

Modal Concord as Modal Modification

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1 Introduction

When certain speaker-oriented adverbs (to use the terminology of Ernst 2007, 2009 and references therein) appear with modal verbs, they do not contribute separate modal force to a sentence, despite their ability to do so independently.

- (1) a. John (definitely) must be home.
b. John is definitely home.

- this phenomenon has been dubbed *modal concord* (Guerts and Huitink, 2006)

The three types of available analyses:

- (i) semantic analysis I (Guerts and Huitink, 2006): ABSORPTION of one modal quantifier into the other under identity

- (2) ABSORPTION: $[[\text{adv modal}]] = [[F(\text{adv}) \text{ modal}]] = [[\text{adv}]]$

- F is a covert operator that requires identity between $[[\text{adv}]]$ and $[[\text{modal}]]$, that is: $[F] = \lambda M'_{st,st} \lambda M_{st,st} : M = M'. M'$

- (ii) syntactic analysis (Zeijlstra, 2008): SYNTACTIC AGREEMENT between a probing modal operator (the adverb) and an expletive goal (the modal)

- (3) SYNTACTIC AGREEMENT: $[\text{OP}_{i\forall, iDeon} \text{ must}_{u\forall, uDeon} [\text{John be home}]]$

- (iii) semantic analysis II (Huitink, 2008): ORDERING SOURCE for modal operator with selectional features

- (4) $[\text{obligatorily}_{u\forall}] = \lambda w \lambda p. p$ is obligatory in w .

Five important properties of modal concord:

- FORCE: Matching in quantificational force

- (5) a. We can legitimately deny your request.

- b. *We must / have to legitimately deny your request.
(this is felicitous on the non-concord, manner reading in which the denial has to be done in a legitimate manner)

- NEGATION: Interaction with negation (cf. Grosz 2008)

- (6) a. John $\left\{ \begin{array}{l} \text{obligatorily} \\ \text{*legitimately} \end{array} \right\}$ cannot be home.
b. John cannot $\left\{ \begin{array}{l} \text{*obligatorily} \\ \text{legitimately} \end{array} \right\}$ be home.

- STRENGTHENING: certain modal concord adverbs strengthen meaning (cf. Grosz to appear)

- (7) a. There is no choice, he absolutely must stay in the lineup.
b. It probably wouldn't make sense for a college professor, but absolutely might make sense for a bus driver.

- VERIDICALITY ([tentative discussion only]): Deontic adverbs w/o modal are veridical operators (Wyner, 1994)

- (8) We legitimately denied your request.
'There was an event of request denial, e , which was legitimate.'

- BARE ADVERB ([tentative discussion only]): \forall adverbs marked without modal

- (9) a. *John obligatorily denied your request.
b. John must obligatorily deny your request.

Problematic for absorption analyses:

- not clear how absorption interacts with negation
- absorption under identity seems to be incompatible with strengthening
- not clear how bare adverb restrictions are derived [part of this is also problematic for our proposal]

Problematic for syntactic analyses:

- not clear how the negation facts, (seemingly) semantic in nature, are derived
- not clear how strengthening is derived

Our proposal: modal concord is *modal modification* by the adverb in question.

- syntactically: adverb modifies modal verb, capturing the lack of BARE \forall ADVERBS
- semantically: adverb contributes own modal quantification on modal's domain
- FORCE is product of implicature conflict: \exists implicates $\neg\forall$, conflicts with \forall in other quantifier
- VERIDICALITY comes from treatment of modal adverbs as event modifiers (following Rawlins 2008) – although an account of modal adverbs as PPIs along the lines of Nilsen (2004) and Ernst (2009) might ultimately be more adequate for the entire range of speaker-oriented adverbs

A more general question: What are the interactions between modals and adverbs in general? Are the restrictions on force (Q) and modal flavor (F) universal or part of a broader typology?

- ATTESTED restrictions: $Q \wedge F$, F , none
- UNATTESTED so far: Q
- these argue for a richer approach to concord phenomena in the modal domain

Road map:

- basic facts of modal concord; analysis in terms of modification
- capturing the behavior of negation
- varieties of modal concord – we focus on three adverbs: *absolutely*, *legitimately* and *legally*

2 A first take on modal concord

2.1 The Basic Facts

Guerts and Huitink (2006): modal concord is sensitive to both modal flavor and modal force.

- modal force mismatches yield ungrammaticality

$$(10) \quad \text{John} \left\{ \begin{array}{l} \text{perhaps}_E \text{ might}_E \\ \text{*perhaps}_E \text{ must}_E \end{array} \right\} \text{ be home.}$$

- modal flavor mismatches – in particular, E (pistemic) and D (eontic) – are grammatical only when the adverb is epistemic

$$(11) \quad \begin{array}{ll} \text{a.} & \text{John} \left\{ \begin{array}{l} \text{*must}_E \text{ obligatorily}_D \\ \text{definitely}_E \text{ must}_D \end{array} \right\} \text{ be home.} \\ \text{b.} & \text{John} \left\{ \begin{array}{l} \text{*might}_E \text{ allowably}_D \\ \text{possibly}_E \text{ may}_D \end{array} \right\} \text{ be home.} \end{array}$$

- if the adverb is E and the modal verb is D , there is no concord – this is stacking of two independent modal quantifications, one on top of the other
- modal and adverb must be clausemates (Zeijlstra, 2008; Huitink, 2008)

$$(12) \quad \begin{array}{ll} \text{a.} & \text{John must obligatorily be home by 12.} \\ \text{b.} & \# \text{John must be home by the time the clock obligatorily strikes 12.} \end{array}$$

- this is a manifestation of a general restriction on adjunct modifiers

$$(13) \quad \begin{array}{ll} \text{a.} & \text{John was needlessly home by twelve.} \\ \text{b.} & \# \text{John was home by the time the clock needlessly struck 12.} \end{array}$$

- **Note:** modal concord with epistemics is derivable from the introspection principles on two epistemics (Guerts and Huitink, 2006); we will therefore focus on deontics and circumstantials.

2.2 Analysis

Main proposal: concord adverbs are modal modifiers that assert their own modal claims about the proposition in question.

- syntactic simplification: assume LF where modals and concord adverbs are sisters (subject to clausemate condition above)

$$(14) \quad [[\text{adv modal}] f_{\text{modal-base}}] \text{ proposition}$$

- modal verbs have their usual denotations (Kratzer, 1977, 1981) (we specify only the modal base f for expository simplicity)

$$(15) \quad [\text{must}] = \lambda w \lambda f_{s, \langle st \rangle t} \lambda p_{st} \cdot \bigcap f(w) \subseteq p$$

$$(16) \quad [\text{can/may}] = \lambda w \lambda f_{s, \langle st \rangle t} \lambda p_{st} \cdot \bigcap f(w) \cap p \neq \emptyset$$

- modal adverbs predicate their own modal claim about the argument proposition p , which they ‘share’ with the modal verb
- the modal claim is parametrized by the *common* modal base f , which the adverb may make demands on

- (17) $[\text{obligatorily}] = \lambda M_{s, \langle \langle s, \langle st \rangle t \rangle, \langle st \rangle t \rangle} \lambda w \lambda f_{s, \langle st \rangle t} \lambda p_{st} : f \text{ is deontic.}$
 $M(w)(f)(p) \wedge \bigcap f(w) \subseteq p$
- (18) $[\text{legitimately}] = \lambda M_{s, \langle \langle s, \langle st \rangle t \rangle, \langle st \rangle t \rangle} \lambda w \lambda f_{s, \langle st \rangle t} \lambda p_{st} : f \text{ is deontic.}$
 $M(w)(f)(p) \wedge \bigcap f(w) \cap p \neq \emptyset$

- modal base presuppositions capture concord in modal flavor; does not capture FORCE agreement
 - existential adverbs could still modify universal modals and vice-versa
- formal featural matching (Zeijlstra (2008); Huitink (2008)) [adverbs specified for syntactic force feature] is redundant and makes incorrect predictions for cases with negated modals (6)

Proposal: contradiction arises from clash of \forall assertion and $\neg\forall$ implicature triggered by the \exists assertion.

- (19) a. *We must legitimately deny your request.
 b. **ASSERTION from modal:**
 $\bigcap f(w) \subseteq \{w : \text{request denied in } w\}$
 c. **ASSERTION from adv:** $\bigcap f(w) \cap \{w : \text{request denied in } w\} \neq \emptyset$
 d. **IMPLICATURE from adv:**
 $\bigcap f(w) \cap \{w : \neg \text{request denied in } w\} \neq \emptyset$

Why isn't the implicature cancelled?

- Option #1: forcible exhaustification in compositional process
- (20) $[\text{legitimately}] = \lambda M_{s, \langle \langle s, \langle st \rangle t \rangle, \langle st \rangle t \rangle} \lambda w \lambda f_{s, \langle st \rangle t} \lambda p_{st} : f \text{ is deontic.}$
 $M(w)(f)(p) \wedge \bigcap f(w) \cap p \neq \emptyset \quad \wedge \quad \bigcap f(w) \cap \bar{p} \neq \emptyset$
- but this predicts that the implicature is uncancellable with an adverb, true for *optionally* / *freely* but not *legitimately*
- (21) a. We can legitimately deny your request. In fact, we have to.
 b. We can $\left\{ \begin{array}{c} \text{optionally} \\ \text{freely} \end{array} \right\}$ deny your request. *In fact, we have to.
- Option #2: cancellation is only available during subsequent discourse update, not in one simple assertion¹

- this constraint is also active in the individual domain, suggesting that a domain-neutral pragmatic procedure is at work

- (22) Boys will $\left\{ \begin{array}{c} \text{*sometimes} \\ \text{always} \end{array} \right\}$ be boys.

- (23) a. *Most dolphins are dolphins.
 b. Every dolphin is a dolphin.²

- two ways of making sense of such a constraint
 - every sentence is a package of proposals (on different meaning dimensions: pre-suppositions, assertions / at-issue content and implicatures) to update the current state of the conversation and the package should be internally consistent since the best possible future for the communicative act (as far as the agent proposing it is concerned) is to be accepted in its entirety, in which case all these dimensions will end up being integrated and predicated of the same world
 - in terms of Hurford cases like (24) (Hurford 1974, generalized in Gazdar 1977); such cases are directional since (25) is acceptable, while modal concord cases are not directional – but since the modal verb and the modal adverb make their contributions to the meaning of the sentence simultaneously, we could argue that we need to check both directions and one of them will always be a Hurford kind of case

- (24) You must take out the trash. #In fact, you can.

- (25) You can take out the trash. In fact, you must.

3 Negation

- negation inverts FORCE, allowing the dual deontic adverb over modal+negation³

- (26) a. John $\left\{ \begin{array}{c} \text{obligatorily} \\ \text{*legitimately} \end{array} \right\}$ cannot be home.

- b. John cannot $\left\{ \begin{array}{c} \text{*obligatorily} \\ \text{legitimately} \end{array} \right\}$ be home.

- (27) a. John $\left\{ \begin{array}{c} \text{*obligatorily} \\ \text{legitimately} \end{array} \right\}$ need not be home.

- b. John need not $\left\{ \begin{array}{c} \text{obligatorily} \\ \text{*legitimately} \end{array} \right\}$ be home.

²Examples (23-a) and (23-b) are from Brasoveanu (2006), where they are attributed to R. Schwarzschild.

³This is the reason for the contrast from Høye (1997) that Huitink (2008) discusses:

- (i) a. I can't possibly eat any more. *concord*
 b. You possibly can't eat any more. *stacking*

¹This procedure is clearly not in force for other modifiers:

- (i) John slipped without actually falling.

- when negation scopes over a modal (26-a), it allows the dual deontic adverb to scope over the modal+negation constituent
- the adverb can also scope ‘between’ negation and modal (26-b)

Proposal: negation acts as a dual operator on the modal, operating above or below the position of the adverbial modifier.

(28) *obligatorily cannot* — LF: [obligatorily [DUAL can]]

(29) *cannot legitimately* — LF: [DUAL [legitimately can]]

- e.g., $\text{DUAL}([\text{can}]) = [\text{must}]$

(30) $[\text{obligatorily} [\text{DUAL can}]] = \lambda w \lambda f_{s, \langle st \rangle t} \lambda p_{st} : f \text{ is deontic.}$
 $\text{DUAL}([\text{can}])(w)(f)(p) \wedge \bigcap f(w) \subseteq p$

In addition to this DUAL operator, we need to assume that a propositional negation, i.e., the usual complementation operation over sets of worlds (independently needed for run-of-the-mill declarative sentences), is syntactically present and takes scope over the sentence radical.

(31) *John obligatorily cannot be home* —
 LF: [obligatorily [DUAL can]] [NEG [John be home]]

(32) $[\text{NEG}] = \lambda p_{st} \lambda w. \neg p(w)$

- Evidence #1:
 - (a suitable generalization of) propositional negation enables us to account for modal subordination examples like (33)
 - but: there is no parallel ‘propositional’ reading for cases of modal negation like (34)

(33) Bill doesn’t have a car. It would be parked in front of the house.

–✓if Bill had a car, it would be parked in front of the house.

(34) Bill couldn’t possibly have a car. He wouldn’t have anywhere to park it.

–✓if Bill had a car, he wouldn’t have anywhere to park it.

–#if Bill could have a car, he wouldn’t have anywhere to park it.

- Evidence #2: the relative scope of negation and various modals is lexically specified – this kind of interaction supports the idea that negation interacts in a specific way with modals

- which we can model as the lexically specified presence vs absence of the DUAL operator

(35) You needn’t leave. $\text{DUAL}(\forall) \text{ NEG}(\text{you leave})$

(36) You mustn’t leave. $\forall \text{ NEG}(\text{you leave})$

(37) You can’t go home for Thanksgiving. $\text{DUAL}(\exists) \text{ NEG}(\text{you go home})$

(38) You can’t not go home for Thanksgiving. $\text{DUAL}(\exists) \text{ NEG}(\text{NEG}(\text{you go home}))$

4 Widening the net

Broader project: an empirical (corpus-driven) investigation of the lexical semantics of modal adverbs and their meaning-based classification and distribution.

More specifically:

- A.** the semantic typology of modal adverbs in terms of their concord properties, i.e., concord with respect to:

- both modal base / ordering source and modal force, e.g., *legitimately*
- modal base / ordering source only, e.g., *legally*
- modal force only (not attested as far as we know)
- neither, e.g., *absolutely*

- B.** the range of readings modal adverbs can have besides their modal concord readings – and whether we should provide a unified account of (a subset of) these readings:

- additional readings for *legally*: domain, means-domain, manner, clausal
- additional readings for *legitimately*: manner, clausal
- additional readings for *obligatorily*: ‘result’

- C.** semantic constraints on modal bases / ordering sources:

- [relatively unstudied] contributed by adverbs, e.g.:
 - * *potentially* can be epistemic or circumstantial, but not deontic (note that it cuts across the usual epistemic vs root classification of modals)
 - * *barely, scarcely, hardly*: circumstantial and existential only
- [better studied] contributed by modal verbs, e.g., *might* is epistemic only

Most of the examples and statistics in the remainder of this section are from the Corpus of Contemporary American English (COCA, www.american Corpus.org).

- a large, balanced corpus of 385 million (M) words that includes 20M words each year from 1990-2008, divided among spoken, fiction, popular magazines, newspapers and academic texts (78.8M, 74.9M, 80.7M, 76.3M and 76.2M, respectively)

Ideally, we would examine all the following combinations of modal adverbs and modal verbs (with the modal verbs either negated or not negated).

Modal verbs						
1. can	2. could	3. may	4. might	5. must	6. should	7. have to

Modal adverbs						
1. absolutely	2. accidentally	3. apparently	4. arguably	5. barely	6. certainly	7. clearly
8. conceivably	9. definitely	10. easily	11. hardly	12. honestly	13. ideally	14. just
15. legally	16. legitimately	17. literally	18. maybe	19. necessarily	20. obligatorily	21. obviously
22. mandatorily	23. perhaps	24. plausibly	25. possibly	26. potentially	27. practically	28. probably
29. reasonably	30. scarcely	31. simply	32. surely/for sure	33. theoretically	34. truly	35. (very/damn) well

We will discuss only three adverbs (and rather briefly): *absolutely*, *legitimately* and *legally*.

4.1 *Absolutely, Definitely* and relatives

- *absolutely/definitely* are both force and flavor neutral

- (39) a. There is no choice, he absolutely must stay in the lineup.
b. Yes, sir, you absolutely may.
c. It probably wouldn't make sense for a college professor, but absolutely might make sense for a bus driver.⁴

Grosz (to appear) (cf. also Huitink 2008):

- good account of *absolutely*, which is force-neutral and selects strongest meaning on the modal base / ordering source scale
 - but: no formal account of concord with respect to modal force; seems to presuppose something like the present account
 - therefore: (it seems) no account for the fact that *absolutely* strengthens the meaning differently when it combines with an existential vs an universal modal
 - existential: choose the smallest modal base $\bigcap f(w)$ (i.e., the largest set of propositions $f(w)$), so that $\bigcap f(w) \cap p \neq \emptyset$ is as strong as possible
 - universal: choose the largest modal base $\bigcap f(w)$ (i.e., the smallest set of propositions $f(w)$), so that $\bigcap f(w) \subseteq p$ is as strong as possible
 - the meaning of *absolutely* is:
 - similar to *regardless of circumstance* and *without exception*
 - possibly similar to *single* in the individual domain – compare with *every single student* and *a single student*
 - *definitely* seems to be interpreted in the same way:
 - when something is not just allowed, but *definitely* allowed, it is allowed under a subset of the deontic worlds (e.g., those where there are no bad consequences)
 - with universals, *definitely* goes for a superset of the deontic worlds
- (40) You can / must definitely come in now.
(vs: You can / must come in now.)
- (41) If you come to Monterey, you can / must definitely stay with Craig.
(vs: If you come to Monterey, you can / must stay with Craig.)

⁴www.capitalgainsandgames.com/blog/stan-collender/1052/keith-hennessy-only-asks-part-health-care-reform-question

Generalization: *certainly, definitely, absolutely, really* and *for sure* pick out the strongest meaning.

- this makes them similar to the German particles *ja*, *bloß* and *ruhig* discussed in Grosz (2008) and to the Romanian particle *liniștit* (the counterpart of *ruhig*)
- the difference is that the English adverbs are compatible with both existential and universal force, while the German and Romanian particles exhibit modal force concord – *ja* and *bloß* require universal force, while *ruhig* and *liniștit* require existential force

Importantly, the modal meaning strengthening contributed by the English adverbs is local, i.e., it targets the modal verb only:

- (42) Each person who could definitely [i.e., without repercussions] stay with Craig stood up.
- (43) Each person who definitely had [was maximally obligated] to stay with Craig stood up.

The locality of the strengthening effect makes all these adverbs similar to *legally*, in that they target the modal quantification contributed by the modal verb only, irrespective of the larger (quantificational) context in which the modal verb appears.

4.2 Legitimately vs Legally

- we have claimed that *legitimately* and *legally* show different force requirements, motivating different adverbial semantics:
 - *legitimately*: concord with respect to both flavor (modal base / ordering source) and modal force (existential)
 - *legally*: concord with respect to flavor only
- (44) a. We may $\left\{ \begin{array}{l} \text{legally} \\ \text{legitimately} \end{array} \right\}$ deny your request.
- b. We must $\left\{ \begin{array}{l} \text{legally} \\ \text{*legitimately} \end{array} \right\}$ deny your request.
- we should thus see this in corpus investigation

We construct a 2×2 contingency table to contrast the behavior of *legitimately* and *legally* with respect to existential modals (*can*, *could*, *not have to*) vs universal modals (*can't*, *couldn't*, *must*, *have to*).

(45)

	<i>legitimately</i>	<i>legally</i>
existential	266	658
universal	26	257

- (46) Pearson's χ^2 test with Yates' continuity correction yields a highly significant *p*-value:
 $\chi^2 = 44.3213$, $df = 1$, $p\text{-value} = 2.787e - 11$.

As expected, the *legitimately*+universal cell contributes the most to the χ^2 value:

(47)

χ^2 contributions	<i>legitimately</i>	<i>legally</i>
existential	8.066654	2.574277
universal	26.337768	8.405058

Prediction: *legitimately* should be able to appear below negation with existentials

- no examples in COCA with \forall concord
 - 4 examples in COCA with $\neg\exists$ concord
- (48) a. Because of widespread corporate belt-tightening, you can't legitimately sum up career status with salary ranges and promotions anymore.
- b. The state can't legitimately cut \$700 million.
- c. They couldn't legitimately take pride in it.
- d. I thought music would articulate that which you couldn't legitimately articulate in dialogue.

5 Conclusion

- modal concord in deontic environments arises because the deontic adverb is a modifier that makes its own ancillary modal claim
- while modal flavor consonance is grammatically determined, we take agreement in modal force to be a pragmatically mediated phenomenon
- we think that the investigation of the standard cases of modal concord should be analyzed only as part of a broader (corpus-driven) investigation of the lexical semantics of modal adverbs and their meaning-based classification and distribution

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A More on the semantic typology of modal adverbs

A.1 Legally

Legally in its modal use

- *legally* is like *absolutely* with respect to modal force, i.e., neutral, but has a deontic flavor requirement:
- (49) a. The Boy Scouts claim they are a private organization and legally may set their own standards for membership.
b. Again, we remind you that Ted Kaczynski has not gone on trial yet, so legally he must still be presumed innocent.
- note that *legally*'s effect is not clause bounded, even by evidential attitudes (Simons, 2007)
- (50) Legally, I think you could probably chew her up [for her testimony].
- this is in line with the behavior of conditional antecedents noted by Iatridou (1991)⁵ ...
- (51) a. If he hurries, then I suspect that John can be out by noon.
b. Whether or not he hurries, I suspect that John can be out by noon.
c. To get to Harlem, I suspect that John needs to take the A-train. (K. Rawlins, p.c.)
- ... and in sharp contrast with *legitimately*
- (52) a. *Legitimately, I think you could probably chew her up.
b. *Legitimately, I suspect that John can be out by noon.
- this suggests that *legally* can be assimilated to a domain restrictor (like conditional antecedents), but *legitimately* should not be

Legally in its extensional uses

- in extensional contexts, *legally* has several interpretations (cf. Ernst 2002)
- (53) a. DOMAIN (alters the domain with respect to which the predicate is evaluated)
No laws had been broken, and, after all, David was legally an adult.
b. MEANS-DOMAIN (specifies domain of manner of accomplishment)
There's little the besmirched can do legally, unless there are children involved.
c. MANNER
I mean, we do everything legally.

- d. CLAUSAL (comment on nature of event property)
Legally, it's used as an anesthetic.

- should these uses be unified? should these uses be unified with modal concord uses?
 - attempts at unification between MANNER and CLAUSAL
 - EVENT MODIFIER: difference correlated with sub-event modification (Wyner, 1994)
 - TYPE-SHIFTING: propositional operator coerced to event property operator (Rawlins, 2008)
 - DOMAIN RESTRICTION: different readings due to contextually-provided eventuality domains that restrict the adverb (cf. Ernst 2002)
 - virtues of event modifier and type-shifting: correlations between adverb position and interpretation
- (54) a. Legally, Alfonso moved the pawn.
'Alfonso moved a pawn, and all such pawn-moving events by him are permitted.'
b. Alfonso moved the pawn legally.
'Alfonso moved the pawn in a manner which was permitted.' (Rawlins, 2008)
- problem for EVENT MODIFIER (and TYPE-SHIFTING): both interpretations possible under ellipsis, though these should pattern with, e.g., *almost*
- (55) a. I almost crossed Antarctica because my father did.
'I almost started because he almost completed crossing Antarctica.'
b. I almost crossed Antarctica because my father almost did.
above reading possible: 'I almost started because he almost completed crossing Antarctica.'
- but multiple readings of *legally* are more permissive:
- (56) I moved my pawn illegally because you did.
'I moved my pawn in an illegal fashion (3 squares at a time) because you should not have moved your pawn at all.'
- this seems to favor a DOMAIN RESTRICTION analysis, which involves a proform of sorts that can have sloppy readings
- (57) I wanted to use my computer because you wanted to. (use my / your computer)
- should the DOMAIN RESTRICTION analysis be extended to covers the cases in which *legally* interacts with modals?

⁵We are indebted to Kyle Rawlins for noticing this connection.

- perhaps because modal use is actually on par with DOMAIN – note that domain *legally* can cross evidential attitudes, unlike the other two uses:

- (58) a. Legally, I think it could make a very big difference.
b. #Illegally, I think that he moved the pawn.

A.2 Legitimately

- assimilation of concord readings to domain readings is challenged by *legitimately*, which has no domain interpretation, but has manner and clausal interpretations

- (59) a. MANNER
Some did finally give up the ghost legitimately, but others doubtless were scuttled.
b. CLAUSAL
Someone who invites you to lunch legitimately wants to get to know you.

- the clausal reading of *legitimately* also appears above \forall deontic propositions (CLAUSAL STACKING)

- (60) Legitimately, you can't / must not marry your sister (there would be massive in-breeding otherwise).

- (61) ...the United States legitimately must question the intent of such provocative acts.

- (60) comments on the (teleological) legitimacy of the law in question, (61) on a foreign policy decision

Positional variation in availability of clausal reading; consider (62), (63), (64) and (65).

- CLAUSAL STACKING requires position before modal (62), (63)

- (62) Legitimately, the doctor can opt for more dangerous options.
stacking: 'That the doctor may pursue dangerous options is a legitimate rule.'
concord: 'The doctor is allowed to pursue more dangerous options according to some code of laws/ethics.'

- (63) The doctor legitimately can opt for more dangerous options.

- placement below modal receives only a concord reading

- (64) The doctor can legitimately opt for more dangerous options.
'The doctor is allowed to pursue more dangerous options according to some code of laws/ethics.'

- right-edge allows concord and manner interpretations

- (65) The doctor can opt for more dangerous options legitimately.
'The doctor is allowed to pursue more dangerous options according to some code of laws/ethics.'
'The doctor is allowed to pursue more dangerous options via a method in accordance with some code of practices.'

- the facts for *legally* are parallel, suggesting the same families of constraints
 - so, it seems that modal concord is not a species of DOMAIN
 - but there seems to be a close connection between MANNER, CLAUSAL and modal concord uses

A.3 Obligatorily / Mandatorily

Distribution

We conclude with a look at *obligatorily* and *mandatorily*, which we claimed are not available in episodic environments.

There are only 16 tokens in COCA, classified as follows.

(66)

	modal	habit	modifier	event
<i>mandatorily</i>	1	3	2	1
<i>obligatorily</i>	0	5	2	2

- categories:
 - *modal* and *habit* cover the cases in which the adverbs co-occur with an independent modal quantifier
 - *modifier* indicates that the adverbs modify a non-verbal predicate
 - *event* indicates that the adverb modifies an event-denoting verbal predicate that is not otherwise modalized
- both cases in which *obligatorily* modifies an eventive predicate that is not otherwise modalized involve *verba dicendi*
 - *obligatory* is interpreted as a comment on the relevant speech act, which has to happen in view of some previously accepted conversational script that applies to the conversation at hand
 - i.e., *obligatorily* never has a MANNER reading in these cases

- (67) "We know it's not the Nobel, of course," he added obligatorily with a self-conscious and revealing laugh, "but still everyone gets excited."

- (68) Pepere asked her to help change a lightbulb. He was saying obligatorily, "How many Frenchmen does it take to change a lightbulb?"

- a search through Google’s 3-gram list reveals the following list of associated verbs; non-habitual examples provided by inspection of Google

- (69) MANDATORILY: converted, covered, exchanged, be included, be sentenced, be subject to, be transferred
- (70) Converted
In February 1984, Strawberry was mandatorily converted from a Foreign Service Reserve position to a civil service position.
- (71) Included
- All of our study participants were mandatorily included in a lawsuit, regardless of their individual choice to be included.
 - First, we mandatorily included marginal and significant SNPs reported in previous study.
- (72) Sentenced
- The accused was mandatorily sentenced under an unconstitutional habitual offender statute.
 - Harmelin was mandatorily sentenced to life imprisonment for possession of 672 grams of cocaine.
- (73) Transferred
- However, in order to meet the integration goals, several hundred teachers were mandatorily transferred by means of a random selection process.
 - Flyte said school officials then told him he was being mandatorily transferred to a community college to finish out his senior year
- (74) OBLIGATORILY: affixed, changed, classified, coupled, linked, marked, subject to
- (75) Changed
I have just (obligatorily) changed to the new version.

Obligatorily – the modifier uses are acceptable with states and do not necessarily require a habit:

- (76) ...take reasonable and mandatorily enforceable actions ...
- (77) ...treat mandatorily insured patients ...
- (78) ...the Golay brothers working their pit saw in an obligatorily bawdy manner ...
- (79) ...standing guard over obligatorily vivid, vital, vivacious, viable sorrows ...

Subject-orientation

- *obligatory* and *mandatorily* are subject-oriented, indicating teleological purpose⁶

- (80) I obligatorily visit my mother yearly.
‘I visit my mother yearly in order to comply with an obligation.’

- contrasts with *legally* and *as required*

- (81) a. He crossed the street legally, even though he didn’t know the law.
b. He always visited his mother three times a year as her will required / ?mandatorily, even though he didn’t know what she had demanded.

Generalization: *obligatorily* / *mandatorily* provide some explanation for the reasoning behind the event’s occurrence: not only was this volitional, the intention was that the end result should be conform with some norm.

- such an intention is not necessarily present in the case of *legal*

The MANNER use is not available for *obligatorily*.

- proposal: this is because of its resultative meaning component – as Levin and Rappaport Hovav (2008) argue, manner and result cannot be simultaneously lexicalized

The CLAUSAL use does not occur either.

- this might be due to the fact that, in and of itself, it does not support the resultative component of *obligatorily*

Habits (and certain other statives) allow *obligatorily* – maybe because they can be associated with a particular intention to achieve an end result. A similar idea might work for the *verba dicendi* eventives.

⁶A lone counterexample:

- (i) Cats and dogs obligatorily use taurine to conjugate bile acids, whereas many other animals, including man, can use either glycine or taurine for bile acid.(Morris, 2002)