðð, but that that which unwarily that wood hews, and so his friend slays, him ðæt him ðæt he fleo ðara ðreora burga anre, to.him is to those three.city one.DAT ðæt ðæt he mota that in necessary that he flee.SBJ to those.GEN three.GEN city.GEN one.DAT ðæt on sumere ðara weorðe genered, ðæt he mota that in some of those become.SBJ saved, that he motan.PRS.SUBJ.3SG libban; live
'But he who unwarily hews wood and by that slays his friend, it is necessary for him that he flee to one of those three cities, so that he be saved in one of them, so that he **mote** live.'

(CP:21.167.15)

In [6] it is assumed that given the possibility, people would indeed do what they want, and then be judged according to what they chose to do.

(6) He sealde swiðe fæste gife and swiðe fæste æ mid þære ælcum menn he gave very firm gift and very firm law with that gift every.DAT man.DAT [oo] his ende. þæt is se fyrdom þæt de mon mot don þæt he until his end. that is the freedom that the man motan.PRS.IND.3SG do what he wile, and þæt is sio æ þæt [he] gilæ ælcum be his gewyrhtum, ægþer ge wants.to and that is the law that he pays to each by his works, both and on þisse worulde ge on þære toweardan, swa god swa yfel swaðer he deð. in this world and in that future.one, or good or evil whichever he does

‘He [=God] gave to every man until his end a very firm gift and a very firm law with that gift. The gift is the freedom that the man **mote** do what he wants to, and that law is the law that God pays to each man according to his works, both in this world and in the future world, be it good or evil that he does.’

(Bo:41.142.11)

In [7] if God makes it possible for the speaker to see them, then obviously the speaker would use that chance.

(7) and gedo me þæs wyrðne þæt ic þe mote geseon. and make me that.GEN worthy that I motan.PRS.SBJ.1SG see

‘and make me worthy of it that I **mote** see you.’

(Sol:1.55.23)

In [8] the soul in question, having been removed from the earthly things, really does not have much choice but to make use of the heavenly things:

(8) Heo forseohð þonne ealle þæs corðlican þing and fagenað þæs þæt heo she despises then all those earthly things and rejoices that.GEN that she **mot** brucan þæs heofonlican [siððan] heo bið abrogden from þam motan.PRS.IND make.use that heavenly since she is removed from that earthly
At that time she [=a soul] despises all these earthly things and rejoices that she
**mot** make use of the heavenly things after she is removed from the earthly ones.'
(Bo:18.45.28)

In [9] if the addressee grants the speaker permission, then the speaker clearly would follow
up by actually investigating the addressee's degree of resolve.

(9) **Mot** nu cunnian hwan pin faestædnesse þæt ic þanon
ongton mæge hwanan ic þin tilian scyle and lu?
learn can whence I you tend.to shall and how

‘**Mot** I now test your resolution a little so that I could learn from what side I
should be curing you and how?’
(Bo:5.12.12)

In a different rhetorical construction in [10] the speaker expects that if the addressee
is granted an opportunity to determine what is more worthy of punishment, they would
actually determine that, so the speaker uses an irrealis conditional to indirectly ask for the
addressee’s opinion.

(10) Gif þu nu deman **mostest**, hwæþerne woldest þu deman
if you now to.judge **mostest** which.of.two would you judge
wites wyrþran, þe [bone þe þone unsyldgan] witnode, þe
of.punishment worthier the that.ACC which the innocent tortured the
ðone þe þæt wite þolode.
that.ACC which that torment suffered

‘If you **mostest** pass a judgement, which would you find worthier of punish-
ment: the one who tortured the innocent, or the one who suffered the torment?’
(Bo:38.122.28)

In [11] we first learn that a particular group of people is always weeping, and then we are
told how this happens: they weep, and after that they make it possible for them to weep
again. As we now know from the beginning of the passage that they are always weeping, it
follows that each subsequent weeping is not just possible, but in fact will actually happen.
Hwæt, se ðonne ne recð hwaðer he clæne sie, [ðe ne sie], se ðe æfter why! that then not care whether he clean is.SBJ or not is.SBJ the that after ðære hreowsunga hine ryhtlice & clænlice nyle gehealdan: ealne weg hi their repentance him rightly & cleanly not.wants.to keep all way they hi ðweað; & ne beoð hie næfre clæne, ðeah hi ealneg wepen; ealneg them wash & not are they never clean though they always weep; always hi wepað, & æfter ðæm wope hi gewyrcead ðæt hi moton eft they weep & after the weeping they obtain that they motan.PRS.PL again wepan. weep

‘Why, he who does not care whether he is clean or not, he who does not want to hold himself in proper ways and clean: always they are washing, and they are never clean, even though they are always weeping; always they are weeping, and after the weeping they make it so that they moton weep again.’ (CP:54.421.14)

The examples above represent a wide range of syntactic environments in which *motan occurs in Early OE: a purpose clause in [5] and [11] a complement clause of noun freodom ‘freedom’ in [6] of adjective weorþ ‘worthy’ in [7], and of verb fægnian ‘to rejoice’ in [8] a matrix question in [9] the antecedent of a conditional in [10]. Despite the syntactic differences, for all cases it is in the discoursive common ground that the argument situation of the modal will be actualized if such a possibility opens. On one extreme, in [11] this conditional presupposition is supported by the context because the preceding sentence directly asserts its consequent (they are always weeping). On the other extreme, in [9] the assumption is accepted in the common ground because of the general rules of conversation, which are not explicitly discussed anywhere in the text (the speaker only asks whether a given speech act by her is OK to perform), so the conclusion that she would ask the question if allowed to follows from the pragmatics of the situation. But in most cases, it is the world knowledge together with the linguistic context of the modal that support the assumption of inevitable actualization.

The remarkable fact is that not just [5][11], but all instances of *motan in the Alfredian sample occur in contexts that support that assumption. In contrast to that, other modals
need not appear only in such contexts. Consider magan ‘may’ in [12] it is clear from the context that both being among people and teaching them, and not being among people and therefore not helping them to get better, are metaphysically and circumstantially possible. The future of such a situation depends on the will of the individual, and can go either way. Compare this with, for instance, [7] “make me worthy to motan see you”, where the situation is such that its elements conspire to determine that if a person would have the chance to see God, that person would inevitably use that chance.

(12) ðonne beoð hie sua monegum scyldum scyldige sua hie manegra undeawa
then be.SBJ they as many sins guilty as they of many vices
gestiran mealton mid hiora larum & bisenum, gif hi ongemong
correct may.PST with their teachings and examples if they among
monnum beon wolden.
people to.be will.PST
‘Then they [=those who could teach, but avoid it for their own ease] would be
guilty of as many sins as there are men whose vices they could correct, if they
would choose to be among people.’ (CP:5.45.20)

Note that it is not only *motan that appears in the contexts supporting the inevitability presupposition: other modals can also do so. This is similar to how the modals’ distributions often overlap with respect to other semantic properties. For instance, in Present-Day English, may is restricted to expressing permission and epistemic possibility, and to some extent, circumstantial/metaphysical possibility. But permission and circumstantial/metaphysical possibility may also be expressed by can, and epistemic possibility, by might. Similarly, even though Alfredian *motan is exclusively found in contexts where inevitable actualization is presupposed, it is not to be expected that no other modal could appear in such a context.9

9Some semantic theories utilize principles such as Maximize Presupposition (cf. Heim [1991], Schlenker (2012)), which requires that given a choice between a lexical item with presupposition p and another lexical item without it, the first one should be used in a context that supports p. One may then worry that if we adopt a presuppositional analysis for *motan that I propose below, given Maximize Presupposition that would predict precisely the absence of other modals from the contexts where the presupposition of inevitable actualization is satisfied. However, that principle actually does not affect our case: the semantic differences between modals in OE are not restricted to the presence of the relevant presupposition. All things
If we assume, as in the standard analysis, that Alfredian *motan was ambiguous between possibility and necessity, that does not predict that it would be restricted to contexts where inevitable actualization is presupposed. In my analysis that follows below, I take Alfredian *motan to directly presuppose inevitable actualization. First, that explains its restricted distribution; second, this presuppositional analysis actually predicts the “variable-force effect” without any need to assume ambiguity. Under my analysis, each instance of *motan simultaneously signals open possibility (by its assertive part) and inevitability (by the presuppositional part). Depending on which part the translator chooses to stress, we can get either possibility or necessity translational correlates. For example, in (13) Henry Sweet rendered *motan using necessity modal have to, while H.W. Norman chose possibility might, but in the end both translations of (13) convey a very similar overall message.

(13) a. Hu mæg he ðonne beon butan gitsunge, ðonne he sceal ymb monigra
how may he then be without avarice when he had to about many
monna are δencan, gif he nolde δa δa he **moste**
men’s property think if he would not when he motan.sg.past.subj
ymb his anes?
about his only
(CP:9.57.19)
b. **Translation by Sweet (1871):**
   “How can he be without covetousness when he has to consult the interests of
   many, if formerly he would not avoid it when he **had** to consult his own interests
   alone?”

c. **Translation by H.W. Norman, printed in Giles et al. (1858):**
   “How can he be without covetousness when he must think about many men’s
   sustenance, if he would not when he **might** think about his own alone?”

2.2. **Variable-force analysis of *motan: informal and formal versions.** I argue that
Alfredian *motan was not ambiguous between possibility and necessity, but had a “third-
type”, variable-force meaning which can be imprecisely rendered by either. I will first lay

**not being equal. Maximize Presupposition** does not apply: speakers may choose a presupposition-less
modal because they find another of its semantic features most fitting the context.
out the proposal, and then discuss how it compares to other plausible accounts of the data. Informally, the meaning for *motan that I propose is as follows:

(14) **Variable-force analysis of *motan (informal, preliminary):** *motan(p) asserts that *p* is an open possibility and presupposes that if *p* is given a chance to actualize, it will.

The crucial part of the meaning in [14] is not the assertion, but the presupposition. Because of the presupposition, *motan* may only be used in a limited set of contexts where the actual future is taken to be predetermined one way or the other, though before the assertion is made, the context may provide no information which way the future will turn out.

One example of a context set that supports the presupposition is given in [15]; it contains worlds that will develop into *p*-worlds (*w*₁), and those that will develop into ¬*p*-worlds (*w*₂). What is notably absent from the context set are worlds where it is not predetermined whether *p* or ¬*p* will actualize (*w*₃). In such a context, asserting that it is possible for the current world to develop into a *p*-world symmetrically entails a necessity assertion saying that it is necessary for the current world to develop so. If the presupposition is met, possibility and necessity collapse together, and no scalar relation emerges between the two. Therefore we can call the presupposition of inevitable actualization the **collapse presupposition**. The variable-force, unambiguous analysis that crucially uses that presupposition may be called the **collapse variable force** analysis.

(15) **Context set supporting the presupposition of *motan(p):**

Context set after the assertion of *motan(p) is accepted:
Given such semantics, we expect that neither possibility nor necessity modals of modern English would be perfect translation correlates of *motan. In particular, *motan does not belong to a scale of modal strength as modern English modals do. If we say can\(p\), that triggers the implicature that must\(p\) is false. But under my analysis of *motan, no such implicatures are to arise in Alfredian Old English: when the presupposition is met, there is no longer a distinction between possibility and necessity assertions.

Thus analyzed, *motan is a part of the class of variable-force modals together with several others recently described by semantic-fieldwork studies on several languages of the North-American Pacific Northwest. All modals in the class share the same feature: they are not ambiguous between possibility and necessity within the language, but are translated by the speakers into modern English sometimes as possibility, other times as necessity modals. However, such surface similarity does not imply underlying semantic identity, and the label VARIABLE-FORCE MODALITY is purely descriptive. In fact, the variable-force modals of St’àt’imcets (Rullmann et al. (2008)), Gitksan (Peterson (2010), Matthewson (2013)) and Nez Perce (Deal (2011)) all have different distributions, and have received several different analyses in the literature. The distribution of Alfredian *motan is different yet, and therefore the analysis for it that is formulated to fit the Old English data is very different from the previous variable-force analyses in the literature. I will compare both the distributions of and the analyses for other variable-force modals and *motan in Section 4.

Let me now turn to the formal rendering of 14. I will deal with the presupposition first, and with the assertion second. The presupposition of inevitability of the (yet unknown) outcome is captured using the metaphysical accessibility relation \(R_{met}\). For a world \(w_1\),
$R_{\text{met}}$ determines the set of metaphysical alternatives of $w_1$. Those metaphysical alternatives are defined as the worlds which share with $w_1$ all of its history up to the time of evaluation. (In this and many other details of the semantics, I use the formalization proposed by Condoravdi (2002)). A proposition $p$ is metaphysically necessary relative to $w_1$ if all ways in which $w_1$ may develop in the future would make $p$ true. Similarly, $p$ is metaphysically possible at $w_1$ iff some of $w_1$’s continuations are $p$-worlds. (Note that metaphysical possibilities and necessities are sensitive to the world of evaluation. What would amount to the metaphysical of everyday discourse, would emerge if we fix our actual world as the world of evaluation.) In the informal definition in 14 by “$p$ gets a chance to actualize”, I intend to say that $p$ is a metaphysical possibility, and by “$p$ will actualize”, I mean that $p$ is a metaphysical necessity. Thus the collapse of ♦ and □ which the presupposition is meant to derive is specifically the collapse of metaphysical possibility and necessity (as opposed to, for example, a collapse of permission and obligation.) In symbols, the informal version of the presupposition is $\Diamond p \rightarrow \Box p$.\footnote{I was able to settle on this particular variant of the analysis, featuring specifically the metaphysical accessibility relation in the presupposition of *motan, thanks to a discussion with Katrina Przyjemski.}

The formal version of the presupposition needs to be more complex than just $\Diamond p \rightarrow \Box p$, though. Most propositions $p$ would be true at one time in the future from the evaluation moment, and false at another time. If we make the presuppositional semantics insensitive to time, then each world could be both a $p$ and a $\neg p$ world. This is not how the intuition represented in the diagram in 15 works: the intuition is that if a world is a $p$-world, it cannot then become a $\neg p$-world, and vice versa. Now, if we consider again the examples in 5-11 and 13 above, we can note the following pattern. If $p$ is an eventive proposition, as in 7 or 9 then each world will either feature a $p$-situation at some point or not. So $p$ would divide all worlds into two classes: one where a $p$-event happens, and another where it never occurs. (One can make a case that only a certain bounded period after the evaluation time is relevant for the statement made, so that $p$ would have to not happen only up to
a certain point; it should be clear how to modify the semantics below accordingly.) With stative $p$-s, things are different: if we look at examples like [5] or [13] where *motan* takes a stative argument, we can see that the relevant time frame (i.e. for the situation of going on living in [5] and the situation of looking after one’s own profit in [13]) is the moment of evaluation plus the immediately following time period. Now, a person $x$ living at the time of evaluation and for some time after will die eventually, so if $p$ is live($x$), both $p$ and $¬p$ will be true at different time periods in the same world. But if we only consider the moment of evaluation plus a time interval immediately following it, each world will be classified as either a $p$-world or a $¬p$-world, just as we want it.

Now we can define the formal version of the presupposition, using the framework of Condoravdi (2002):

\[ [\text{motan}]^{\text{w, t}}(p) \text{ presupposes that} \]
\[ (\exists w': R_{\text{met}}(w, w', t) \land AT(p, w', [t, \infty])) \rightarrow (\forall w': R_{\text{met}}(w, w', t) \rightarrow AT(p, w', [t, \infty])), \]

where $p$ is a property of events;

$R_{\text{met}}(w, w', t)$ holds iff $w$ and $w'$ are identical up until time $t$;

and the interpretation of $AT(p, w', [t, \infty])$ depends on whether $p$ is stative or eventive: for a stative $p$, $AT(p, w', [t, \infty])$ holds iff there is a $p$-situation the running time of which intersects with $[t, \infty]$, and moreover, includes $t$; and for an eventive $p$, $AT(p, w', [t, \infty])$ iff there is a $p$-situation whose running time is included into $[t, \infty]$.

\[11\]This is where my semantics differs from the one given by (Condoravdi, 2002, p. 70, (19)). In Condoravdi’s semantics, there is no requirement that $t$ is included into a stative event’s running time. So for an epistemic sentence like Mary might be in London, Condoravdi derives a meaning that is true if it’s compatible with the relevant knowledge that Mary will be in London at some point in the future. With my definition of $AT$, Mary might be in London can only be true if it’s not ruled out by evidence that Mary is in London now. I conjecture that it is a better semantics across the board, if one allows for silent temporal arguments supplied by the context which may sometimes shift $t$ to some relevant moment. For example, if we had been talking about a workshop to be held in London next June, Mary might be in London could effectively mean Mary might be in London at the time of the workshop.

Regardless of how that is resolved for modern English, there is no evidence of such forward-shifting for stative arguments of *motan* in Alfredian OE. At the same time the assumption of $t$-inclusion is crucial for deriving that metaphysical necessity that $p$ entails metaphysical impossibility that $¬p$. 

Let us now turn to the assertion of \( \textit{motan}(p) \). If the presupposition of \( \textit{*motan} \) is about metaphysical possibility collapsed with metaphysical necessity, for the assertion it is harder to establish the exact modal flavor. The two candidates are circumstantial/metaphysical, and deontic modal flavors. (I will discuss the choice between circumstantial and metaphysical shortly, for now just noting that they are often so close that there are current debates as to which modern English examples feature which, cf. \cite{Abusch2012} who disagrees with \cite{Condoravdi2002}'s characterizations.) Some examples, from the modern point of view at least, seem to favor a deontic interpretation: e.g., \cite{9} may be interpreted as featuring a request for permission, and a deontic analysis could be appropriate in examples such as \cite{5} or \cite{10}. Other examples, however, would hardly be compatible with a deontic interpretation (for instance, \cite{11}), while favoring circumstantial/metaphysical readings. But in the Alfredian sample considered I did not find examples which would be only compatible with one of the two analyses.\footnote{The case of \cite{9} one of the examples that favor the deontic interpretation the most, illustrates the difficulty well. From the modern-English point of view, it may feel natural to find the deontic flavor in that question. But Alfredian \textit{mot} in \cite{9} is a rendering of Latin \textit{pateris}, with the primary sense “to be open”. The Latin word may also convey “to be accessible, attainable, allowable”, but the deontic flavor is secondary to the metaphysical/circumstantial one. Of course, the Latin correspondent does not rule out that the OE translator could intend a deontic interpretation for the modal. But the correspondence makes it less likely.} The Alfredian data do not allow us to determine whether Alfredian \( \textit{*motan} \) made deontic, metaphysical, circumstantial assertive contributions, or a combination thereof. In contrast to that, already in Ælfric (late 10th cent.) there are instances of \( \textit{*motan} \) that are almost undoubtedly deontic, as we will discuss in Section \ref{sec:deontic}.

For concreteness, I assume as the baseline analysis that \( \textit{motan}(p) \) asserted metaphysical possibility.\footnote{\cite{17} Combined with the metaphysical assertion as in \cite{17} the presupposition of inevitable actualization in \cite{16} entails that \( p \) will happen, and moreover that \( p \) was inevitable — a reading matching the informal analysis in \cite{14}.} The case of \cite{9}, one of the examples that favor the deontic interpretation the most, illustrates the difficulty well. From the modern-English point of view, it may feel natural to find the deontic flavor in that question. But Alfredian \textit{mot} in \cite{9} is a rendering of Latin \textit{pateris}, with the primary sense “to be open”. The Latin word may also convey “to be accessible, attainable, allowable”, but the deontic flavor is secondary to the metaphysical/circumstantial one. Of course, the Latin correspondent does not rule out that the OE translator could intend a deontic interpretation for the modal. But the correspondence makes it less likely.\footnote{The case of \cite{9} one of the examples that favor the deontic interpretation the most, illustrates the difficulty well. From the modern-English point of view, it may feel natural to find the deontic flavor in that question. But Alfredian \textit{mot} in \cite{9} is a rendering of Latin \textit{pateris}, with the primary sense “to be open”. The Latin word may also convey “to be accessible, attainable, allowable”, but the deontic flavor is secondary to the metaphysical/circumstantial one. Of course, the Latin correspondent does not rule out that the OE translator could intend a deontic interpretation for the modal. But the correspondence makes it less likely.}
But what if *motan’s assertion was circumstantial or deontic in some cases? For the circumstantial case, the first thing to note is that there is no case where *motan would assert circumstantial possibility without the realistic restriction on the modal base. A circumstantial accessibility relation determines a set of worlds where some facts and circumstances relevant in the evaluation world are true. Realistic relations in addition require that the actual world be accessible; in other words, they require that the facts used were all actual facts of the current world. In everyday speech, we are rarely interested in circumstantial backgrounds not restricted to be realistic: in practical situations, we usually discuss what can actually happen, and to reason about that, we need to start with true premises. A case where we might want to use a non-realistic circumstantial relation is when we discuss whether somebody who started from potentially faulty premises nevertheless used sound reasoning in their argument. There are no cases of that kind among the Alfredian OE instances of *motan. Our choice is thus not simply between metaphysical and circumstantial, but rather between metaphysical and realistic circumstantial flavors.

And the difference between those two flavors is subtle. For metaphysical relations, all facts whatsoever about the world are factored in. For realistic circumstantial ones, only a subset of actual facts is used. But of course, speakers are not omniscient, so they can never know all the facts about the world. When they are using a metaphysical modal relation rather than a realistic circumstantial one, that is mainly a matter of presentation. Using metaphysical modality implies pretending that you are omniscient, while using realistic circumstantial modality does not involve that pretense. Thus if we ask the speaker to provide reasons for which they find a modal statement true, there can be differences between metaphysical and realistic circumstantial modals: for a metaphysical modal, the speaker may say “Well, p is possible because that’s how the world is”, whereas for a realistic circumstantial, they could instead point to a specific set of facts that supports the possibility that p. But we cannot ask the speaker of Old English what they think. From what may be found in the Alfredian texts I examined, a metaphysical analysis seems to me more plausible if one
has to choose one for all instances of *motan, but that is a matter of judgement. So to be
fair, a very similar analysis where both the presupposition in [16] and the assertion in [17] are
reformulated using realistic circumstantial relations, also fits reasonably well to the data.

What about a deontic-possibility assertion? Consider again one of the examples which
in principle allow for a deontic interpretation:

(5) ‘But he who unwarily hews wood and by that slays his friend, it is necessary for
him that he flee to one of those three cities, so that he be saved in one of them, so
that he mote live.’ (CP:21.167.15)

If we assume that mote in [5] asserts a deontic possibility, it is clear from the context
that whether the person in question will live hangs entirely on that permission. If there
is such permission, he will live; if not, he will die. A similar intuition holds for other
potentially deontic cases. To capture that, I suggest the following formal analysis for the
cases where one would like to see a deontic assertion. In general, permission does not imply
metaphysical possibility: I may be permitted (=not forbidden) to photograph a dinosaur,
but that doesn’t make it possible. But Alfredian *motan is not used to describe permissions
of that sort. I propose that if *motan could have a deontic assertion, it came with a further
presupposition tying the deontic assertion to the metaphysical presupposition as in [16]:

that permission implies metaphysical possibility, or, in symbols, ♦_{deon}p \rightarrow ♦_{met}p. The overall
semantics is then derived as follows:

(18) (i) Presupposition 1 (−[16]):
the metaphysically accessible worlds are either all p or all ￢p.

(ii) Presupposition 2: ♦_{deon}p \rightarrow ♦_{met}p

(iii)Assertion: ♦_{deon}p

(iv)Consequence: ♦_{met}p \land □_{met}p

In other words, with the additional presupposition ♦_{deon}p \rightarrow ♦_{met}p, we derive metaphys-
ical necessity as a consequence of deontic possibility.
To sum up, I proposed three possible analyses for the assertive component of Alfredian *motan: 1) the baseline metaphysical analysis; 2) its very close variant with a realistic circumstantial accessibility relation; and 3) the permission analysis with the additional presupposition that ♦dezonp → ♦metp. All three analyses predict the specific variable-force effect that we observed for *motan: sentences featuring it convey both the openness of the relevant possibility, and also the inevitability of its actualization if it is given a chance.

The proposed analyses may be viewed as approximating formally some of the intuitions reported by Standop (1957) regarding his third reading for OE *motan. Indeed, when the presupposition in 16 is met, possibility and necessity collapse together, forming an “Einheit”. The presupposition itself would be satisfied in particular in those contexts where some future has already been determined, measured out, granted by some higher force, be it Fate or God. 16 describes a situation where it is destined what will happen, and it is the assertion (be it metaphysical, circumstantial or deontic) that tells us what that destined future will be.

However, our proposal is not a mere formalization of Standop’s ideas. In particular, none of the three analyses for assertion suggested above makes “rights and duties coincide” (one of Standop’s informal characterizations of his “third meaning”, not supported with a specific example like some of the others). Similarly, it is not required in our proposal that the force determining the future would always be of a higher nature, as Standop writes — thus under Standop’s informal analysis, examples like 9 or 11 would have to be analyzed as instances of some regular possibility or necessity meaning, as in them it is the human will that makes the outcomes inevitable. In our analysis, both are captured.

Moreover, there is a particular type of examples for which our analyses all make the same correct prediction, while Standop’s informal analysis does not: examples with negation.
There are about twenty examples in my Alfredian sample that feature a clausemate or higher negation. All of them convey the meaning of impossibility, cf. [19] [13]

19. Eala lu yfel me dōn māneg me worulmdenn mid þæm þæt ic I not 
mot pealān minra agentra [peawa].

‘Alas, how evilly I am treated by many worldly people, so that I mot not (=it is impossible for me to) follow my own customs.’ (Bo:7.17.23)

With our “collapse” presupposition in [16] that is in fact expected regardless of the relative scope of the modal and the negation: if ♦p ↔ □p, then ♦¬p → □¬p, and □¬p = ¬♦p [14]

But if we simply add negation to Standop’s informal paraphrases, that would not necessarily result in an impossibility reading: e.g., if p has not been determined for me, that does not mean that ¬p was determined instead. Our ♦□ collapse presupposition in [16] is crucial for deriving the determinedness of the future.

2.3. Collapse variable force analysis versus its competitors from the historical literature. It is useful to compare our analysis based on the collapse presupposition in [16] with several analyses for OE *motan from the historical literature. The analyses we will consider are: 1) the ♦□ ambiguity analysis; 2) the unambiguous ♦ analysis, and 3) the “periphrastic subjunctive” analysis. The arguments for our analysis and against those three (and, indeed, any possible others) often have to be subtle: as we are dealing with a limited size corpus of historical texts, we cannot directly test semantic hypotheses by asking for speakers’ opinions regarding test cases specifically constructed to tease different analyses.

13Moreover, this pattern of interaction with negation seems to hold across *motan’s cognates in other early Germanic: [Breitbaerth] [2011], studying the relative scope of modals and negation in Old Saxon (=Old Low German), finds that all 16 examples in her corpus convey impossibility, just as our Alfredian OE examples. However, cf. the discussion of later OE and Early ME in Section 3 with changes in the semantics of *motan/*moten, the previously unobserved ♦¬p meaning distinct from ¬♦p becomes available. Similarly in some of the Dutch dialects moeten, a cognate of OE *motan, scopes under negation, as well as Standard German müssen.

14For the metaphysical and realistic circumstantial cases, that goes through directly; for the deontic case, the same additional presupposition ♦deon → ♦met is used.
apart. Instead, we have to rely on “soft” arguments based on statistical considerations and historical credibility. That said, historical linguistics can go a great length using only such “soft” arguments, and historical semantics is no exception to that.

The ambiguity analysis, by far the most popular in the literature, has several flaws. First, it fails to predict that *motan would only appear in contexts where inevitable actualization is assumed. Second, when we are dealing with a truly ambiguous item, then at least some of its contexts would feature cues for disambiguation. This is not what we find, and it is significant for the following reason. In Section 3 we will see that when a modal is truly ambiguous between $\Diamond$ and $\Box$ — as the Early Middle English descendant of *motan turns out to be, — then the context often quite clearly disambiguates it. The lack of such disambiguation evidence in Alfredian OE, and the presence of cases like [13] where expert translators use different translation equivalents for *motan, are thus evidence against the ambiguity analysis. To sum up, the ambiguity analysis provides little insight into the empirical distribution of Alfredian *motan, while also being not particularly convincing because of the lack of disambiguation cues in the texts.

The possibility analysis, as suggested by [Solo 1977], is harder to show to be inferior to our collapse variable force analysis. After all, in our analysis the assertion of the modal is a possibility assertion. So the difference between the generic $\Diamond$ analysis and ours is in the fact that our analysis crucially employs the collapse presupposition in [16]. There are two kinds of arguments that show that our analysis is better.

The first kind is based on statistical considerations. For example, without the presupposition, it becomes hard to explain why it is only *motan that is restricted to such a particular kind of contexts in Alfredian OE. Other modals do not have similar restrictions. Of course, it could be a statistical fluke that all 72 examples of *motan in our sample just happened to be this way. However, it should also be noted that *motan is a very rare modal: compare its 72 instances in our corpus to the about 1000 instances of magan (>modern may) and the about 700 instances of *sculan (>modern shall, a deontic and circumstantial
necessity modal of choice in Alfredian OE, and arguably with some futurate meanings as well). The presuppositional nature of *motan helps to explain this difference in frequency, but for the possibility analysis the difference is harder to make sense of.

Another similar piece of evidence comes from participation in scalar relations with other modals. In modern English, possibility and necessity modals form dual pairs where □ creates a strictly stronger statement than ♦ does. E.g., in “You may take this exam. In fact, you have to”, have to in the second clause strengthens the assertion made with may in the first. Similarly in Alfredian OE, we easily find cases where possibility magan enters into such relationships with necessity *sculan. For example, [20] is an instance of the scalar pattern “Not only can(p), but also have.to(p)”: (20) hi beoð swa gefwæra þætte no þæt an þæt hi magon geferan beon, ac þy furðor þæt heora furðum nan buton oðrum beon ne mæg, ac a sceal þæt widerwearde gemetgian.

’they (=fire and water, and sea and land) are so harmonious that not only can they be companions, but moreover that none of them can be without each other, but they always have to on the contrary restrain each other.’

No such examples where *sculan would strengthen *motan are present in our Alfredian sample. Now, this is not exactly a killer argument: as I noted above, magan is one order of magnitude more frequent than *motan, so it could in principle be that the absence of scalar patterns with *motan is a sheer accident. But other things being equal, a theory for which that fact is not an accident is to be preferred. For our variable-force theory of *motan, that is indeed no accident: because of the presupposition, *motan under our analysis is predicted to not be able to form scales with other modals, cf. the scheme in [21]. And absence of scalar patterns with *motan is exactly what we see in the data.

(21) Alfredian Old English:
The second type of arguments comes from historical and typological observations. Suppose for a moment that *motan was indeed a regular ♦ modal. We know plenty of regular possibility modals in a wide range of languages with long recorded histories. But they don’t just turn into □ modals as they develop. At the same time, it is not only *motan that developed into a necessity modal, but all of its Germanic cognates as well. Now, if there was something semantically special about that common-Germanic word — for example, presuppositional variable-force semantics — then we can explain why its descendants had such similar trajectories of semantic change. But if *motan was a plain possibility modal, and so were all its Germanic cognates, then we have to assume that the same very rare event of a ♦ turning into a □ happened independently to a set of cognates across many Germanic languages. In historical linguistics, such an explanation is to be rejected, unless there is very strong evidence for parallel independent development, of which there is none in the case of *motan.

Taken together, the arguments of statistical plausibility and historical consistency, I believe, provide sufficient support for the presuppositional variable-force theory of *motan over the theory that says it was an unambiguous possibility modal.

Finally, let us consider the “periphrastic subjunctive” theory. To my knowledge, it has not been invoked specifically to account for the special properties of *motan, but it is a frequent enough theory of the semantics of OE (and ME) modals to merit some discussion. The “periphrastic subjunctive” theory states that modals did not actually have independent semantic content (at least in some uses). Instead, they were analytical substitutes for the inflectional subjunctive, which has been slowly, but monotonously dying out since OE. For modern English, an example of a “periphrastic subjunctive” would be should in sentences such as ‘It is essential that we should hire her’, on one of its readings.
It should be stressed that there are considerations that make this theory not completely implausible: in a number of constructions, modals did indeed replace the earlier inflectional subjunctive as it was lost. For example, ‘Long live the king!’ is one of the few fossils in Present-Day English that preserve the earlier subjunctive of matrix wishes, while later they gradually started to be expressed first with (the ancestors of) must, then with (the ancestors of) may.

Despite that initial plausibility, Ogawa (1989) convincingly argues against this sort of analysis for OE modals in general. Ogawa demonstrates quantitatively that various modals had in Old English very clearly defined distributions which at least in some cases call for semantic explanations. Moreover, one of the clearest signs that the modals did not simply replace the subjunctive is the fact that they sometimes appeared with indicative inflections, but other times, bore subjunctive morphology themselves. In particular, *motan has unambiguous subjunctive morphology in 5 and 7, and unambiguous indicative morphology in, e.g., 8 and 9. Thus the periphrastic subjunctive theory is just not a plausible analysis for OE modals.

Summing up, none of the arguments for the presuppositional variable-force theory of *motan is decisive on its own. But they all point in the same direction, and thus taken

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15 Note that forms such as moten in 11 are morphologically ambiguous. Though textbooks would give moton for the pres. ind. plural form, and moten for the corresponding subjunctive — which is in principle correct diachronically, — the vowels of such unstressed syllables were heavily reduced, and generally exhibit great variation in various manuscripts. Without carefully investigating the orthography of a given manuscript and reconstructing the morphological situation represented by it, one cannot assume that spelling moton unambiguously signaled indicative. One should be especially careful given the fact that the levelling of the on-en endings seems to have been more rapid in preterite-presents such as *motan than in other verbs, see (Kitson 1992, p. 66). Cf. also (Mitchell 1985 §22) on the “confusion” between en/on in general. In contrast to that, the difference between mot and mote is a reliable indicator of a morphological difference, as the distinction between the zero and e endings survived into the Middle English period.

16 An anonymous reviewer asks about the following theoretical possibility: what would we get if we say that motan in motan(p) signaled “that p is an argument of a higher deontic or circumstantial modal operator”? As far as I can see, such a “modal concord” analysis does not give us much by itself. The distribution of *motan is highly peculiar, and needs to be explained. As the appearance of *motan does not correlate with any particular syntactic environment, cf. 5 11 the higher operator would have to be assumed to be covert. And it does not help us if we blame a mysterious higher covert operator for the semantic properties of *motan’s contexts: we still need to explain the peculiarities.
together, make it very probable that my variable-force theory, or something fairly close to it, is true for Alfredian Old English. None of the theories suggested in the earlier historical literature comes closer to accounting for the actual distribution of the modal.  

3. From collapse variable force to true $\Diamond$-$\Box$ ambiguity in Early Middle English

Though Alfredian OE *motan can be rendered with either possibility or necessity modern modals, there is no sign of true ambiguity in the Old English data. But when we turn to Early Middle English *moten, we find a very different picture. My analysis of ME *moten is based on data from Ancrene Wisse, an early-13-century manual for anchoresses touching upon both spiritual and practical matters. That book, immensely popular at the time, is one of our best sources for Early ME, written the so-called ‘AB language’, a dialect written in the West Midlands of England. In that text, some of the about 60 instances of *moten are clear □ uses, while some others feature possibility, or at least non-necessity. The Early ME modal is thus truly ambiguous in the source language. In this section, I will briefly

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17 One more theory that deserves some attention, though not to my knowledge ever discussed in the literature, would be along the following lines: *motan in Alfredian OE was not a genuine modal, but rather a sentential modifier that marked its argument situation as good or desirable. I know of two reasons why this theory should be taken seriously, though neither of them applies directly to the Alfredian sample that I use as my primary source in this work. First, as Ogawa [1989] Ch. 4.5) shows, *motan was used under verbs of asking and requesting to mark situations where the requester and the beneficiary of the request (usually the embedded subject) were the same person. If *motan could convey the meaning of desirability, that feature of its distribution would follow. Second, in the laws of Alfred and Ine, representing earlier, and crucially much more formulaic, OE prose than the Alfredian translations I discuss in the main text, *motan, *sclan and the inflectional subjunctive are used almost interchangeably, but at the same time the argument situations of *motan always involve something beneficial for the subject — e.g., “to swear (one’s innocence)”, — and never involve bad things like “to pay a fine” or “to forfeit one’s property”, as happens with the subjunctive and *sclan. Again, if *motan conveyed the desirability of its argument situation for the subject, that is exactly what we would expect. However, for Alfredian OE translations specifically, it is clear that such an analysis fails. Many examples of *motan in CP, Bo and Sol indeed involve something good, such as continuing to live in 5 or getting to see God in 7. But there are also examples where the argument situation is clearly undesirable for the subject, such as the weeping as in 11. The example 2 can also hardly be taken to feature a desirable argument situation. 

18 The edition used was Millett [2005]. I checked my interpretation of the Middle English examples with the glosses in Hasenfratz [2000].
discuss the Early ME distribution, and outline possible paths of semantic development that
could have led from Alfredian variable force to the ambiguity of AB-language *moten.

In about half of the examples from Ancrene Wisse, *moten conveys the meaning of
circumstantial necessity. This type of use is illustrated in 22 with two instances of *moten.
For the first instance, owning a cow does not just create a possibility to think about the cow’s
fodder: it necessitates such thinking. For the second instance, the conditional antecedent
in the second sentence in 22 talks about the case when the anchoress really has no other
practical options but to have a cow — after all, if she had such options, then the preceding
discussion about choosing not to have a cow would apply. Thus in both instances, we have
a normal necessity reading: there is no collapse of possibility and necessity as in Alfredian
OE, and no other kind of variable-force effect.

(22) "You should have no animal but one cat only. An anchoress who has livestock seems
more a housewife, as Martha was, she cannot easily be Mary, Martha’s sister, with
her tranquillity of heart."

for þenne mot ha þenchen of þe kues foddre <...>
for then moten.prs.3sg she think of the cow’s fodder

‘For then she (=the anchoress) has to think of the cow’s fodder <...>’

Nu þenne, 5ef eani mot nedlunge habben hit, loki þet hit na
Now then if any moten.prs.3sg necessarily have it, see that it.nom no
mon ne eili ne ne hearmi
man.acc not ail not not harm

‘Now then if any (anchoress) absolutely has to have a cow, at least see to it that
the cow does not hurt or ail anyone.’ (AW 8:90-9)

But even though circumstantial-□ uses as in 22 are the most common for *moten in
Ancrene Wisse, some instances of the modal do not allow a necessity interpretation. A
particularly clear such case involves the use of *moten in prayers, as in 2319

19There may be different opinions regarding what exact meaning the modal in contexts like 28 has. But
in Present-Day English, necessity modals cannot be used in such contexts, and possibility may is used
instead. Moreover, as *moten gradually turned into an exclusively necessity modal in Late Middle and
‘In honor, Jesus Christ, of your twelve apostles, may I everywhere follow their teaching, may I have through their prayers the twelve branches that blossom with love’ (AW 1:174-6)

In addition to the meanings of circumstantial necessity and of wishing/praying, *moten in the AB language could express deontic necessity (of the objective kind, with clear moral overtones), perhaps teleological necessity (in conditional consequents, where it is hard to tease apart deontic and teleological flavors), and also — though very rarely — was used in examples that can be connected to the Alfredian collapse variable-force semantics.

One of the cases of the last type is 24. Here, the modal seems to assert the deontic openness of the possibility to change the formal rule according to which anchoresses live. But that permission is explicitly tied to the desire of the anchoresses themselves, so the permission is asserted only for the cases where it would be followed upon. This is very close to how *motan was used in our Alfredian sample. The difference between Alfredian *motan and the kind of *moten we see in 24 is that the former’s distribution was entirely tied to this type of contexts, while for Early ME *moten, it is just one marginal possibility among many. It is not clear whether *moten in 24 bears the presupposition of collapse any longer: its occurrence in such a context may be due to inertia of use, rather than to a constraint built into the meaning of this semantic variant of the modal.

(24) ah ȝe ȝet moten changin hwen-se ȝe eauer wulde, þeose for betere.

Early Modern English, it was ousted from such wishes/prayers (cf. §1692, §1680-1 of Visser (1963-1973)). That fact shows that whatever particular meaning the modal had in such constructions, it was crucial for it to be able to have non-necessity semantics in order to appear in them.
'But on the contrary you moten change those [rules], whenever you want, for the better.' (AW 8:5-6)

Thus the overall distribution of *moten in Ancrene Wisse may be summarized as follows. The dominant meanings in this 13-century text are the meanings of circumstantial and deontic necessity. Yet non-necessity meanings are also present. Importantly, both for prayers/wishes and for ◇-like meanings as in 24, there is a connection to the older distribution of OE *motan. Matrix wishes develop out of purpose clauses, in which OE *motan was used regularly (cf. 5 in Sect. 2). As for possibility-like uses, it is not clear if they bear anything like the collapse presupposition anymore, but they are still associated with contexts where the presupposition would be satisfied.

We thus find clear signs of continuity between Alfredian *motan and AB-language *moten. But there is also a crucial difference between them: while Alfredian *motan could be accounted for using a uniform meaning, *moten in Ancrene Wisse is a clearly ambiguous modal. The ambiguity of Early ME *moten is unusual in that it involves dominant □ as well as non-□, perhaps ◇, readings. So if we only looked at the two modals' translation correspondents in Modern English, we could have concluded that both of them are “variable-force modals”. But when we compare them to each other, the difference becomes clear. For example, there are no such clear □ instances of *motan in the Alfredian prose as we have seen in 22 from Ancrene Wisse.

What the comparison between Alfredian *motan and Early ME *moten thus shows is that a true variable-force modal of the collapse type may develop into a ◇-□-ambiguous one. Moreover, the particular semantic distribution that we find in Ancrene Wisse makes good sense given our semantics for Alfredian *motan and what we know about semantic change in general. As we have already noted, wishing and ◇-like uses as in 23 and 24 show certain continuity with the uses of Alfredian *motan. As for the innovative □ uses, we can sketch reasonable lines of development from the Alfredian collapse variable-force meaning.
The emergence of circumstantial □, the most frequent meaning of *moten in Ancrene Wisse, is quite straightforward given our variable-force analysis for OE. In Alfredian OE, the possibility assertion of *motan implied necessity given the presupposition. It is well known that semantic reanalysis may lead to conventionalization of inferences and implicatures into the plain meaning of a lexical item. We illustrate where such reanalysis could happen with an example from Wulfstan’s Homilies (early 11th cent.) in 25.

(25) nu deofol sylf his mægnes mot wealdan, now devil himself his might motan PRS.3SG wield
& deofles bearn swa swiðlice motan cristene bregean. and devil’s children so severely motan PRS.PL Christians terrify

‘...now that the devil himself mot wield his power, and the devil’s children motan terrify Christians so severely.’ (WHom, 5:55-56) 20

Both instances of *motan in 25 still fit the Alfredian meaning I proposed in the last section. For example, for the first instance it is claimed that the possibility for the devil to wield his power is open (the assertion of variable-force *motan), and it is known in the context that if the devil gets a chance to harm humans, he surely will (the presupposition of variable-force *motan). No opposition between possibility and necessity arises in the context. And yet we can also see the potential for semantic reanalysis in the same example. A reader or hearer of the passage, given the eschatological nature of Wulfstan’s text, may take the author to mean that now, when the worst days have come (as Wulfstan believed and extensively argued), it is circumstantially unavoidable that the devil wield his power. In fact, we cannot tell from this example alone which of the two meanings Wulfstan himself intended. 21 The presence of such examples where both the old and the new meaning would both fit constitutes a precondition for reanalysis. And in Early ME 22 we see the later

20 I provide homily number and line numbers from the edition of Bethurum (1957).
21 A pilot investigation of Wulfstan’s Homilies, his Institutes of Polity, and laws drafted by him for Æþelstan and Cnut, leads me to the conjecture that in his own language the reanalysis has not yet happened.
result of such reanalysis: *moten in 22 cannot be reasonably interpreted using the earlier collapse meaning. It has to feature the innovative circumstantial-□ meaning.

As for the rise of deontic □, there are two plausible possibilities. First, circumstantial □s often develop into deontic □s (cf. van der Auwera and Plungian (1998), a.m.o.) We do not know much about the particular reanalysis mechanisms that are at play in such developments, but they occur often enough. Second, there is a second potential pathway leading to deontic □ more or less directly from collapse variable-force *motan. It would involve *motan in conditional consequents. Consider another passage from Wulfstan’s Homilies:

(26) We motan nyde þæt stiðre þolian, gyf we clæne beon sceolan þonne we motan.PRS.PL necessarily the harder suffer if we clean be shall when se dom cymð, nu we þæne fyrst nabbað þe þa hæfðon þe the judgment comes now we the period not.have which those had which wiðforan us waren.

before us were

‘We motan without other options suffer harder, if we were to be clean when the Judgment comes, now that we don’t have the time that those who were before us had.’ (WHom, 4:30-33)

In the Alfredian sample, there is only one example out of 72 where *motan occurs in the consequent of an if-clause or a wh-ever construction (cf. ?? in the online appendix.) But the semantics of such contexts is compatible with the presupposition of collapse: in the worlds to which the conditional clause is taking us, there may be only one way things can be. (In fact, Stalnaker (1981) argues for a type of collapse analysis for would in conditional consequents, which we will discuss in the next section.) Arguably, in Wulfstan’s passage the presupposition is also met: there is only one way that his audience may become clean enough to be saved, and the consequent declares what that way is.

In 26, Wulfstan does not mean that people should seek suffering. In the larger context of our example, he explains that Antichrist is given power by God in order to inflict such
suffering on good people that they can then go to heaven. Wulfstan’s Homilies were composed at the time of Norman attacks on England, which involved a lot of severe suffering for its inhabitants. Wulfstan apparently attempts to at least rationalize why such tremendous pain is needed. So it is clear from the homily as a whole that____26____ does not contain a moral instruction about what people should do. However, if we consider that example in isolation, we can easily substitute *motan with deontic-□ ought: ‘If we are to be clean, we ought to suffer harder’. So again, we have an example that allows for semantic reanalysis — in this case, reanalysis from a collapse modal to a deontic necessity one.

To determine which of the two potential pathways to deontic □ actually applied, a careful investigation of the primary sources for the critical period is needed. It can also be that both paths were relevant, reinforcing each other — or that there was some other, third line of development. But importantly, we already have a plausible scenario for how Alfredian *motan could have turned into its Early ME descendant. In fact, very few cases of semantic change received analyses that are better supported by primary evidence than the story for *motan that we have just told. 

22There are two types of analyses for how □ readings of *motan could have emerged based on the assumption that it was a plain possibility modal, rather than a variable-force one. Neither of the two was directly supported by primary evidence; both thus constitute logical possibilities rather than developed theories of change.

The first analysis is based on conventionalization of implicatures, cf. Traugott (1989). The implicature used in it is the obligation implicature that may arise for “subjective” permissions when those are granted by a high authority figure such as a queen. But there is no evidence for such subjective deontic-♦ uses of *motan in early sources. Our scenario for the emergence of circumstantial □ is thus better supported by the data.

The second analysis, cf. OED (2002), links the change to negative contexts, using the observation that “not possible” is equivalent to “necessarily not”. But, for instance, in Ancrene Wisse we find only 2 (!) instances of negated *moten, out of ca. 60 examples. And even worse, one of those two features the reading “not necessary” rather than “necessarily not”: nis nan ðet make edlution ðet ha ne mot him luuien ‘none is such that can avoid it that she does not have to love him [=Christ]’ (AW 7:229-30). The point of the passage is that no one can avoid loving Christ, and that interpretation can only be generated if the negation within allution ‘avoid’ and the negation on the modal cancel each other out. The existence of such ¬ □ examples casts serious doubts onto the theory that relies on □ ¬ contexts for reanalysis.

Of course, theoretically such reanalysis through negative contexts could have occurred much earlier, so that by the time of Ancrene Wisse the new □ meanings were no longer associated with negative contexts and with □ ¬ scope. But there is currently no spelled-out theory of “negative reanalysis” that would have said when and through which examples specifically that change would have happened, and how it could have been generalized from negative contexts to positive ones. Moreover, what makes this theory particularly
4. Variable-force modality in Old English vs. in St’át’ímcets, Gitksan, and Nez Perce

It is well-known that some constructions in natural languages may be underdetermined between possibility and necessity, like the ‘have something to say’ construction (Fischer, 1994, Sec. 3.2) or German modal infinitives (van der Auwera and Plungian, 1998, Sec. 3.3). However, recent semantic fieldwork on St’át’ímcets, Gitksan, and Nez Perce has uncovered a group of modals which seem to feature a different kind of “indeterminacy” between possibility and necessity: while those modals may be rendered into languages like Modern English with both possibility and necessity modals depending on the context, there seems to be no lexical ambiguity or vagueness involved. In this section, I review the data and analyses formulated for various variable-force modals of St’át’ímcets, Gitksan, and Nez Perce, and discuss how they compare to the Alfredian OE data and to my presuppositional variable-force analysis.

4.1. Variable force in Alfredian OE and the Pacific Northwest: the empirical picture. Schematically, the shape of the modal system in the three Pacific Northwest languages where variable-force modals have been described can be represented as follows, alongside the same for Alfredian OE:

(27) Alfredian Old English:

<table>
<thead>
<tr>
<th></th>
<th>ability</th>
<th>circ.+met.</th>
<th>future</th>
<th>deontic</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>◇</td>
<td>magan</td>
<td>magan</td>
<td>—</td>
<td>non-modal</td>
<td></td>
</tr>
<tr>
<td>□</td>
<td>—</td>
<td>sculan</td>
<td>∅ or sculan</td>
<td>sculan</td>
<td></td>
</tr>
</tbody>
</table>

(28) St’át’ímcets (Rullmann et al., 2008)

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doubtful is the fact that ◇ modals generally have narrow scope with respect to clausemate negation, for reasons yet unknown (cf. van der Auwera, 2001). But we do not see them routinely turning into □ modals.
Consultants select □ paraphrases for variable-force modals more often

(29) **Gitksan** ([Peterson (2010), Matthewson (2013)])

<table>
<thead>
<tr>
<th></th>
<th>circ.</th>
<th>deontic</th>
<th>epist.</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦</td>
<td>da’akhlw</td>
<td>anook</td>
<td>ima(’a); gat</td>
</tr>
<tr>
<td>□</td>
<td>sgi</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Consultants select ♦ paraphrases for variable-force modals more often

(30) **Nez Perce** ([Deal (2011)])

<table>
<thead>
<tr>
<th></th>
<th>circ. and deontic</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦</td>
<td>o’qa</td>
</tr>
<tr>
<td>□</td>
<td></td>
</tr>
</tbody>
</table>

Even though the diagrams above provide, by necessity, very limited information, that is already enough to see that the shapes of modal systems with variable-force modals may vary significantly between languages. In St’át’imcets, all modal expressions are apparently variable-force. In Gitksan, variable-force modals occur in the epistemic domain with little competition. In Nez Perce, the variable-force modal (argued by Deal (2011) to be a regular ♦, as we discuss below) occupies the circumstantial/deontic meaning domain alone, without other modals. But unlike in any of those, in Alfredian OE variable-force modal *motan* is in the same general domain of deontic-circumstantial-metaphysical modality as non-variable force *sculan* and *magan*.

If we look closer yet, the Alfredian variable-force pattern of behavior turns out to be very different from those in St’át’imcets and Gitksan. First, there is no inevitability conveyed by the variable-force modals in the latter two. In St’át’imcets [31], we see the variable-force future marker *kelh*. That marker often corresponds to English simple future *will*, but [Rullmann et al. (2008)] are a bit more cautious about the epistemic markers *ku7* and -an’, but the rest are unequivocally variable-force.
does not have to. In examples like (31) the argument situation of *kelh* is not construed as inevitable, only as potentially possible in the future.

(31) (Rullmann et al., 2008, (19)):

ka-kwís-a *kelh* ti k‘ét’h-a
circ-fall-circ fut det rock-det
‘That stone might drop.’

Similarly for Gitksan *ima*, no inevitability is conveyed by the modal in the general case:

(32) (Matthewson, 2013, (22)):

Context: You hear pattering, and you’re not entirely sure what it is.

yugw=ima/x/ma’=hl wis
IMPF=EPIS=CN rain
‘It might be raining.’

Another difference between Alfredian OE on the one hand and St’át’imcets and Gitksan on the other concerns the interaction between variable-force modals with negation. As we discussed in Section 2, Alfredian *motan* always conveys impossibility when combined with negation, cf. (19) But in St’át’imcets and Gitksan, variable-force modals can give rise to ‘not necessary’ readings.

(19) ‘Alas, how evilly I am treated by many worldly people, so that I mot not (= it is impossible for me to) follow my own customs.’ (Bo:7.17.23)

In St’át’imcets, at least the evidential epistemic *k’a* shows both ‘necessarily not’ and ‘possibly not’ readings in different examples, (Rullmann et al., 2008 Sec. 3.6), and variable-force modals *kelh* and *ka* show at least ‘possibly not’ readings. This differs from Alfredian *motan*. As for Gitksan, the variable-force reportative evidential *kat* scopes uniformly above its clausemate negation, (Peterson, 2010, pp. 66-8, 149-50), producing readings like ‘I heard ¬p’, and never ‘I didn’t hear that p’. But only ‘possibly not’ readings are provided by Peterson and Matthewson for inferential epistemic *ima*, (Peterson, 2010, pp. 45),
(Matthewson 2013, Sec. 3.1). So again the pattern of interaction with negation is different from that of Alfredian *motan, for which we find only ‘not possible’ readings.

Summing up, Alfredian OE and St’át’imcets and Gitksan differ not only in the kind of accessibility relations their variable-force modals can use, but also in whether the modals always convey inevitability (Alfredian *motan does, while St’át’imcets and Gitksan variable-force modals don’t), and how they interact with negation (Alfredian *motan always gives rise to the impossibility reading, while in St’át’imcets and Gitksan ‘possibly not’/‘not necessary’ readings are also attested, and sometimes are the only attested ones for a given modal.)

The variable-force modal o’qa of Nez Perce, described by Deal (2011), is much closer to Alfredian *motan, though not identical to it. First, o’qa may use accessibility relations from the same general domain of circumstantial-deontic(-metaphysical) as *motan. Second, o’qa always gives rise to impossibility meanings when combined with clausemate negation. But there is a very important difference: inevitability is not conveyed by Nez Perce o’qa, as the sentence in 33 shows. No such examples were found in my Alfredian OE sample (N=72).

(33) (Deal 2011, ex. (7)):

pícpic ha-’ac-o’qa mét’u wéet’u ha-’ac-o’. cat 3SUBJ-enter-MOD but not 3SUBJ-enter-PROS

‘The cat could go in, but it won’t go in.’

The second important difference between o’qa and *motan surfaces when the modal occurs in a conditional antecedent. In Alfredian OE, possibility and necessity collapse in such examples, as we discussed regarding 13. But for Nez Perce, Deal (2011) provides several examples with o’qa in the antecedent of a conditional for which her consultants accept a possibility paraphrase, but firmly reject a necessity paraphrase, cf. 34.

(34) (Deal 2011, ex. (59)):
Summing up, Alfredian *motan is empirically very different from the variable-force modals of St’át’imcets and Gitksan, and is more similar to, but still quite different from the variable-force modal o’qa of Nez Perce. In none of the three Pacific Northwest languages does a variable-force modal convey a sense of inevitability as Alfredian *motan does.

4.2. Variable force in Alfredian OE and the Pacific Northwest: comparison of theories. Because of the empirical differences just described, my presuppositional analysis for *motan does not carry over to the Pacific Northwest variable-force modals: it would derive the inevitability effect which is not observed for them. In the other direction, earlier analyses do not carry over to Old English either. The five analyses of the variable-force effect proposed in the literature, for different languages, are as in (35):

(35) a. □ with narrowing

(b) modal with only 1 accessible world

(Rullmann et al. (2008), for St’át’imcets)

24Both Rullmann et al. (2008) and Peterson (2010) attribute the rise of the variable-force effect to special mechanisms manipulating the quantificational domain of the modal. But there is a crucial theoretical difference between the two approaches. Rullmann et al. (2008) use a special apparatus of choice functions applied to sets of worlds to implement the narrowing, while Peterson (2010) proposes to use the standard apparatus of conversational backgrounds by Kratzer (1981) to the same end. As the result, Peterson’s treatment of Gitksan’s modals ends up being very similar to Kratzer’s treatment of German können, and his treatment of St’át’imcets modals, to Kratzer’s treatment of German müssen. But empirically German modals and the modals of Gitksan and St’át’imcets are very different. It is not clear how Peterson’s system that uses the same apparatus for both can accommodate that fact.

OK ‘If I can go in, I will go in.’
∗ ‘If I have to go in, I will go in.’
None of the first three analyses in [35] formulated for St’át’imcets and Gitksan, is designed to derive anything close to either the inevitability effect or the pattern of interaction with negation where the variable-force modal always giving rise to an impossibility reading. But the ‘analysis II’ of [Kratzer (2012)] and the analysis based on the absence of a modal dual by [Deal (2011)] may account for an empirical pattern closer to the one we see in Alfredian OE, and thus will be discussed here.

The second variable-force analysis by [Kratzer (2012)] is the following suggestion (explored by Kratzer without proposing that it is the right analysis for any particular language). Suppose a modal quantifies over a singleton set of worlds. In such a case, there is no distinction between ♦ and □ any more: a collapse occurs. A modal specified as one that only quantifies over singleton sets of worlds would be, using the descriptive term, a variable-force modal. And in fact, [Stalnaker (1981)] proposes such a collapse analysis for would in English counterfactual conditionals, independently from any concerns about variable-force modals of the kind found in the languages of the Pacific Northwest.

Our analysis has a lot in common with Kratzer’s suggestion: under both of them, possibility and necessity collapse in the set of worlds quantified over. But there are differences, too. First, the way in which the collapse is imposed (namely the presupposition proposed for *motan) is specific in my theory, and left unspecified in Kratzer’s brief suggestion. Second, there is no need to assume that the quantified set is singleton under my analysis, so in a sense the guiding intuition behind my proposal is slightly different from Kratzer’s: the possibility-necessity collapse occurs not just because it is impossible to distinguish ♦ and □ in a singleton set of accessible worlds, but as something that needs to be specifically imposed within the semantics. Modulo those differences, my theory for Alfredian *motan may be viewed as an elaboration of Kratzer’s suggestion.

Turning to the analysis of the variable-force effect proposed for Nez Perce by [Deal (2011)], in principle it may be applied to Alfredian *motan, but only if one grants several further assumptions with no empirical basis for them in the Old English data. Deal’s analysis for Nez
Perce variable-force modal *o'qa makes crucial use of the fact that Nez Perce lacks a modal that could have been *o'qa’s vanilla-necessity counterpart. *o'qa has deontic and circumstantial readings (in the same general modal meaning domain as *motan). In upward-entailing contexts, it behaves similarly to the Gitksan variable-force modals: it may be rendered by consultants into English using both possibility and necessity modals, but possibility translations are generally preferred. However, in downward-entailing contexts (namely under negation, in relative clauses modifying universally quantified noun phrases, and in antecedents of conditionals), *o'qa appears to unambiguously convey possibility: consultants strongly reject sentences with *o'qa as translations for English sentences with necessity modals in such environments.

Deal explains this pattern as follows: *o'qa’s literal meaning is always that of possibility, so it has roughly the same basic semantics as modern-English can or may. The peculiar variable-force pattern observed in upward-entailing contexts, Deal argues, is due to the absence of a stronger necessity dual for that regular possibility modal. In English, the speaker would not use can when she can use a stronger have to. But if her language does not have a modal with the semantics of have to, there would be no reason for the speaker to not use can in upward-entailing contexts. The variable-force effect in such contexts would be simply an epiphenomenon of the shape of the overall modal system of a given language.

So can we apply the same line of reasoning to *motan? Unlike in Nez Perce, in Alfredian OE there is a modal that would have been a necessity dual for *motan: the deontic/circumstantial modal *sculan (>modern shall). *sculan is the pure-necessity modal of choice both in deontic and circumstantial contexts: in *sculan conveys the meaning of moral obligation, while in *sculan is a circumstantial □ modal: the context suggests a much stronger force making the action inevitable than just deontic necessity.

(36) Hwiclice suidor sculan we donne beon gehiersume ðæm ðe ure how much more shall we then be obedient to.him who we.GEN gæsta Fæder bið wið ðæm ðæt we moten libban on ecnesse! spirits.GEN father is so that we motan.PRS.PL live on eternity
‘Then how much more must we obey the father of our souls so that we may live eternally!’

(37) Preceding context: “Every person’s inner thought desires two things, which are the will and the power. If someone lacks one of those two, then he cannot fulfill anything with just the other.”

Forþam nan nyle onginnan þæt þæt he nele, buton because none not.wants.to start that which he not.wants.to unless [nede] scyle; and þæh he eall wille, he ne mæg gif he þæs by.necessity shall and though he entirely wants.to, he not may if he that.Gen þinges anweald næfō. thing.Gen power not.has

‘Because nobody would start what they do not want to (start), unless they have to by necessity; and when someone truly wants to (do that), they cannot if they do not have power over that thing.’

Now, I have noted above that it is hard to establish with certainty which modal flavors the assertion of *motan may have had in Alfredian OE: it occurs in examples that could be argued to exhibit a meaning from the general range of circumstantial, metaphysical and deontic, but it seems impossible to establish without doubt whether *motan definitely had each of those meanings. Given that uncertainty, if we really wanted to stretch Deal’s analysis to cover Alfredian *motan, we could stipulate that *motan only had metaphysical readings, while *sculan had only circumstantial and deontic readings, but never metaphysical ones. If so, then *motan would indeed have no exact necessity dual, and we would be able to apply Deal’s account.

But there is no basis in the data for making such a claim: it would be just an ad hoc assumption adopted specifically to make one particular theory work. Moreover, the assumption that there was a complementary distribution between the modal flavors of *sculan and *motan is problematic on both historical and typological grounds. On the typological side, modals rarely have such clear-cut complementary distributions. On the
historical side, even when a modal does lack a particular modal flavor, it can often acquire it in time if it already can express close modal meanings — and circumstantial modality is close to metaphysical modality, and is known to give rise to deontic readings in language change. So the assumption we’d need to adopt to make Deal’s theory work, even if true at some point, should have become false quite fast. That is not very probable given the fact that *motan’s cognates in other Germanic were special in similar ways, suggesting that the variable-force situation was in place for a relatively long time. The same comparison with other Germanic, as we already discussed, suggests that *motan had special semantics, not the regular ◊ semantics: otherwise, it would be strange that only that particular ◊ and all its relatives in other closely related languages underwent the change into a □ modal.

Finally, we have already discussed in Section 4.1 that empirically, there are two important differences between *motan and Nez Perce o’qa: first, o’qa does not convey inevitability (cf. 33), and second, o’qa gives rise to regular possibility readings in conditional antecedents (cf. 34). Given those two differences, it does not look as if there are any benefits in adopting Deal’s analysis for Nez Perce to Alfredian OE.

To conclude the comparison of data from, and theories of, the variable-force modals of the Pacific Northwest and Alfredian *motan, first, the distribution of the Alfredian modal is different than that of any of the Pacific Northwest variable-force modals; second, our presuppositional theory of *motan should not be applied to St’át’imcets, Gitksan or Nez Perce, as it would make wrong predictions; third, the earlier accounts of the variable-force effect proposed in the literature do not apply to Old English *motan either.

5. Collapse variable force and other cases of inevitable actualization semantics

In this section, I discuss the relations between my collapse variable-force analysis for *motan and three different areas of modal semantics: 1) actuality entailments; 2) semantics
of ability\(^{25}\) and 3) acquisitive modality in languages spoken around the Baltic Sea. In all three cases, semantic elements are used that are very close to the ones we employed in the analysis of Alfredian *motan*: possibility implying actualization, and setting a course of events without there being any possible alternatives. But the way those components are brought together in the lexical meanings, and the particular flavors involved, differ in all four cases. This section is thus a brief study of three phenomena that are close enough to collapse variable-force modality that one might try to see if they are the same, — but which all turn out to be quite different from Alfredian *motan* in the end.

5.1. **Collapse variable force and actuality entailments.** Recall our collapse semantics for Alfredian *motan*: the presupposition says that all possible developments of the evaluation world worlds are either all \(p\) or all \(\neg p\); the assertion says that some of them are \(p\); it follows that in fact all of them are \(p\). Thus the modal claim entails actualization of \(p\).

That effect is similar on the surface to actuality entailments of non-epistemic modals, cf. Hacquard (2009), a.o. As argued by Hacquard, actuality entailments arise when a non-epistemic modal appears under perfective aspect. In such a configuration, it is implied that \(p\) that is the argument of the modal has actually occurred:

\[
\text{(38)} \quad \text{Pour aller à Londres, Jane a pu prendre le train.}
\]

lit. 'To go to London, Jane was able to take the train.'

but can’t be followed by ‘...but he actually didn’t.’

In both the collapse case and the actuality entailment case, the argument situation \(p\) of the modal is implied to actualize. However, the conditions under which that happens differ in the two cases. First, actuality entailments only arise in perfective environments, while the effects of collapse variable-force do not depend on the tense-aspect form of the modal. Second, modal statements with actuality entailments do not presuppose anything about

\(^{25}\)I owe the clarification of those two connections to discussions with Paul Portner and Irene Heim and to the comments of an anonymous reviewer.
the context: they may be made regardless of any prior assumptions about the actualization of \( p \). So while the end effect is similar in the two cases, the conditions under which it arises are different, and thus the mechanism by which it comes through is likely to be different as well.

5.2. **Collapse variable force and ability modals.** Ability modals as in ‘Mary can swim’ look like possibility modals in many respects. For example, ability markers often serve as circumstantial-\( \Diamond \) markers as well, as English can and be able do. Moreover, ability modals do not make the scheme \( \text{Op}(p) \wedge \text{Op}(\neg p) \) a contradiction, which makes sense if they are \( \Diamond \)s: in logic, \( (\Diamond p) \wedge (\Diamond \neg p) \) is a contingent statement that can be true or false, but \( (\Box p) \wedge (\Box \neg p) \) may be true only if there are no accessible worlds whatsoever. Ability can behaves as a \( \Diamond \) in this respect:

\[
(39) \quad \text{Mary can swim (which not everyone can), and of course Mary can [not swim], too (just as virtually every human).}
\]

But there are also properties of ability modals that make them not so similar to other \( \Diamond \)s. In particular, they give rise to entailments as in \( \text{40} \). An overview of related phenomena and their treatment in the literature may be found in [Portner 2009, Sec. 4.4.1], who writes that current approaches to such facts ‘are alike in combining some sort of existential quantification, corresponding to the idea that the agent chooses an action, and some sort of universal quantification, corresponding to the idea that the action guarantees a certain outcome’.

\[
(40) \quad \text{Mary can swim.} \\
\Rightarrow \text{Whenever Mary wants to (and the circumstances are normal), Mary will swim.}
\]

The form of the inference in \( \text{40} \) is structurally similar to our presupposition of collapse variable force. Informally, the ability inference says that if an action is enabled by the agent’s desires, the action will actualize. The collapse presupposition says that if the action
is enabled by the way the world is, it will actualize. The status of the two statements is
different: one is entailment, another a presupposition; the nature of the enabling is also
different — for ability modals it’s the agent’s attitude, while for our collapse presupposition
it’s the way the world objectively is. But the overall schema is similar.

So both in the case of actuality entailments and that of ability modals, what we are
seeing is semantic building blocks similar to the ones used in the collapse presupposition,
but employed differently, to produce different meanings.

5.3. Collapse semantics around the Baltic Sea? In the languages spoken around the
Baltic Sea, there exists an areal phenomenon of ACQUIsite MODALITY, cf. van der Auw-
era et al. (2009), a.o. Verbs with the basic meaning ‘get’ in those languages acquired
modal meanings as well, and have been described as sometimes conveying possibility, and
other times necessity. Such get-modals include: Norwegian få (Askedal (2012)), Swedish
Estonian saama (Tragel and Habicht (2012)), Latvian dabūt (Daugavet (2014)), as well as
modals in other Finno-Baltic and Baltic languages.

From the descriptions in the secondary literature, it may seem as if some of those get-
modals have semantics similar to the semantics of collapse variable force. If that were the
case, we could have used data from the Baltic-Sea languages to shed further light on OE
*motan. Consider, for example, what Kangasniemi (1992) writes on Finnish saada:

‘One motivation for the use of saada in expressions of necessity may be the
speaker’s or writer’s pursuit of irony, stating that the actor has the possibility
of doing something that he or she does not want to, and moreover, that all
other possibilities are excluded.’ (Kangasniemi (1992), p.62); [emphasis mine]

And from the following description, it may seem as if there is no real ambiguity in Finnish
saada:
(41) **Saa-t lähteä matkalle taivaaseen.**  
SAADA-2SG go trip.textscAll heaven.ILL  
‘You may/have to set out for your trip to heaven.’

‘The interpretation of [41] depend[s] on whether the agent wants to perform the act or not, i.e. whether the addressee of sentence [41] wants to go for a trip to heaven <...>. Thus sentence [41] could be interpreted as permission in a religious context (which was in fact the case) but as an obligation or a threat in James Bond adventure.’ (Kangasniemi, 1992, p.322-3)

Kangasniemi’s description suggests that *saada*(p), at least in this case, simply signals that the future is determined in a particular way, and the choice of a translation equivalent depends on the perception of that determined future as desirable or undesirable. That looks somewhat similar to *motan*(p), which according to our analysis entailed the absence of alternatives for *p*.

(Viberg, 2002 p.132-3), who at the time apparently was not aware of Kangasniemi’s work on Finnish, describes Swedish modal *få* very similarly:

Which alternative applies is a pragmatic question. <...> In the following example [42], Obligation is the correct interpretation, and this is also reflected in the English translation. The passage is taken from a novel (P.C. Jersild: *Babels hus* 1985) and describes what happens when someone arrives at a hospital. The presupposition is that someone who feels ill wants to stay at the hospital:

(42) **Den som inte är sjuk är följaktligen frisk och få åka hem igen.**  
‘The person who is not ill is consequently well and has to go back home.’

In the following example [43] taken from the same novel, another patient wants to leave the hospital after an operation. In this case, Permission is the appropriate interpretation, which is reflected in the translation:
(43) Han skulle förmodligen snart få åka hem.

‘He would presumably be allowed [(to) go] home soon.’

Again, this explanation seems to feature components similar to the parts of our collapse variable-force analysis. There is a fixed course of events, and the translation equivalent of the modal depends on the perception of that course of events. In Old English, we could see that as well: *motan would be considered a possibility modal when the argument situation was desirable, as in [1] or [5], and a necessity modal when the situation is undesirable, [2] and [11]. But I argued that in both cases we are dealing with the same semantics that ultimately conveys that there is a single alternative in the metaphysically accessible set of worlds.

So the question is whether Baltic-Sea aquisitive modals indeed have collapse variable-force semantics, or not. If they did, we would expect those aquisitive modals not to appear in those cases where their argument \( p \) is an open possibility (circumstantially, metaphysically or deontically), but where it is not assumed that \( p \) would necessarily actualize if it’s given a chance. We can test this prediction both using speaker’s judgments and naturally produced texts, and it turns out that at least in Norwegian, Swedish, Finnish and Estonian, get-modals behave differently from Alfredian *motan.

Imagine that John, an adult host, is explaining to Robin, a child, what she can and cannot do while she is at this house. There are multiple possibilities. She can play in the garden, and she can also watch cartoons in the room. Those are possible (both in the deontic and in the circumstantial/metaphysical sense), but it’s not assumed that Robin will necessarily engage in one or another. The presupposition of inevitable actualization thus does not hold. Yet Norwegian få (which seems to be deontic) and Estonian saama (circumstantial) are good in this context (and Finnish deontic saama is good as well)\(^{26}\).

(44) Estonian saama:

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\(^{26}\)I am grateful for the judgements to Atle Grønn, Andres Karjus and Lauri Karttunen.
"You have the possibility to play in the garden. You can also watch cartoons over there."

(45) Norwegian **få**:

Du **får** leke i hagen. Du **får** også se tegnefilmer der.

'You may play in the garden. You may also watch cartoons over there.'

We can also find naturally occurring examples where it is clear that despite the possibility for $p$ is declared to be open, it is not assumed that it would be necessarily used. With Finnish **saada** in (46) it is clearly not presupposed that every teenager will work right after they get the right to. (The rest of the text describes other legal rights and restrictions — e.g., the age when a person can get a driver’s license, etc.) With Swedish **få** in (47) the relatives of immigrants are clearly not legally obliged to take the integration courses.

(46) Finnish **saada**:

Si-nä vuon-na, kun nuori täyttä-ä 14 vuot-ta, häne-t saa that-ESS year-ESS, when young fill-3SG 14 year-PART, they.3SG-ACC saada.3SG otta-a kevye-en työ-hön.

take light-ILL work-ILL

"In the year when the young person gets 14 years, it is allowed to take him into light work."


(47) Swedish **få**:

Anhöriginvandrare får också gå kurs i samhällsorientering

immigrant.relatives få also go course in civic.orientation
‘Dependents of immigrants may also take courses in integration into the society.’

from http://www.vartgoteborg.se/prod/sk/vargotnu.nsf/1/ovrigt,anhoriginvandrare_far_ocksa_ga_kurs_i_samhallsorientering

Thus whatever the proper semantics for Baltic-Sea acquisitive modals is (and it must be different for different get-modal modals, at the least because even directly cognate ones may show different sets of modal flavors), that semantics is not the collapse semantics I proposed for Alfredian *motan. This leaves the Old English word for now without direct analogues in living languages.

6. Conclusion

I have proposed a new analysis of the semantics of *motan in Alfredian Old English, arguing that it was a non-ambiguous variable-force modal. I derived the variable-force effect from the presupposition in [16] which forces possibility and necessity collapse in the set of worlds quantified over by the modal. This type of variable-force effect has not yet been observed, so Alfredian OE makes the typology of possible variable-force modals richer. Apparently there exist very many ways in which a variable-force effect may arise: the variable-force modals of Stát’imcets, Gitksan, Nez Perce, and Alfredian Old English, as well as the get-modal modals of the Baltic-Sea languages, seem all to show important distributional differences.

By the Early Middle English period, *moten turned from a non-ambiguous variable-force modal into one ambiguous between various possibility and necessity readings. I have shown, using evidence from Late Old English, that the rise of necessity readings for *motan/ *moten can be explained well if we assume the proposed variable-force semantics for the earlier period.

Comparing the collapse semantics for *motan with the semantics of (i) actuality entailments, (ii) ability modals, and (iii) Baltic-Sea get-modal modals, we have seen how the semantic
components of our meaning may occur in other linguistic constructions, though in different combinations and to a different end. This can be taken as evidence that our collapse semantics is natural, in the sense that it uses elements that are independently needed for the analysis of other natural-language phenomena.

The evidence supporting the new semantics for Alfredian *motan notwithstanding, may it be that I have argued for a wrong proposal after all? As is always the case in empirical sciences, it may. There is plenty of evidence that may in the future falsify the theory proposed here. First, I have not examined the whole corpus of early and late Old English writing, which features quite a number of instances of *motan. Second, there is data from other early Germanic languages: *motan’s cognates are reasonably widely used in Old Saxon *Heliand, as well as in some of the Old High German sources. Third, later on German müssen was borrowed by Old Czech and Old Polish, and studying that process could provide additional insights into the semantics of the modal in the Germanic. If my proposal is on the right track, one should be able to eventually fit all those data together within a single general theory. Thus fortunately, there are many ways in which future research can falsify or further support the variable-force theory of *motan proposed in the current paper.

References


Drawing on the uncompleted edition by E.J.Dobson, with a glossary and additional notes by Richard Dance.


