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Modifying modality

Peter Klecha
Ohio State University

This paper seeks to initiate serious inquiry into a category of expressions which I call modifiers of modal auxiliaries (MMAs), by examining a case study, the modifier *easily*.

The term *modify* is not terribly well-defined. Morzycki (2015) discusses this at length, pointing out several proposals: A modifier is any expression of type $\langle \alpha, \alpha \rangle$, or any expression which combines with something that it is not an argument to, or simply is defined in syntactic terms, as adjectives and adverbs. I will tentatively adopt the first definition here, but nothing much hinges on it; the central of question this paper raises is how certain expressions (call them 'modifiers') combine with non-gradable modals to lend some gradience to their interpretation.

Depending on how exactly this definition goes, many expressions can be called modifiers of modals. Huitink (2014) gives an overview of various expressions that have been discussed in the context of analyzing modal concord, the phenomenon by which two seemingly independent modals co-exist in a sentence with only one apparent semantic exponent.

(1) We **can legitimately** deny your request.

Both *can* and *legitimately* can appear on their own and provide their own kind of modal meaning, but appear to collapse into a single modal in (1). Huitink terms cases like these 'true concord', as opposed to other cases which I discuss below.

But most analyses of these do not actually ascribe any 'modification' to expressions like *legitimately*. Geurts and Huitink (2006) argue for the existence of a 'concord operator' which takes both expressions, and returns their common meaning, presupposing that they are synonymous. Anand and Brasoveanu (2010), on the other hand, argue that both meanings occur in parallel, i.e., that (1) can be paraphrased as in (2).

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(2) We can deny your request and it is legitimate to deny your request.

In any case modal concord involving adverbs like *legitimately* does not appear to be 'modal modification' in the sense that I am interested in – namely, cases where the adverbial expression either denotes a function from a modal meaning to modal meaning, or serve as an input to such a meaning, ultimately strengthening or weakening the original modal meaning; so I will not discuss them any further.

Another set of expressions discussed by Huitink (2014) are what can be called flavor-specifiers, like the adverbs below.

(3) You are **legally required to** submit your taxes by April 15th.

These expressions, discussed by Huitink (2012) among others, can simply be taken to specify the modal base and/or ordering source, given Kratzer's (1981) classic analysis of modals. These may be cases of 'modal modification' by my definition above, but do not involve a change to the strength of the modal given its baseline modal domain. As Huitink discusses, cases like (3) may be thought of as simply disambiguators, since context alone is often sufficient to specify the flavor of a modal. So I will leave these aside as well.

It is rather a third class of expression, which Huitink (2014) terms 'intensifiers', which are the object of present study. Below are some examples of what could be termed modal intensifiers.

(4) a. It's **quite** possible Katie will win.
b. The vase could **easily** have fallen.
c. You should **really** walk the dog more often.
d. I **absolutely** have to finish this paper tonight.
e. The Red Wings are **very** likely to make the playoffs again.
f. The bar is **super** unlikely to be open at this hour.

Klecha (2014) argues that the intensifiers in (4a-d) cannot be given a unified account with the intensifiers in (4e-f), contra Grosz (2010), who attempts to unify not only these expressions,[2] but also the concord and flavor-specifying modifiers discussed above. The intensifiers in (4e-f) are degree modifiers and require the expression that they compose with to be gradable. Since, as argued in Klecha (2012, 2014), expressions like *possible*, *should*, and *have to* are not gradable, Grosz's account cannot be maintained.

The challenge with sentences like (4e-f) is reconciling the meaning of the modal, assuming an analysis of modality along the lines of Kratzer (1981, 1991) with the degree semantics required for intensifiers like *super* or *very*, (Kennedy and McNally, 2005) given their very broad distribution; that challenge has been taken on by many authors, including Yalcin (2010); Klecha

[2]Grosz does not discuss (4a-c).

(2012, 2014). In the present paper I deal with the challenge of (4a-d): Providing a meaning for the modifiers in these expressions that squares with a non-scalar interpretation for modals like *possible*, *should*, and *have to*. This paper focuses on *easily*, seen in (4b); see Klecha (2014) for further discussion of the others.

In Section 1, I establish the basic data. In Section 2, I consider various homophones of *easily* and show that they are distinct and can be set aside. In Section 3, I establish my assumptions about gradability. In Section 4, I provide the analysis. In Section 5 I consider how the analysis derives context sensitivity. In Section 6 I conclude.

1 Essentials

Consider the use of *easily* as a modifier of a modal auxiliary.

(5) The vase could **easily** fall.

This expression 'intensifies' the meaning of *could*, giving rise to the following asymmetric entailment pattern.

(6) a. The vase could easily fall. $\rightarrow$ The vase could fall.
b. The vase could fall. $\nrightarrow$ The vase could easily fall.

This expression requires the presence of a modal auxiliary and is thus distinct from modal adverbials like *probably* (see, e.g., Giannakidou and Mari (pear)).

(7) *The vase easily fell.

The distribution of *easily* is quite limited. First, it cannot appear with any necessity modals.

(8) a. *The vase must easily have fallen.
b. *The vase should easily have fallen.
c. *The vase would easily have fallen.

Second, it can only appear with possibility modals on epistemic, metaphysical, or counterfactual readings (not, e.g., deontic or teleological readings).

(9) a. The vase could easily have fallen.
b. The vase might easily have fallen.
c. ?The vase may easily have fallen.
d. #The boys can easily go to bed late tonight. (deontic reading intended)
e. To get down town, you can easily take the six. (manner reading, see below)

If the modal that *easily* modifies does not appear together with the perfect marker *have*, *easily* must appear immediately after the modal.

(10) a. *The vase easily could fall.
b. The vase could easily fall.

However, if the auxiliary does appear together with the perfect marker, the position of *easily* becomes much more flexible; it can appear either before the modal, immediately after it, or after *have*.

(11) a. The vase easily could have fallen.
b. The vase could easily have fallen.
c. The vase could have easily fallen.

With or without *have*, it is only marginally acceptable in sentence final position.

(12) a. ?The vase could fall easily.
b. ?The vase could have fallen easily.

Finally, *easily* is gradable, as indicated by its acceptability with degree modifiers (Kennedy and McNally, 2005).

(13) a. The vase could have very easily fallen.
b. The painting fell, but it just as easily could have been the vase.

(13b) is true if, for some point t prior to the painting's falling, the 'strength' of the possibility of the vase falling in the future of t was just as good as the strength of the possibility of the painting falling at t. The question of what 'strength of possibility' means here (likelihood? stereotypicality or expectedness?) is a very subtle one which I will not focus on in this paper. Rather, the purpose of this study is to show how compositionally a gradable expression like *easily* may induce this strengthening effect on a non-gradable, Kratzerian possibility modal. Thus I will assume that the scale that *easily* relates worlds to is the stereotypicality scale, but further analysis of the expression may show otherwise.

Thus I argue that *easily* is a gradable property of worlds which narrows the domain of the modal it attaches to. Since it only combines with possibility modals, this always results in a strengthening effect. In particular, *easily* narrows the modal domain to just the worlds in it which meet a standard for stereotypicality. This analysis is provided in detail below, but first I clarify the empirical picture a bit.

2 What *easily* Is Not

At first glance this expression may seem to simply be an instance of the manner adverbial which I will call $easily_{MA}$, seen in (14).

(14) He lifted the vase easily.

But two tests show that this is not the case. First of all, $easily_{MA}$ is an agent-oriented adverbial, and so cannot appear with non-agentive verbs.

(15) *The vase fell easily.

The acceptability of (5) can only be explained if the *easily* in that sentence is a distinct expression without a restriction to agentive verbs.

Second, $easily_{MA}$ can be paraphrased with the PP *with ease*, while the MMA *easily* cannot.

(16) a. He could easily lift it over his head. $\leftrightarrow$ He could lift it over his head with ease.
b. The vase could easily have fallen. $\nleftrightarrow$ #The vase could have fallen with ease.

A sentence with *could*, *easily*, and an agentive verb, like in (16a), may be ambiguous between the two readings, though the manner adverbial reading is generally favored. But the distinct MMA reading is also present, and is especially salient when the agent's intentions are unknown and of present concern. Moreover, the reading of the modal *could* is always different, at least in future-oriented cases; $easily_{MA}$ co-occurs with *could* on its ability readings (which can be paraphrased by *able to*, but not *might*), while the MMA *easily* co-occurs with *could* on its metaphysical/historical and counterfactual readings (paraphrased by *might* and not *able to*).

Yet a third expression, which I will call $easily_{ep}$ is homophonous with these two adverbials, and provides an inference of epistemic certainty (something like "it's obvious that...", or "it's easy to discern that...") and patterns with the MMA *easily* in terms of both of the diagnostics above.

(17) a. That book is easily 300 pages long.
b. #That book is 300 pages long with ease.

But this expression has its own paraphrase, the sentence-final particle *easy*, which distinguishes it from the MMA *easily*.

(18) a. That book is 300 pages long, easy.
b. #That vase could fall, easy.

Ideally, some account would be given of what links these three expressions, whether it is synchronic, or perhaps more likely, diachronic; but here I will

focus only on an analysis of the MMA usage of *easily*.[3]

3 Degree Semantics

There are a number of ways in which natural language expressions can have a scalar interpretation. One way is for their conventional meanings to be specified as such; in other words, the semantics itself is scalar. This can be seen in expressions like gradable adjectives as in (19); compare these to non-gradable adjectives as in (20).

(19) a. Chris is (very) tall.
b. Itamar is taller than Tim.

(20) a. Julia is (*very) vegan.
b. Martina is (*more) Balkan.

I will assume a theory of gradability along the lines of Cresswell (1976), von Stechow (1984), Kennedy (1999) and Kennedy and McNally (2005). This theory takes *degrees* to be a basic type which the interpretation of gradable expressions depends upon. Degrees are abstract objects which can form a dense, linearly ordered scale, where the ordering is determined by a dimension (height, beauty, etc.). On this approach, gradable adjectives like *tall* denote measure functions, or functions from entities to degrees (type $\langle e, d \rangle$) [4]. In other words, a predicate like *tall* in (19a) maps an entity like Chris to a degree – his height.

(21) $[\![\text{tall}]\!] = \lambda x[\text{HEIGHT}(x)]$

This contrasts with the denotation of a simple non-gradable adjective, which maps an individual to a truth value. The difference between gradable and non-gradable adjectives is therefore their type. It is their type which in turn constrains the types of expressions they may combine with; it is because of this that we can readily diagnose gradability in adjectives[5]

[3] I will speculate that there is a diachronic link between these three expressions which begins with the manner adverb/adjective *easy(ly)*, the antonym of *difficult*. As noted above, $easily_{ep}$ can be paraphrased "it is easy to discern that ϕ", while *could easily* ϕ might be paraphrased "it is easy to imagine a world in which ϕ". However I will not speculate beyond this.

[4] Alternatively, they could denote relations between degrees and entities, $\langle d, et \rangle$, but this choice doesn't really matter for the present study.

[5] There are alternatives to the degree-based approach which do not take gradability to be a matter of type, e.g., Klein (1980). The discussion here is not actually sensitive to this concern; it is widely acknowledged that only gradable adjectives may combine with degree modifiers, whatever the analysis of gradability may be. For example, on Klein's analysis, gradable adjectives are the ones which are sensitive to a comparison class, while non-gradable (non-vague) adjectives are not. Thus the analysis of gradability itself is not a question under discussion here, and nothing hinges on this choice.

On Kennedy's (1999) view, degree modifiers are complex functions which take a measure function, possibly in addition to other arguments, and return a simple non-gradable predicate.Thus the measure function *six feet* combines with *tall* to produce a non-gradable predicate, *six feet tall*.[6]

(22) $[\![\text{six feet}]\!] = \lambda g_{\langle e,d\rangle}[\lambda x[max\{d : g(x) \geq d\} \geq 6 \text{ feet}]]$

More complicated expressions like the comparative take an additional argument which denotes the *standard of comparison*, formally a degree; in (19b) above, the standard is denoted by *than Tim*. The individual who is denoted by the subject of a predicative construction is called the target, while the standard is the other degree involved in the comparison. On the degree view, gradable predicates are always used to denote some kind of comparison.

(23) $[\![\text{more than}]\!] = \lambda g_{\langle e,d\rangle}[\lambda d[\lambda x[max\{d' \in g(x)\} > d]]]$

That the semantics of gradable adjectives, and their degree modifiers, rely crucially on degrees, allows for a straightforward explanation of the incompatibility of degree modifiers with non-gradable adjectives, as shown in (20), which are assumed to denote simple properties, $\langle e, t\rangle$. A crucial result of this is that degree modifiers constitute a diagnostic for gradability.

Below are the acceptability judgments for *big* with degree modifiers.

(24) *big* with degree modification
   a. The ball is **bigger** (than the block).
   b. The ball is is **very big**.
   c. That ball is the **biggest** (in the room).
   d. **How big** is the ball?

Non-gradable adjectives, in turn, should be robustly unacceptable with degree modifiers. Consider a classic example, *dead*[7].

[6]Most proposals argue that this is mediated by a null functional head, but this isn't important here.

[7]Kennedy and McNally (2005) actually argue that *dead* is gradable on the basis of (i).

(i) The cat is {**almost/nearly/totally**} dead.

However, the use of *almost* and *nearly* as diagnostics for gradability is questionable. While these expressions are certainly scalar, they apply very widely, without respect to gradability:

(ii) {Nearly/Almost} every student failed.

Moreover *totally* (and some other maximizing degree modifiers) can be used with a non-degree semantics.

(iii) A: Seven isn't prime.
   B: What? Seven is *totally* prime.

(25) *dead* with degree modification

a. *The linguist is {**deader**/**more dead**} (than the psychologist).
b. *The linguist is is **very dead**.
c. *That linguist is the {**deadest**/**most dead**} (in the room).
d. ***How dead** is the linguist?

This diagnostic confirms that *dead* is not gradable.

4 Analysis

I assume a more-or-less standard analysis of modality along the lines of Kratzer (1981), whereby a modal like *could* denotes a quantifier over possible worlds.

(26) $[\![\text{could}]\!] = \lambda\phi_{\langle s,t\rangle}[\lambda R_{\langle s,\langle s,t\rangle\rangle}[\lambda w[\exists v \in R(w)[\phi(v)]]]]$

Given this, I propose that *easily* denotes a gradable property of worlds, relating worlds to degree concepts on a scale of stereotypicality (ST below).

(27) $[\![\text{easily}]\!] = \lambda v[\lambda w[\text{ST}(v)(w)]]$

Thus *easily* has the type $\langle s, \langle s, d\rangle\rangle$. It takes two worlds arguments, v and w and returns the degree of stereotypicality or expectedness of v given circumstances in w, the evaluation world.

Since *easily* is of type $\langle s, \langle s, d\rangle\rangle$ it is an intensional measure function and therefore gradable. Given the flexible type denotation for degree modifiers suggested in Klecha (2014), *easily* is combinable with degree modifiers. In (27) below a denotation is given for the degree modifier *just as*.[8]

(28) $[\![\text{just as}_7]\!]^g = \lambda G_{\langle \alpha,\langle s,d\rangle\rangle}[\lambda x_\alpha[\lambda w[max(G(x)(w)) = g(7)]]]$

The degree modifier *just as* takes a gradable property of objects of type α and returns the non-gradable property of objects of type α, which is true of such objects iff they possess the gradable property to exactly the degree specified by a contextual parameter specified by the assignment g. The flexible of type of such an expression is independently motivated by the fact that it can combine with gradable properties of, e.g., events, as well as entities.

(29) $[\![\text{tall}]\!]^g = \lambda x_e[\lambda w[\text{height}(x)(w))]]$
$[\![\text{just as}_7]\!]^g = \lambda G_{\langle \alpha,\langle s,d\rangle\rangle}[\lambda x_\alpha[\lambda w[G(x)(w) = g(7)]]]$
$[\![\text{just as}_7\ \text{tall}]\!]^g = \lambda x_e[\lambda w[\text{height}(x)(w) = g(7)]]$

[8]Here I am simplifying a considerable typology of degree modifiers; see, e.g., McNabb (2012).

(30) $[\![\text{early}]\!]^g = \lambda x_\epsilon[\lambda w[\text{earliness}(x)(w)]]$
$[\![\text{just as}_7]\!]^g = \lambda G_{\langle \alpha, \langle s,d \rangle \rangle}[\lambda x_\alpha[\lambda w[G(x)(w) = g(7)]]]$
$[\![\text{just as}_7 \text{ early}]\!]^g = \lambda x_\epsilon[\lambda w[\text{earliness}(x)(w) = g(7)]]$

Thus, such an expression can also combine with *easily*.

(31) $[\![\text{easily}]\!]^g = \lambda v[\lambda w[\text{ST}(v)(w)]]$
$[\![\text{just as}_7]\!]^g = \lambda G_{\langle \alpha, \langle s,d \rangle \rangle}[\lambda x_\alpha[\lambda w[G(x)(w) = g(7)]]]$
$[\![\text{just as}_7 \text{ easily}]\!]^g = \lambda v[\lambda w[\text{ST}(v)(w) = g(7)]]$

Since *easily* is analyzed as a measure function, any instance of it without an overt degree modifier is analyzed as combing with the silent *pos* morpheme, which relates it to a contextual standard.

(32) $[\![\text{easily}]\!]^g = \lambda v[\lambda w[\text{ST}(v)(w)]]$
$[\![pos_8]\!]^g = \lambda G_{\langle \alpha, \langle s,d \rangle \rangle}[\lambda x_\alpha[\lambda w[G(x)(w) \succeq s(G)(g(8))(w)]]]$
$[\![pos_8 \text{ easily}]\!]^g = \lambda v[\lambda w[\text{ST}(v)(w) \succeq s(\text{ST})(g(8))(w)]]$

Once *easily* has combined with its degree modifier, it denotes an accessibility relation. This set can be intersected with the modal domain of *could* or other possibility modals to achieve domain restriction. In order for *easily* to access the modal domain itself, however, the modal domain must be represented in the syntax.

Thus I adopt one tweak to the standard model. Following some authors, I posit that modals combine with **accessibility relations**, functions from worlds directly into sets of worlds, type $\langle s, \langle s, t \rangle \rangle$, rather than modal bases in the strict sense. This is necessary for the present account of MMAs like *easily*.

However I do not sacrifice the Kratzerian notion of relativizing modals to sets of propositions rather than sets of worlds which may be gotten from them. There is data which shows that simple accessibility relations are not rich enough to capture the variable behavior of modals' domains. Consider (33) in a context in which a vase is locked in a very secure safe.

(33) a. The vase can be broken.
b. The vase can't be broken.

Both sentences could be true depending on finer aspects of the context. (33a) can be true if the modal is relativized to the proposition that the vase is fragile (and *not* the proposition that the vase is in the safe) while (33b) is true if we include the proposition that the vase is in the safe. Note that (33a) could not be accounted for by any kind of implicit modal domain restriction – here the domain of *worlds* is larger than it is in (33b). But it can be accounted for by implicit modal *base* restriction.

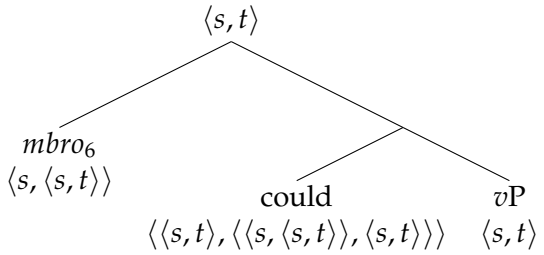
Thus I argue that while modals combine with a simple accessibility relation, this accessibility relation is determined by a hidden indexical in the

modal's specifier which is anaphorically related to a modal base intension. I call this modal base pronoun ***mbro***. In (34) I provide its denotation relative to an assignment function g which maps indices to semantic objects; I assume *mbro* bears such an index.

(34) $[\![mbro_6]\!]^g = \lambda v[\lambda w[v \in \cap g(6)(w)]]$

The index *mbro* bears is mapped by g to a modal base intension, but the semantics of *mbro* shifts this into an accessibility relation.

(35)



Distinct versions of *mbro* may carry distinct presuppositions determining their flavor. Each lexical modal may then impose distinct *syntactic* selectional restrictions on which kinds of accessibility relations they may combine with.

(36) a. $[\![mbro[\text{EPI}]_6]\!]^g(v)(w)$ is defined iff $g(6)(w) \subseteq \{p \mid p \text{ is known in } w\}$
$[\![mbro[\text{EPI}]_6]\!]^g = \lambda v[\lambda w[v \in \cap g(6)(w)]]$

b. $[\![mbro[\text{CIR}]_6]\!]^g(v)(w)$ is defined iff $g(6)(w) \subseteq \{p \mid w \in p\}$
$[\![mbro[\text{CIR}]_6]\!]^g = \lambda v[\lambda w[v \in \cap g(6)(w)]]$

Several factors complicate the issue of modal domain determination significantly. The first is the role of time in determining the modal domain. The second is the role of individual anchors in determining the modal domain. For example, an epistemic modal base is a set of facts known by a given individual or individuals. It could be that the precise subset of information is contextually determined, or the individual anchor is as well. Two possible ways of representing epistemic-*mbro* are given below.

(37) a. $[\![mbro[\text{EPI}]_{6,8}]\!]^g(v)(w)$ defined iff $g(6)(w) \subseteq \{p \mid p \text{ is known by } g(8) \text{ in } w\}$
$[\![mbro[\text{EPI}]_{6,8}]\!]^g = \lambda v[\lambda w[v \in \cap g(6)(w)]]$

b. $[\![mbro[\text{EPI}]_6]\!]^g(v)(w)$ defined iff $g(6)(w) \subseteq \{p \mid \exists x[p \text{ is known by } x \text{ in } w]\}$
$[\![mbro[\text{EPI}]_6]\!]^g = \lambda v[\lambda w[v \in \cap g(6)(w)]]$

However, I will ignore these concerns for present purposes and thus not include any temporal or individual anchors in modal domain representation.

The basic schematic syntax for modals in place, it is possible to provide a compositional analysis of *easily*. After combining with its degree modi-

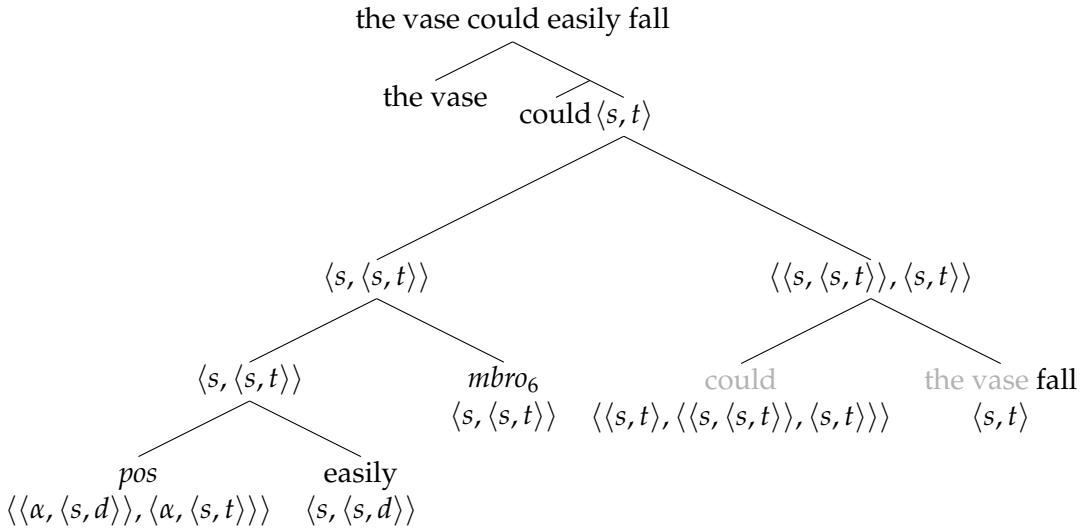
fier, *easily* adjoins directly to *mbro*, Nx a Generalized Predicate Modification rule applies, which takes two properties of type $\langle \alpha, st \rangle$ and returns their intersection. This allows us to maintain a simple type for *easily* of $\langle s, \langle s, d \rangle \rangle$, i.e., the type of a gradable property – this in turn allows us to keep a simple compositional semantics for degree modifiers.

> **Generalized Predicate Modification** If a node α has two daughters, β and γ, both of type $\langle \tau, \langle s, t \rangle \rangle$, then let $[\![\alpha]\!] = \lambda x_\tau [\lambda w [[\![\beta]\!](x)(w) \ \& \ [\![\gamma]\!](x)(w)]]$

The tree in (39) illustrates the compositional analysis of (38), which is spelled out in detail in (40).

(38) The vase could easily fall.

(39) *Structure of (38)*



(40) *Derivation of (38)*

1. $[\![\text{the vase fall}]\!]^g = \lambda w[\text{tvf}(w)]$ LEX
2. $[\![\text{could}]\!]^g = \lambda \phi_{\langle s,t \rangle} [\lambda R_{\langle s,\langle s,t \rangle \rangle} [\lambda w [\exists v \in R(w)[\phi(v)]]]]$ LEX
3. $[\![\text{the vase could fall}]\!]^g = \lambda R_{\langle s,\langle s,t \rangle \rangle} [\lambda w [\exists v \in R(w)[\text{tvf}(v)]]]$ FA
4. $[\![mbro_6]\!]^g = \lambda v [\lambda w [v \in \cap g(6)(w)]]$ LEX
5. $[\![pos_8 \text{ easily}]\!]^g = \lambda v [\lambda w [\text{ST}(v)(w) \succeq s(\text{ST})(g(8))(w)]]$ (32)
6. $[\![pos_8 \text{ easily } mbro_6]\!]^g =$
   $\lambda v [\lambda w [\text{ST}(v)(w) \succeq s(\text{ST})(g(8))(w) \ \& \ v \in \cap g(6)(w)]]$ GPM
7. $[\![\text{the vase could } pos_8 \text{ easily } mbro_6 \text{ fall}]\!]^g =$
   $\lambda w [\exists v [\text{ST}(v)(w) \succeq s(\text{ST})(g(8))(w) \ \& \ v \in \cap g(6)(w) \ \& \ \text{tvf}(v)]]$

This gives the desired domain restriction and corresponding stronger interpretation. Intensification of *easily* will correspondingly give greater domain restriction, and thus further strengthening.

Notice also that the modal *could* is represented without an ordering source – i.e., it quantifies directly over the worlds in its modal base with further restriction. This is a highly non-trivial move because *easily* fills a role potentially very similar to that of an ordering source. If *could* has a stereotypical ordering source already, the effect of *easily* should be redundant. However, in Klecha (2014), I argue that the apparent restriction to 'reasonable' or 'stereotypical' worlds seen in many modals is due not to a semantically specified ordering source but rather the pragmatic phenomenon of imprecision.

Consider the following discourse:

(41) *A man walks along a tightrope between two buildings, secured by a safety line*

a. A: You could have fallen to your death!
b. B: No, I couldn't have – I had a safety line which was tested right beforehand.
c. A: Yes, but the safety line could have broken in some unforeseen way!

Compare this to a similar example with *easily*.

(42) *A man walks along a tightrope between two buildings, secured by a safety line*

a. You could easily have fallen to your death!
b. Not true – I had a safety line which was tested right beforehand.
c. #Yes, but the safety line could have broken in some unforeseen way!

While in (41), speaker B is forced to admit the strict truth of (41c) (and thus the presence of unstereotypical worlds in the domain of *could*), in (42), speaker B is not compelled to do the same. The use of *easily* really does make the modal too strong for this context, no matter what kind of precisification goes on. Thus, I argue there is no ordering source in *could*; *easily* therefore is not redundant.

One important point I do not have room to address is the full distribution of *easily*; it can only be used with possibility modals. One possible explanation for this is that *easily* can only be used in cases where it gives rise to a stronger interpretation. Similar proposals have been made for polarity sensitive items (Kadmon and Landman, 1993; Chierchia, 2006), though see Giannakidou (1997, 1998, 2006) for compelling arguments against this view.

In fact, as Giannakidou argues for NPIs, a general pragmatic approach based on strength of interpretation cannot work to explain the distribution of this kind of modal modification. The mere existence of weakening or approximating expressions like *almost* or *nearly* shows that a general pragmatic constraint in favor of strengthening cannot constraint lexical distribution in this way. Rather, the distribution of *easily* must be due to semantic properties of the relevant expressions; but this could still be stated in terms of 'strengthening'; i.e., a lexical stipulation that *easily* is only felicitous when it combines with an expression to result in a strengthened meaning. Note that, depending on how this constraint is realized, this might also predict that necessity modals under the scope of negation can combine with *easily*; however, necessity auxiliaries with epistemic, metaphysical, or counterfactual domains do not scope under negation, so this is difficult to test.

(43) a. Helena must not be at home. $(\Box > \neg)$
b. If I came in late, Gallagher would not notice. $(\Box > \neg)$

5 Context Sensitivity

One important flaw that this theory may seem to be susceptible to concerns monotonicity. Since the modal domain is determined intersectively, it appears that with *easily*, this domain should be monotonic. To make this point clear, consider the following conditional example.

(44) If a strong gust of wind had come along, you could easily have fallen.

If we suppose that in this context, all worlds in which a gust of wind comes along are below the salient standard of stereotypicality, this should result in an empty domain (making (44) trivially true). This is contrary to intuitions about (44), which suggest that (44) should always range over some non-empty set of worlds.

The original semantics for ordering sources given by Kratzer (1981), with its lexicalized superlative meaning, was formulated to avoid this very problem. This semantics avoids ever getting an empty domain with conditionals (except where the antecedent is contradictory) because the modal always takes the *best* worlds of the domain, rather than the worlds which exceed some externally determined standard. Thus the standard is always sensitive to what is in the domain.

However, the present theory of *easily* actually does not make use of an 'externally determined standard' either. Recall that when *easily* does not appear with a degree modifier, its standard is fixed by the silent positive morpheme. This morpheme determines a standard from a contextually given comparison class (Kennedy, 2007). However, when a positive adjective is in attributive position, this comparison class can be, at least partially,

determined by its sister.

(45) a. That is a tall boy.
b. That is a tall basketball player.
c. That is a tall skyscraper.

Correspondingly, we should expect that the standard in play for *easily* is also determined in part by its sister – i.e., the modal domain. Thus, the standard for stereotypicality will be relativized to what worlds are already in the domain, and therefore avoid the problem of creating an empty domain.

Thus *easily* in a sense replicates the semantics of the ordering source, but relativizes to the modal base via positive rather than superlative semantics.

6 Conclusion

Most modifiers of modal auxiliaries seem to be of the flavor specifying variety discussed by Huitink (2014), but a few have intensifying behavior, including *easily*, discussed above, and *well*, seen below, which could be given a comparable analysis.[9]

(46) They ?(very) well could be there.

This paper has shown that a compositional semantics can be given to these expressions which maintains a conservative view of the semantics of non-gradable modals, and provides a schema for one kind of analysis of scalarity in modality: Modals may come to have a scalar type of meaning because their domains are restricted by gradable expressions. But this is just one method. Klecha (2014) considers several other such expressions which go about introducing scalarity in different ways. But the class of these expressions is large, especially when considering languages other than English, as, e.g., Giannakidou and Mari (pear) do; so there is still much work to be done.

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[9]These expressions often display a high level of idiosyncrasy – notice that *well* can combine with *very*, but is marginal in the positive form, and unacceptable with seemingly any other degree modifier.

(i) a. #They better could be there.
b. #They well enough could be there.

I will refrain from speculating as to why this is not a more robustly attested class.

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