Non-actualistic mood in Czech, Russian, German, and Norwegian

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Abstract

The type of mood or tense marking that causes 'non-actuality' entailments, as figuring prominently, but far from exclusively, in counterfactual conditionals, has not yet received a comprehensive and compositional analysis. Focusing on four languages, the paper presents under-appreciated facts and a novel theory where the mood serves to activate alternatives to operations over propositions, in particular one: the identity operation, giving rise to implicatures of contrast. Depending on the context, these contrast implicatures amount to non-actuality or – in negative contexts – actuality entailments.

1 Introduction

The aim of this paper is to show that what I will call non-actualistic mood in two Germanic and two Slavic languages – German, Norwegian, Czech, Russian – calls for a treatment where the mood operates on a generalized modal and contrasts it with the 'null modal', and to offer such a treatment.

Loosely, what I mean by non-actualistic mood is a mood or tense marking that causes the clause it appears in to entail the negative of some type t constituent, or more briefly, to have a 'non-actuality' entailment. I explain this choice of terms in light of alternatives in section 2.2. The term 'X-marking' as used by von Fintel and Iatridou (2020) seems to have a roughly matching intended reference, so I will also be using that, along with 'X mood' or just 'X'.

Some illustrations are in order. Although conditionals are a core context for it, non-actualistic mood is also often found in overtly modalized sentences without an antecedent‑consequent structure. Here are four example sentences, from Russian, German, Norwegian and Czech, respectively:

(1) Nado   bylo by podnjat'sja na vtoroj ètaž zdanija,   ….[1]
     necessary was SUBJ raise.REFL to second floor building.GEN
     'I should have climbed to the second floor of the building, …'

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(2) Ich hätte   ohne   weiteres eine Bombe mitnehmen können.[2]
     I   had.SUBJ without further a   bomb   with-take   can.INF

     'I could have brought a bomb just like that.'

(3) Jeg er ikke rusfri,   så jeg hadde trengt å stå   løpet   ut.[3]
     I   am not drugfree so I   had   needed to stand run.DEF out

     'I am not off drugs yet so it would have been crucial for me to finish.'

(4) Ale kdepak, jela zcela přiměřeně, klidně by   byla schopna zastavit.[4]
     but no   she drove reasonably calmly is.SUBJ been able   stop

     'But no, she was driving slowly, she would easily have been able to stop.'

In each case here, the sentence entails the negation of the modal's prejacent.

   On all previous approaches, the X mood, whether spelt out as a subjunctive or as a 'fake' past tense, or a combination, operates on a proposition or introduces a presupposition, or it does both. Therefore, every existing analysis faces at least one major empirical challenge, in the form of one or both of these two observations:

1. The mood marking is sometimes not in the clause expressing the proposition that non-actuality is entailed for but in a matrix clause.
2. The non-actuality entailment sometimes turns into an actuality entailment, essentially in negative contexts.

1 is challenging for any analysis that lets the mood operate on a proposition, and 2 is challenging for any analysis that lets it introduce a presupposition. The analysis to be proposed here does neither, and in fact, both observations are predicted by it.

   Set within the general theory of alternatives and exhaustification advanced by Chierchia (2013), this analysis can be summarized in the following five points:

- The mood operates on meanings of modals, monadic propositional operations, and its ordinary semantic value is the identity function on such arguments.
- At the same time, it activates alternatives: its alternative semantic value contains the function that maps any propositional operation to the identity operation.
- Through exhaustification at some type t level, the alternative here – usually the argument proposition of the mood-modified modal – gets its negation added to the ordinary semantic value as a 'grammatical' implicature of non-actuality.
- However, if exhaustification applies to a negative context, the alternative is itself negative, resulting in an implicature of *actuality*.
- Like any implicature, the (non-)actuality implicature will fail to arise at the threat of inconsistency.

The first two points state, by stipulation, the semantics of the non-actualistic mood – its ordinary and alternative semantic values. That much is new, but the rest is old: The three last points follow from the meaning of the mood in conjunction with the general theory of alternatives and exhaustification.

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[2]Source: https://www.spiegel.de/politik/deutschland/abdullah-von-saudi-arabien-in-berlin-a-516253.html

[3]Source: https://fontene.no/nyheter/hege-skrev-seg-ut-fra-rusinstitusjon-fordi-6.47.773871.590a706810

[4]Source: https://forum.autoforum.cz/viewtopic.php?t=3988

The third point sets out, in a nutshell, how the non-actuality entailment comes about: Once activated, alternatives must be factored into meaning, and with the O (for 'only') exhaustifier, also called *Exh*, this operation results in an added conjunct NOT ϕ where ϕ is usually the argument of the modified modal. Schematically:

(5)   O(MOOD(MODAL)(ϕ)) ≡ MODAL(ϕ) AND NOT(ϕ)
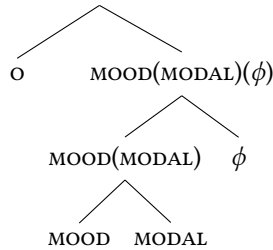
Note that MOOD(MODAL) and ϕ can be expressed in two different clauses, the latter in an embedded clause and the former in a matrix; this explains how the mood marking can be 'upstairs' while the non-actual proposition is expressed 'downstairs' – cf. 1. Note, too, that if, say, a negation intervenes between O and O(MOOD(MODAL)(ϕ)), the added conjunct will not be NOT ϕ but NOT(NOT ϕ), that is, ϕ; this explains how the mood can bring about an actuality entailment – cf. 2. and the fourth point. The fifth point, finally, articulates a corollary of the theory which will prove explanatory in connection with, in particular, so-called semi-factual conditionals.

As a simple instance of the schema (5), consider the Russian sentence (6), cited by Dobrušina (2016, 146f.) and replicable in Czech, German and Norwegian:

(6)   On dolžen   byl by   vseh razbudit', ….
        he obligated was SUBJ all   awaken
        'He was due to have woken everyone up, …'

According to Dobrušina, in contrast to the sentence without the subjunctive particle *by*, (6) entails *on ne razbudil ih* – 'he failed to awaken them'. With reference to (5), MOOD = *by*, MODAL = *dolžen* 'due', and ϕ = *on vseh razbudil* 'he woke everyone up'. O, finally, is assumed to be covertly present in a position at the top level of (6) and to contribute the negation of the alternative – ϕ – to the meaning of the sentence.

The paper is organized as follows. Section 2 brings preliminary clarifications in two key regards: First, the formal means of signaling non-actuality through mood in the languages under study and their functions beyond signaling (non-)actuality, second, the signs by which to tell a non-actualistic mood in a language apart from other uses of the same formal machinery, and a working definition.

In section 3, existing formal semantic literature on the X mood, including work on English 'subjunctive conditionals', is reviewed, and novel evidence constituting serious challenges to every previously proposed account is presented in section 4. The alternative, novel account is set out in section 5 and shown to produce precise predictions for the problem cases from section 4, and in section 6, predictions about counterfactuals are explored and shown to be adequate as well. Section 7 addresses potential counterevidence to the theory, and section 8 brings conclusions.

2 Non-actuality mood: Preliminaries

The four languages Czech, Russian, German and Norwegian have been selected for study because they show a spread in how non-actualistic mood is expressed and in how the same expression can also be used to express a 'non-non-actualistic' mood. These variations are described in section 2.1.

It is also useful to have as accurate a sense as possible of what a non-actualistic mood is and of what distinguishes it from other uses of subjunctive or 'fake past' in one or the other of the four languages. Section 2.2 brings a discussion of how to single it out, coalescing into a working definition.

2.1 Mood in the four languages, forms and functions

The following overview of the formal machinery of irrealis mood and of its place in the functional field of mood in the languages under study is based, in particular, on three monographs: Bech (1951) (in regard to Czech), Fabricius-Hansen et al (2018) (in regard to German), and Dobrušina (2016) (in regard to Russian).

2.1.1 Forms

Morphologically, Norwegian stands out from the other three languages in that there is no subjunctive, leaving auxiliaries and fake tenses, such as past perfects in present and past contexts, as the regular means of encoding non-actualistic mood.

(7)   Jeg hadde vært død   nå.[5]
        I   had   been dead now
        'I would be dead now.'

German, Russian and Czech have subjunctives which encode non-actuality, but the subjunctive manifests itself differently in the three languages:

- in German, as the *umlaut* stem of one of several auxiliaries or a few main verbs,
- in Russian, as the particle *by*, which can cliticize to the 'that' complementizer *čto*,
- in Czech, as the *by(-)* stem of the auxiliary *být* 'be', which combines with perfect participles and can help form the declarative clause complementizer *aby(-)* or the conditional clause complementizer *kdyby(-)* (see Hana 2007, 81).

(8)–(10), in German, Russian and Czech, respectively, may illustrate:[6]

(8)   Ich wäre   jetzt tot![7]   (9)   Ja byl by   sejčas mertv.[8]
        I   was.SUBJ now dead   I   was SUBJ now   dead
        'I would be dead now!'   'I would be dead now.'

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[5]Source: https://khrono.no/nord-universitet-ovelse/skremmende-realistisk-terror-ovelse-pa-nord/141072

[6](7)–(10) are elliptical conditionals, with a covert conditional necessity modal serving as a conditional operator and with a null pronominal conditional antecedent; these cases are discussed specifically in section 6.2.

[7]Source: https://www.wochenblatt.de/archiv/wie-viele-unfaelle-muessen-hier-noch-passieren-61847

[8]Source: Galina Gončarova, *Učit'sja, vljubit'sja … ubit'sja?*

(10) Byl bych   ted' mrtvý…[9]
      been am.SUBJ now dead
      'I would be dead now.'

As far as the non-actuality use is concerned, this subjunctive marking is regularly accompanied by some form of past tense which may well be 'fake' (Iatridou 2000). In Russian and Czech, past forms of verbs, simple in Russian, periphrastic in Czech, are used in past and present contexts,[10] in German, past (or past perfect) forms are used in present contexts and past perfect forms are used in past contexts.

2.1.2 Functions

The subjunctive-cum-fake-past forms found in Czech, German and Russian are not uniform functionally but serve other functions than marking non-actualistic mood as well. Notably, these other functions are different in the three languages:

- In Czech and in Russian, the subjunctive is prominently used in purpose clauses and in 'purpose-like' complement clauses (Dobrušina 2016, 263ff., Sočanac 2017). These uses are closely akin to the 'intensional' subjunctive in Romance languages (Stowell 1993, Quer 1997). They are often described in terms of matrix predicates 'licensing' or 'selecting for' subjunctive complements, for example, Czech *chtít* or Russian *hotet'* 'want', as in (11) and (12) below.

- In German, there is instead a prominent use of the subjunctive in reported speech (Fabricius-Hansen et al, 2018, 105ff.), exemplified in (13) below.

- All three languages exhibit a 'polarity subjunctive' usage closely akin to the uses of Romance subjunctives designated by this term (Stowell 1993, Quer 1997) – see Bech (1951, 45ff.), Dobrušina (2016, 242ff.), Kagan (2013, 133ff.), Fabricius-Hansen et al (2018, 62ff.) – and exemplified in the Czech sentence (14) below.

(11) Chtějí, aby   se   část CO_2 ztrácela v podzemí.
      want   that-is.SUBJ REFL part CO_2 lost.FEM in underground
      'They want some of the CO_2 to disappear underground.'[11]

(12) Učenye hotjat, čtoby   vrednyj CO_2 sprjatali pod   zemlej.
      scientists want   that-SUBJ harmful CO_2 hid.PL   under ground
      'Scientists want to hide away harmful CO_2 underground.'[12]

(13) Er schrieb mir, …, zwei Jahre nach unserer Trennung. Ich würde   ihm
      he wrote me   two years after our   separation I   would.SUBJ him
      fehlen, …[13]
      miss
      'He wrote to me two years after we split up, saying he missed me.'

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[9]Source: https://adoc.pub/no-title32e911e5848cc10af0cfed401f068c3e69321.html
[10]Note that in Russian, the subjunctive particle can occur in (infinitivals and in) predicatives without copula, hence with the present tense, see Dobrušina (2016, 117ff.); such contexts do not strictly license non-actuality inferences.
[11]Source: https://www.sosbn.cz/wp-content/uploads/2017/03/2-Purkrtov%C3%A1-CO2.pdf
[12]Source: https://hi-tech.news/science/1958-uchenye-hotjat-chtoby-vrednyj-co2-sprjatali-pod-zemlej.html
[13]Source: https://www.faz.net/aktuell/stil/leib-seele/ich-du-er-sie-es/wenn-der-partner-den-17348070.html

(14)   Sluníčka má dosti,   vláhy   taky a   roste jak divá ale aby
       sunshine has enough moisture too   and grows like wild but that-is.SUBJ
       vykvetla to   ne.[14]
       bloomed that not
       'It gets enough sunshine and moisture and grows like wild, but blossom it
       doesn't.'

In Norwegian, on the other hand, fake past (perfect) forms are almost exclusively used in a (non-)actuality entailing sense. It may be objectionable to use the term 'mood' about fake past in a subjunctive-less language; I do so here for simplicity, without attaching any theoretical importance to it.

2.2 Delineation and a working definition

What I mean by non-actuality entailments and non-actualistic mood is something quite strong: Unless prevented by threat of inconsistency (in systematic ways, see sections 5.3.2 and 6.3), the mood causes the sentence to entail the falsity (or truth) of a constituent sentence. The term 'irrealis' has been used in roughly this sense – see, e.g., Csipak (2015, 19ff.) – but for the most part it is, particularly in typological literature, used in a much wider sense, as more or less synonymous with markings of non-veridicality; see the discussion by, e.g., Mithun (1995) and von Prince (2020). Hence it could be misleading to speak of irrealis in the present context, where what is at issue is what von Prince (2020) calls **the counterfactual domain of irrealis**. On the other hand, the term 'counterfactual', especially in philosophical literature, tends to be linked with conditionals and might unduly narrow the phenomenology under study. Hence, taking cues from the literature on 'actuality entailments' and 'actualistic interpretations' arising from root modals in perfective past tenses (see, e.g., Hacquard 2021 and Homer 2021), I speak of non-actuality entailments arising from non-actualistic mood, and I will presently delineate these notions and provide clues for recognizing the phenomena which fall within their scope.

   A first heuristic can be drawn from the fact about Norwegian noted in section 2.1.2: Here, fake past (perfect) is, by and large, exclusively used in a (non-)actuality entailing sense, so that whenever a subjunctive in Czech, German or Russian can be translated into that language with a fake past (perfect), one can be fairly confident that it is used in that same sense.

   It is possible to say something more, however, and something more principled. In fact, non-actualistic mood coincides reasonably well with what has traditionally been called the 'independent' subjunctive,[15] as opposed to uses of subjunctive that are conditioned by some certain kind of context, mostly a matrix clause predicate, where subjunctive may be the only possible mood, or indicative and subjunctive are interchangeable. By contrast, when subjunctives occur independently, they make a difference: indicative can be substituted, but as a rule, the meaning will be affected.

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[14]Source: https://www.zahrada.cz/forum/listnace/co-je-to-za-strom-373166/?kotva=co-je-to-za-strom-373238

[15]"der unabhängige Konjunktiv" 'the independent subjunctive' (Bech, 1951); "der selbstständige irreale Konjunktiv" 'the autonomous counterfactual subjunctive' (Fabricius-Hansen et al, 2018); "soslagatel'noe naklonenie v nezavisimyh konstrukcijah" 'subjunctive in independent constructions' (Dobrušina, 2016)

In the standard case, the difference made by the independent subjunctive is an added entailment of non-actuality, as illustrated in the two Russian sentences (15) and (16), a near-minimal pair where only the first member features the subjunctive; (15) licenses the inference that I did not call Vadim, while (16) licenses the inference that she did call Zina. And although the first clause in (16), without the particle *by*, is also compatible with a context in which no call was made, the first clause in (15), with the *by* particle, is only compatible with a context in which no call was made.

(15) Nado   bylo by   pozvonit' Vadimu, no ja rešil   ne delat' ètogo.[16]
      necessary was SUBJ call.PF   Vadim   but I decided not do   it

      'I should have phoned Vadim but I decided not to.'

(16) …nado   bylo pozvonit' Zine, no Zina ne brala trubku.[17]
      …necessary was call.PF   Zina but Zina not took tube

      '…she had to call Zina, but Zina didn't pick up the phone.'

Thus in this example of the standard case, the mood is responsible for an entailment of non-actuality with respect to the prejacent of the necessity modal.

   Two non-standard cases must be taken into consideration:

1. The case where the non-actuality entailment switches to an actuality entailment in a negative context, see section 4.2,
2. the case where the non-actuality (or actuality) entailment is overridden by a conflicting entailment or presupposition (see sections 5.3.2 and 6.3) and fails to materialize.

But note that even in case 1., the mood marking, be it pure subjunctive, subjunctive-cum-fake-past, or fake past, will make a meaning difference vis-à-vis the indicative, real-tense alternative, which will lack the actuality entailment and frequently have a non-actuality entailment instead.

   Note one other case where a non-actuality entailment may not be forthcoming: Sometimes, a sentence contains two or more mood markers, one in an embedded clause and another in the matrix, say (subjunctive conditionals are a case in point); then the lower occurrence may be an uninterpretable concord phenomenon.

   Summing up, an occurrence of a mood marker of the forms surveyed in section 2.1.1 can count as an occurrence of non-actualistic mood if and only if

- it causes a sentence to entail the negative or the positive of a type t constituent, or
- a negative or positive entailment for a constituent would cause inconsistency, or
- it is c-commanded by another occurrence satisfying one of these conditions.

The relevant sentence is mostly the full, root sentence, but we will see in section 5.6 that it can be smaller; we will see in section 5.2 that the relevant type t constituent is always the argument of some modal which is in turn the argument of the mood; and that the entailment will be positive just in case the environment is negative.

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[16]Source: http://www.maxima-library.org/knigi/genre/b/233032?format=read
[17]Source: https://litschool.pro/almanah/proza1/lyubov/

A note on the term 'entailment' is in order. It is not intended to commit to any specific notion of the status of the inferences in question or how they come about. Rather, like the label 'actuality entailment' in connection with root modals in past tenses, 'non-actuality entailment' is used as a label in a pretheoretic sense. As previewed in section 1, the inferences will be analyzed as conversational implicatures, not as presuppositions or logical entailments. On the other hand, in the grammatical theory of implicatures the analysis will be based on, once the implicatures are there, they figure as additional truth conditions on a par with the original content; therefore, the term 'entailment' turns out to be not inappropriate.

3 Previous proposals and their commonalities

Quite a few proposals have been made for describing the contribution of fake past or subjunctive to the meaning of a sentence in more or less formal semantic terms. Few of these have been articulated compositionally, however, as definitions of the meaning of the fake past or subjunctive which could be written on this form:

(17) $[\![\text{MOOD}]\!] = \lambda \dots$

Moreover, most of the proposals are tailored to English 'subjunctive' conditionals.

Still, some of the proposals that have not been articulated compositionally lend themselves to such an articulation, and some that are tailored to conditionals can be generalized to other contexts – as shown in the following survey, where it will become clear that all the proposals have their merits. All will also face challenges, however, in the form of a class of facts to be presented in section 4.

3.1 Presupposing non-membership or non-overlap

A common assumption about 'subjunctive conditionals' is that they are counterfactuals and "presuppose that their antecedent is false" (von Fintel, 1998, 29).[18] Indeed, the terms 'subjunctive' and 'counterfactual' have often been used interchangeably.[19]

The most direct implementation of this idea is offered by Schlenker (2005, 279), who lets the English 'subjunctive' apply to a world and trigger the presupposition that this world is different from the world of evaluation.[20]

(18) $[\![\text{SUBJ}]\!]^w = \lambda w' \begin{cases} w' & \text{if } w' \neq w, \\ \text{undefined} & \text{else} \end{cases}$

This analysis is based in the analysis of conditionals proposed by Schlenker (2004), where an *if* clause denotes a possible world, the closest to the world of evaluation where the antecedent is true; when w' is that world, (18) amounts to presupposing that the antecedent is not true in the world of evaluation, as set out in (19):

(19) $[\![\text{SUBJ} (\textit{if } \phi)]\!] = \lambda w [\![\text{SUBJ}]\!]^w (f([\![\phi]\!], w)) = \lambda w : f([\![\phi]\!], w) \neq w . f([\![\phi]\!], w)$

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[18]Note that this assumption is not shared by von Fintel.

[19]Cf. also Lakoff (1970, 177) and (Krakauer, 2012, 12).

[20]Schlenker's definition is somewhat more complex; I render it in a simplified form and a more conventional notation. In (19), f is the selection function defined by Dowty (1976, 208), building on Stalnaker (1968).

Now however this result is obtained, it is controversial, since the assumption that the antecedent is presupposed to be false has often been argued to be too strong – see, e.g., Mackay (2019) and von Fintel (1998), but also, in its defense, Zakkou 2019. More critically perhaps, it is difficult to see how the analysis could be generalized to subj mood outside conditionals.

In his work on German *dass* 'that' and *wenn* 'if' clauses in their use as optatives, Grosz (2012, 168) provides a definition of counterfactual mood, located above T and applying to a proposition, which is a little weaker: The presupposition it introduces is not that the proposition fails to contain the world of evaluation, rather, it is that it fails to overlap with the set of worlds compatible with what the speaker believes: "The speaker presupposes p to be false."

(20) $[\![\text{Mood}_{\text{CF}}]\!]^c = \lambda p \lambda w : p \cap \text{Dox}_{\text{speaker}}(w) = \varnothing . p(w)$

Because the mood can apply to any proposition, this analysis is much more general than Schlenker's. But precisely because the mood applies to propositions, the facts to be encountered in section 4.1 will be problematic, and because its contribution is a presupposition, the facts to be encountered in section 4.2 will be problematic too.

Targeting the English 'modal past' in conditionals, Schulz (2014) defines a still weaker presupposition: the relevant subset of the antecedent is not consistent with the 'epistemic center of the speaker', E*. This presupposition is not encoded in any definition of the modal past as such but in that of a special operator for subjunctive conditionals, **S**. However, a compositional analysis of the modal past can be interpolated by defining an operation over binary modal operations, as in (21).[21]

(21) $[\![\text{ModalPast}]\!]^{w_0, g} = \lambda M_{s((st)((st)t))} \lambda w \lambda p \lambda q : \text{Opt}_{g(R)}(w)(p) \cap \text{E*} = \varnothing . M(w)(p)(q)$

In words, the modal past adds to a binary propositional operation a presupposition of non-overlap between the epistemic center and a subset of the first argument. One challenge for an analysis like this is that non-actualistic mood often cooccurs with *unary* modal operators; another is posed by the data described in section 4.2.

3.2 Subtracting the world of evaluation

Focusing on 'fake past tenses' in a language like English or Greek, Iatridou (2000) identifies past tenses, whether 'fake' or 'real', with the morpheme, or feature, ExclF (exclusion feature) which is underspecified for what it ranges over, times or worlds; in both cases, the index of utterance is excluded from the set the feature applies to – or in another wording, the times/worlds 'of the speaker' are excluded from those 'that we are talking about'. When worlds are at issue, the effect is that these latter worlds 'exclude the actual world' (Iatridou, 2000, 247).

Iatridou (2000) does not formalize this idea, but von Prince (2019, 593) supplies a formal definition of ESP 'English Simple Past' which is similar in spirit and scope. (22) is a simplified version of that definition which at the same time can serve as a compositional articulation of Iatridou's exclusion feature.

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[21]The notation of Schulz (2014, 132) is here simplified for perspicuity and ease of comparison.

(22) $[\![\text{PAST}]\!]^{w,t} = \lambda p_{s(it)} \lambda w' \lambda t' : w' = w$ and $t' < t$ or $t' = t$ and $w' \neq w \, . \, p(w')(t')$

In the 'world case' – that of the second disjunct in the definiens, $t' = t$ but $w' \neq w$ – this amounts to filtering out the world of utterance from the argument proposition (to be exact, the argument world-time relation). When the resulting proposition is the antecedent of a conditional or the argument of *wish*, the exclusion is to induce an implicature that the original proposition fails to contain the actual world.[22]

Even if this approach primarily targets counterfactual conditionals, Iatridou's ExclF or von Prince's ESP can in principle operate on any proposition (to be exact, any relation between times and worlds). However, like the one of Grosz (2012), the approach is poorly equipped to cope with the facts presented in section 4.

3.3 Presupposing C-D non-inclusion

Building on Stalnaker (1975) (see also section 3.4), von Fintel (1998) proposes that the subjunctive in subjunctive conditionals 'q if p ' "is not directly about p at all" but marks that the domain of world quantification is partly outside the context set, as defined in (23), where D is the contextually determined modal domain in intension, assigning to the world of evaluation w the set of relevant worlds accessible from it, and C is the context set, the intersection over the Common Ground:

(23)   subjunctive: $D(w) \not\subseteq C$

Similarly, Mackay (2019) expounds "the view that a subjunctive conditional carries the presupposition that the modal base for the modal restricted by the *if*-clause . . . is a proper subset of the factive common ground".

(24) gives a compositional articulation of this 'domain widening' view (see von Fintel and Iatridou 2020, 32) in the form of a definition of the meaning of the modal past as a function from meanings of dyadic modal operators as functions from, i.a., modal bases, sets of propositions in intension:[23]

(24) $[\![\text{X-marking}]\!]^{w_0,C} = \lambda M_{s((s((st)t))((st)((st)t)))} \lambda w \lambda f \lambda p \lambda q : \cap(f(w)) \not\subseteq C \, . \, M(w)(p)(q)$

Both von Fintel (1998) and Mackay (2019) only have conditionals in mind, and (24) is tailored to dyadic modal meanings as arguments of the mood, but since what the mood does is add a presupposition in terms of modal base and common ground, it is possible to modify (24) to cover the case of *monadic* modal meaning arguments:

(25) $[\![\text{X-marking}]\!]^{w_0,C} = \lambda M_{s((s((st)t))((st)t))} \lambda w \lambda f \lambda p : \cap(f(w)) \not\subseteq C \, . \, M(w)(p)$

In fact, von Fintel and Iatridou (2020) describe the effect of X-marking in relatively general terms – X-marking signals that the modal base is not entirely contained in the set of epistemically accessible worlds – and note that this or a similar constraint should have a wider potential than just accounting for X-marking in conditionals.

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[22]Tellings (2016, 110) supplies two formal articulations of Iatridou's proposal, one, in tune with (22), subtracting the speaker worlds from the proposition and the other stating that the speaker worlds do not overlap with the proposition; yet another formulation is offered by Karawani (2014, 88). Asarina (2006) offers an implementation and extension of Iatridou's proposal where the Russian subjunctive particle *by* is ascribed the role of forcing ExclF to range over worlds.

[23]'X-marking' covers subjunctive or conditional or fake-past marking, following von Fintel and Iatridou (2020).

Particularly, they provide thoughts on how it could be extended to also account for wishes marked as counterfactual, but do not commit to concrete proposals, ending on this note:

> Once we broaden our attempts to understand X-marking in non-conditional environments, we see that all existing accounts fail.

In any case, the facts brought to light in the next section, particularly those at issue in section 4.2, prove difficult to reconcile with any theory ascribing a presupposition to the subjunctive in terms of (sets of) propositions and inclusion or overlap relations.

3.4 Antipresupposing (non-)overlap

Stalnaker (1975) proposed that all conditionals carry the pragmatic presupposition that the function f proposed by Stalnaker (1968) selects a member of the context set C as the world most similar to the actual world where the antecedent is true:

(26) $f(\phi, w) \in C$

The subjunctive lifts that presupposition: It "is a conventional device for indicating that … the selection function is one that may reach outside of the context set".[24]

Building on this, Leahy (2018, 58) ascribes a presupposition of overlap between the conditional antecedent and what the speaker knows, roughly corresponding to $\text{Dox}_{\text{speaker}}(w)$ in (20) or E* in (21), to indicative conditionals:

(27)   Indicative Presuppositon: $\Diamond_s \phi$, "ϕ is epistemically possible for (speaker) s"

The opposite relation of non-overlap is derived as a 'presuppositional implicature', or antipresupposition.[25]

This proposal can be seen as a direct formalization of the Stalnakerian idea, and if 'indicative' is taken to operate on the antecedent proposition, it can be generalized to many subjunctive contexts. But not to the ones considered in section 4.1.

3.5 Summary

According to all the surveyed proposals, the X mood operates on a proposition or it introduces a presupposition, or both.

- The subjunctive operates on a **proposition**:
  Iatridou (2000), von Prince (2019), Grosz (2012)
- The subjunctive introduces a **presupposition**:
  von Fintel (1998), Schlenker (2005), Grosz (2012), Schulz (2014), Mackay (2019)
- The indicative introduces a presupposition, leaving the subjunctive with an *antipresupposition*: Leahy (2018), Stalnaker (1975), Ippolito (2003)

For this reason, all of them will be seen presently to face at least one problem.

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[24]About "the subjunctive mood in English and some other languages" more generally than just in conditionals, Stalnaker suggests that it is "a conventional device for indicating that presuppositions are being suspended".

[25]As noted by von Fintel and Iatridou (2020, 31), Stalnaker's "domain-widening idea" is intrinsically present in the so-called 'past-as-past' approach to fake past (perfect) in *if* clauses, and Ippolito (2003) in fact appeals to the notion of an implicated presupposition to explain counterfactuality inferences.

4 Two challenging observations

This section presents and discusses two general facts about mood and non-actuality entailments across the four languages Czech, Russian, German and Norwegian, facts which constitute major challenges to existing approaches to non-actualistic mood. Firstly, any theory that places the mood at a clausal level, the level of TP, say, and assumes that it operates on propositions will be hard put to accommodate the fact that the marker often appears in a matrix clause – and sometimes only there – while the 'non-actual' proposition is expressed in an embedded clause. Secondly, theories that formulate non-actuality inferences as presuppositions will have difficulty with the fact that the inferences can turn negative in contexts of negation.

4.1 The mood in the matrix

In (28)–(31), there is a non-actuality entailment, but this entailment does not concern the proposition expressed in the clause where the subjunctive or fake past (perfect) occurs, it concerns the proposition expressed in a subordinate, complement clause. Thus in the Czech example (28), the constituent expressing the non-actual content does not show past subjunctive but present indicative morphology. This is the case for the clauses expressing this content in the German (29) and the Russian (30) too. The corresponding clause in the Norwegian (31), finally, does show a fake past, but the matrix clause features a fake past perfect.[26]

(28) Zdálo by   se, že o prázdninách se   u nás nic   neděje.
      seemed is.SUBJ REFL that on holidays   REFL at us nothing happens
      Není to pravda.[27] (Czech)
      not.is it truth

      'It would seem that nothing is going on here in the holidays. That's not true.'

(29) K godovščine revoljucii bylo by   ožidaemo, čto kto-to   snimet fil'm
      at anniversary revolution was SUBJ expectable that someone takes.PF film
      o   …, no ètogo ne proizošlo.[28] (Russian)
      about …, but that   not occurred

      'At the anniversary of the revolution, someone would be expected to make a film about …, but that has not happened.'

(30) Es wäre   wünschenswert gewesen, dass Zeugen   auch unter Eid
      it was.SUBJ wish-worthy   been   that witnesses also under oath
      befragt   werden.[29] (German)
      interrogated become

      'Ideally, witnesses should have been questioned under oath.'

---

[26] Note that in (28) and (29), the non-actuality entailment is reaffirmed in the succeeding sentence; we will see in section 5.1 that this is in keeping with the treatment of it as an implicature.

[27] Source: https://www.dobra.cz/soubory/doberske-listy/0907.pdf

[28] Source: https://ria.ru/20180130/1513634936.html

[29] Source: https://www.deutschlandfunk.de/es-waere-wuenschenswert-gewesen-dass-zeugen-auch-unter-eid.1346.de.html?dram:article_id=221207

(31)   Typisk   da   når   eg ikkje er i form og verkeleg hadde hatt behov for
       typically then when I   not   am in form and really   had   had need   for
       at   han kom heim i tre   tida og avlasta meg litt …[30] (Norwegian)
       that he   came home in three time and relieved me   little …

       'It's typical when I am out of shape and really need him to come home in
       early afternoon and relieve me for a bit …'

This poses a problem for any theory that seeks to attach a non-actuality entailment,
however strong or weak and in whatever way, to a proposition taken as the mood's
argument. From such theories, one would expect a non-actuality entailment for the
matrix clause in each of the examples: such-and-such does not seem to be the case,
is not to be expected, or wished, or is not something I need to be the case. And sure,
a non-actuality entailment is there, but it affects the *subordinate* clause.

   It might be thought that there is a sense in which the content of the matrix is,
in (29) and (30), implied to be non-actual after all: any expectation, or wish, would
be, as it were, thwarted, or vain, and so not truly entertained or worth entertaining;
the non-actuality of the embedded content could be seen as a consequence of that.

   But this reasoning can hardly be extended to data like (28), (31) or (32):

(32)   Der Sieg   für Hoyerswerda war ein Riesenerfolg, aber auch eine
       the victory for Hoyerswerda was a   giant success but   also a
       Überraschung für alle Beteiligten. Alle hätten   erwartet, **dass die**
       surprise   for all   involved   all   had.sᴜʙᴊ awaited that the
       favorisierten Leipziger Mannschaften die vorderen Plätze belegen.
       favored   Leipzig   teams   the front   places occupy
       Aber bei diesem Pokalwettkampf war alles anders   als   erwartet.[31]
       but   at this   cup contest   was all   different than expected

       'Everybody had expected the teams from Leipzig to come out on top.'

In this German sentence-in-context, it is evident that the non-actuality entailment
only concerns the content of the boldfaced embedded clause and in no way infects
the content of the matrix clause, which is untouched by any such implication: The
expectation on the part of everybody that the teams from Leipzig would come out
on top of the chess tournament is as much of a truth condition as when the mood
is not subjunctive but indicative, as indicated in the English paraphrase.

   The fact that the mood marking can be 'upstairs' while its effect is 'downstairs'
does not necessarily pose a problem for approaches where the mood manipulates
a modal or a modal's restrictor; recall from section 3.3 that von Fintel and Iatridou
(2020) can be taken to take such an approach. The reason is that in each case above,
the 'downstairs' proposition is the argument of an intensional operator or predicate
'upstairs'; if now these are the type of entities to populate the mood's domain, it is
reasonable that the mood should reside 'upstairs' as well.

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[30]https://forum.klikk.no/foreldre/topic/8636773-til-gravidenbarnimagen-og-camhella/page/12/
[31]Source: https://www.lr-online.de/lausitz/hoyerswerda/gastgeber-asp-schach-hoyerswerda-schafft-die-sensation-34255076.html

We will see in section 5 how a theory can be built on this premise and yield the desired predictions about the 'downstairs' propositions.

4.2 Non-actuality entailments turn into actuality entailments

In negative contexts, mood-induced non-actuality entailments are turned around to become actuality entailments. This effect can be observed in the following cases, in Czech, Russian, German and Norwegian, respectively.

(33) …vlastně by   nebylo nutné   je   předělávat, mohli jsme
      …actually is.SUBJ not-been necessary them remake   could are.1PL
      použít stávající obsah, ale neučinili jsme   tak.[32]
      use   existing content but not-done are.1PL so

      'We didn't actually need to reproduce them, we could have used the existing content, but we didn't.'

(34) Ono tak. Tol'ko ne nado   bylo by   snosit' starye istoričeskie zdanija.[33]
      it   so   only not necessary was SUBJ tear.IPF old   historical   buildings

      'Right. Only, the old historical buildings needn't have been demolished.'

(35) Es wäre   nicht nötig   gewesen, die Bäume zu fällen.[34]
      it was.SUBJ not   necessary been   the trees   to fell

      'The trees needn't have been felled.'

(36) Jeg hadde ikke trengt å bekymre meg.[35]
      I   had   not   needed to worry   REFL

      'I needn't have worried.'

This poses a challenge for any theory that ascribes a presupposition to the mood, as the same sentences without negations would license *non-actuality* inferences.

As far as German and Norwegian are concerned, so would the same sentences without the X-marking, whereas these sentences without negations would in turn license *actuality* inferences. Thus the subjunctive reverses the picture that has been observed for past tense root modals in a number of languages, among them French (see Alxatib 2021, Hacquard 2021, Homer 2021, Jeretič 2021).

	INDICATIVE	SUBJUNCTIVE
POSITIVE	Actuality	Non-Actuality
NEGATIVE	Non-Actuality	Actuality

Table 1: Past tense (non-epistemic) modals: (Non-)Actuality inferences

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[32]Source: https://www.zoochleby.cz/news/karty-zvirat-na-webu-398/
[33]Source: https://ok.ru/group53875099959535/topic/152972489915887
[34]Source: https://www.bernerzeitung.ch/es-waere-nicht-noetig-gewesen-die-baeume-zu-faellen-557598063535
[35]Source: https://ieuropa.no/2015/02/en-smak-av-resesjon-osterrike/jennifer/

It may seem conspicuous that all four examples involve necessity modals. Indeed, when possibility modals have realistic conversational backgrounds, actuality entailments will contradict the main, at-issue content of the negated sentence. However, when they have normative or teleological ordering sources, actuality inferences are consistent with the truth conditions of the negative statement and will surface, as in (37), which clearly licenses the inference that an event of the type referred to by the pronoun *das* 'that' has in fact occurred.

(37)   Das hätte   nicht passieren dürfen![36] (German)
        that had.SUBJ not   pass   may
        'That shouldn't have happened!'

The theory laid out in the next section brings out why actuality entailments fail to surface when they would conflict with the main content of the negated sentence: there are no 'innocently excludable alternatives' to be (doubly) negated.

The actuality entailment is problematic for any analysis which ascribes a non-actuality *presupposition*, however weak, to the mood, because any presupposition would have to remain unaffected by an anti-additive functor like a negation adverb, projecting past it. Conversational implicatures, on the other hand, are sensitive to negation, so the data rather point towards a treatment of the non-actualistic mood in such terms; more evidence in that direction is provided in the next section.

5 The novel move: The mood modifies modals

This section sets out an account of non-actualistic mood that meets the challenges identified in section 4. It is rather different from any existing account, yet it shares features with two of the approaches to similar 'grammemes' surveyed in section 3, firstly, regarding the scope, secondly, the effect of the mood:

- It develops further the outlook of von Fintel and Iatridou (2020) on X-marking to let the mood operate on the meaning of any modal,[37]
- it has in common with the view of von Prince (2019) on the modal past tense that the mood is taken to give rise to an implicature.

Set in the theory of alternatives and exhaustification developed by Chierchia (2013) a.o., the account to be presented treats the mood as a means to contrast the modal in its scope with one special alternative – the identity function over propositions.

Section 5.1 lays some groundwork for the account in relatively informal terms, section 5.2 supplies formal definitions and the derivation of a simple paradigm case, and section 5.3 shows how the two 'problem cases' considered in section 4 are not problematic but predictable on this account. Sections 5.4 through 5.6 offer thoughts on (i) the morphosyntax of the mood, (ii) the robustness of the implicature, and (iii) the possible positions for the exhaustification operator.

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[36]Source: https://www.wallstreet-online.de/nachricht/13831052-halliburton-passieren-duerfen
[37]A conditional operator restricted by an antecedent clause is in this connection a modal.

5.1 Non-actuality entailments as implicatures

The leading idea is that the mood activates alternatives to the modal it operates on, particularly one: the 'null modal', denoting the identity function over propositions; exhaustification with respect to this alternative yields the non-actuality entailment.

The status of this entailment is, then, as a non-conventional implicature within the 'grammatical theory' of implicatures (see, e.g., Chierchia et al 2012). This theory has mainly been employed for computing scalar implicatures and for deriving NPI licensing conditions (see Chierchia 2013, 143ff.). Here, alternatives are activated by lexical items, scalar terms or NPIs, and at propositional level, the relations between these items and the activated alternatives play out as differences in logical strength. This is not an essential feature of the theory, however; implicatures that are based on 'non-logical scales' or on contrastive topichood can be computed with the same procedure, activation and exhaustification presupposing 'innocent exclusion' (Fox, 2007) and respecting 'various contextual considerations' (Chierchia et al, 2012).

While (38) illustrates an implicature based on a logical scale, (39) and (43) are illustrations of implicatures based on non-logical scales – non-logical because it is possible to shoot someone without having threatened to do so (and vice versa), and possible for something to be a bomb without looking like one (and vice versa).

(38)   Many of them are poultry ... [38] ⤳ not all of them are

(39)   Hedda threatened to shoot Løvborg at the time, ... [39]
        ⤳ she did not shoot him

(40)   A device ... looked like a bomb ... [40] ⤳ it wasn't one

In all three cases, characteristically, the implicature can felicitously be reaffirmed in the immediately subsequent discourse:

(41)   Many of them are poultry but not all of them.[38]

(42)   Hedda threatened to shoot Løvborg at the time, but at last didn't.[39]

(43)   A device attached to the body ... looked like a bomb but was not one, ... [40]

Notably, the non-actuality entailment associated with the subjunctive and fake past (perfect) in, say, German shows the same behavior, cf.:

(44)   ... – der Täter hätte   es wissen müssen, hat es aber nicht gewusst – ... [41]
        ... – the agent had.SUBJ it know   must   has it but   not   known – ...
        '... the perpetrator ought to have known but didn't.'

This is another piece of evidence for a treatment of the non-actuality entailment as an implicature (one piece, its sensitivity to negation, was presented in section 4.2, and yet another piece, its failure to materialize when inconsistency threatens, will be displayed in sections 5.3.2 and 6.3).

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[38] Source: https://www.producer.com/livestock/destined-to-fail/

[39] Source: https://www.litcharts.com/lit/hedda-gabler/summary

[40] Source: https://edition.cnn.com/2012/09/05/us/california-bank-robbery/index.html

[41] Source: http://criminet.ugr.es/recpc/10/recpc10-01vo.pdf

Such a treatment will involve defining – through a definition of the alternative to the mood – the 'null modal' as the alternative to the modal, and ultimately, the proposition expressed by the sentence without the modal as the alternative to the proposition expressed by the sentence with the modal. Now the relation between the modal – in (44), *müssen* – as modified by the mood and its putative alternative, the 'null modal', is not scalar in a logical sense: the proposition expressed by (44) – before any implicature of non-actuality is factored in – and the prejacent, viz., that the perpetrator in fact knew, are not ordered by strength. Still, a case can be made that, on the one hand, what ought to be the case, etc., and, on the other, what is in fact the case form a natural scale in a non-logical sense of conceptual strength.

Against this background, the gist of the proposed account can be outlined thus: The potential contrast between two scalemates where one is a modal, any modal – say, a conditional operator restricted by the antecedent clause, see section 6 – and the other is the 'zero modal', in effect the 'actual' world, is made an actual contrast when the mood applies to the modal, activating the zero modal alternative. A non-actuality entailment comes about as an implicature – as added content brought on by the exhaustification operator O, coming into play just in case the added content is compatible with the content it is added to as well as with the context.

The proposal will presently be spelt out in compositional detail.

5.2 Definitions and a case study

Taking a cue from von Fintel and Iatridou (2020), I will represent the non-actualistic mood across the four languages under consideration by an uppercase X, neutrally as to whether it is articulated with mood or tense morphology, or with both.

In the framework of alternatives and exhaustification developed and advanced by Chierchia (2006), Fox (2007), Chierchia et al (2012), Chierchia (2013) and others, meanings have two separate dimensions: the ordinary semantic value (or OSV, $[\![\,\cdot\,]\!]$) and the alternative semantic value (or ASV, $[\![\,\cdot\,]\!]^{A}$), a set of alternatives to the former. To start with, here are the definitions of the two semantic values of X:[42]

(45) $[\![\,X\,]\!] = \lambda \mathcal{P}_{(st)(st)}\, \mathcal{P}$

(46) $[\![\,X\,]\!]^{A} = \{\lambda \mathcal{P}_{(st)(st)}\, \mathcal{P},\ \lambda \mathcal{P}_{(st)(st)}\, \mathbb{D}_{(st)(st)}\}$

Let us focus on a simple example, the Russian sentence (47):

(47) Staryj dub nužno   bylo by   srubit'.[43]
      old   oak necessary was SUBJ cut.PF

      'The old oak should have been felled.'

---

[42]I use here an 'intensional' scheme of composition where, say, the meaning of a modal is a function from propositions to propositions; the alternative of pointwise extensional composition, where the meaning of a modal is a function from worlds to sets of propositions, would be possible but less perspicuous when alternative semantic values are composed.

[43]The paraphrase represents one reading of the sentence; it can in addition be read as an elliptic anankastic conditional, see section 6.2, corresponding to a paraphrase like 'the old oak would have had to be felled', and it can also have future time reference, see section 7.1, corresponding to a paraphrase like 'the old oak should be felled' or 'the old oak would have to be felled'. Note, too, that the corresponding sentence without the subjunctive particle can also be read in the sense of the paraphrase, but that in contrast to the sentence with *by*, (47), it can also mean that the oak had to be – and was – cut down. – The judgments are validated by Solomeya Bagautdinova.

There is a non-actuality entailment here: the old oak has not been, or was not, felled. Let us now build the meaning of the sentence in accordance with the rudimentary Logical Form in (48) to see how this entailment is derived.

O is the name of the covert exhaustification operator attaching at clausal level, and its sister's two daughters are,

- on the one hand, the join of the necessity modal *nužno* and the mood X,
- and on the other, the prejacent infinitival clause:

(48)   [O [[[nužno] [X]] [PRO srubit' staryj dub]]]

First, since the ordinary semantic value of the mood X is the identity function over propositional operations, the ordinary semantic value of the merge of the mood and its argument *nužno* 'necessary' equals this argument:

(49) $[\![\, \mathrm{X}\,(\,\mathit{nužno}\,)\,]\!] = [\![\,\mathit{nužno}\,]\!]$

Second, to calculate the alternative semantic value (ASV) of that merge, we need the rule of Pointwise Function Application (Chierchia, 2013, 138):

(50) $[\![\, a(b)\,]\!]^{\mathrm{A}} = \{\, \gamma : \text{there is a } \alpha \in [\![\, a\,]\!]^{\mathrm{A}} \text{ and a } \beta \in [\![\, b\,]\!]^{\mathrm{A}} \text{ such that } \gamma = \alpha(\beta) \,\}$

Using this, since the ASV of *nužno* itself is just the singleton set containing its OSV, there being no distinct alternatives, we obtain (51):

(51) $[\![\, \mathrm{X}\,(\,\mathit{nužno}\,)\,]\!]^{\mathrm{A}} = \{\, [\![\,\mathit{nužno}\,]\!] , \mathbb{D}_{(st)(st)} \}$

Let us now say that the ordinary and alternative semantic values of the infinitival complement of X (*nužno*), with an indefinite PRO subject and – for simplicity – a free variable t referring to a contextually given past time *t*, are the proposition in (52) and the singleton set containing that proposition in (53).[44]

(52) $[\![\, \mathrm{t\ PRO\ \mathit{srubit'\ staryj\ dub}}\,]\!] =$
        $\lambda w\,.\,\text{someone fells the old oak at } t \text{ in } w$

(53) $[\![\, \mathrm{t\ PRO\ \mathit{srubit'\ staryj\ dub}}\,]\!]^{\mathrm{A}} =$
        $\{\lambda w\,.\,\text{someone fells the old oak at } t \text{ in } w\}$

The next to last move in the composition of the meaning of (47) is the interpretation of the merge of X (*nužno*) and its argument, given in (54) – the OSV, a proposition – and (55) – the ASV, a set of two propositions.

(54) $[\![\, \mathrm{X}\,(\,\mathit{nužno}\,)\,(\,\mathrm{t\ PRO\ \mathit{srubit'\ staryj\ dub}}\,)\,]\!] =$
        $[\![\,\mathit{nužno}\,]\!](\lambda w\,.\,\text{someone fells the old oak at } t \text{ in } w)$

(55) $[\![\, \mathrm{X}\,(\,\mathit{nužno}\,)\,(\,\mathrm{t\ PRO\ \mathit{srubit'\ staryj\ dub}}\,)\,]\!]^{\mathrm{A}} =$
        $\{[\![\,\mathit{nužno}\,]\!](\lambda w\,.\,\text{someone fells the old oak at } t \text{ in } w),$
        $\lambda w\,.\,\text{someone fells the old oak at } t \text{ in } w\}$

---

[44]Complications to do with temporality are glossed over here: a proper treatment of tense and time would require the interpretation of a PAST feature and abstractions over time indices.

In a last step before the sentence meaning is finished, the activated alternatives in (55) will have to be factored into meaning through exhaustification, more exactly, it will be necessary for an exhaustification operator (called Exh or O, for 'only') to exhaustify the meaning in (54) with respect to the alternatives. The exhaustification amounts to adding a condition to (54) saying that its distinct alternative is not true. The definitions of the contribution of the exhaustifier O to OSVs and to ASVs (alternatives are reset once they are factored into OSVs through O) given in (56) and (57) are based on Chierchia (2013, 138), but the notation is adapted.

(56) $[\![\, O\, p\,]\!] = \lambda w\, .\, w \in [\![\, p\,]\!]$ and for all $\phi \in [\![\, p\,]\!]^A$ such that $[\![\, p\,]\!] \nsubseteq \phi$, $w \notin \phi$

(57) $[\![\, O\, p\,]\!]^A = \{[\![\, p\,]\!]\}$

Now we can compute the final OSV of (47). Since exactly one of the two alternatives ϕ in $[\![\, p\,]\!]^A$ = (55) fails to include $[\![\, p\,]\!]$ = (54), namely, the proposition that someone did fell the old oak, this proposition is subtracted from – or, put differently, its complement is intersected with – $[\![\, p\,]\!]$ = (54), resulting in (58):

(58) $[\![\, O\, (\, X\, (\, nužno\,)\, (\, t\, PRO\; srubit'\; staryj\; dub\,))\,]\!]$ =
        $[\![\, nužno\,]\!](\lambda w\, .\, \text{someone fells the old oak at } t \text{ in } w) \cap$
        $\lambda w\, .\, \text{noone fells the old oak at } t \text{ in } w$

In other words, the non-actuality inference that noone felled the old oak is now indeed an entailment, an integrated truth condition.

In due time, we will see how the entailment becomes an *actuality* entailment when a negation intervenes between the exhaustifier and the mood (section 5.3.2) and how it is blocked when it would conflict with the original OSV (section 5.3.2) or with an additive presupposition (section 6.3).

5.3 The two problem cases

The two phenomena which cause particular difficulties for existing approaches, as set out in section 4, are straightforwardly accounted for by the given analysis.

5.3.1 The mood sits right

The circumstance that the mood can be marked in a matrix while the non-actuality entailment concerns a subordinate clause does not present a problem because the mood is not a 'spinal' category and does not apply to a proposition; it applies to a modal and sets off a non-actuality entailment for the modified modal's argument, which can perfectly well be expressed in a subordinate CP.

As indeed it is in the Norwegian example (59), with the LF sketched in (60): the mood modifies the modal *ynskjeleg* and the result takes a 'that' clause complement.

(59)   Det hadde vore ynskjeleg at   denne gruppa auka,   ...[45]
        it   had   been wishable that this   group   increased ...
        'It would have been desirable for this group to grow, ...'

---

[45] Source: https://www.vestnes.kommune.no/_f/p1/ifbb5885f-ae2f-4fc9-9734-35aaa0a0e0d3/omsorgsplan.pdf

(60)
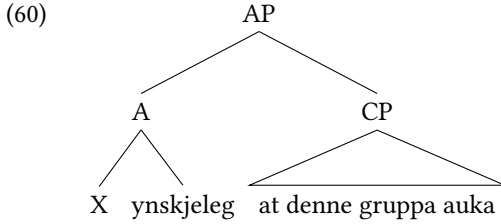
It may be noted that there is a fake past marking in the subordinate clause as well, though not a past perfect marking as in the matrix clause; like the X marking in 'if' clauses, this can be viewed as an uninterpretable concord marking (see section 6.1).

5.3.2 Exhaustification over negation

Like the sentences (33)–(36) discussed in section 4.2, the Norwegian sentence (61) has an actuality entailment for the complement clause: 'I quit.'

(61)   Det hadde ikkje vore naudsynt at   eg sluttar.[46]
        it   had   not   been necessary that I   quit.PRES
        'There is no need for me to do this, quit.'

This is immediately predicted by the present analysis on the reasonable assumption that the negation scopes over the mood-modified modal but under the exhaustifier; in this way, the negative entailment which would otherwise be there turns positive:

(62) $[\![\,O\,(\,ikkje\,(\,(\,X\,(\,naudsynt\,)\,)\,(\,at\,eg\,sluttar\,)\,)\,)\,]\!] =$
        $[\![\,ikkje\,]\!](\,[\![\,naudsynt\,]\!](\lambda w\,.\,\text{I quit in } w)) \cap \lambda w\,.\,\text{I don't not quit in } w$

On the other hand, as noted in section 4.2, when combined with possibility modals with empty ordering sources, X fails to license actuality inferences under negation, and we can see now why: The definition of the ordinary semantic value of O in (56) restricts the exclusion of alternatives ϕ to propositions that do not include $[\![\,p\,]\!]$, and when $[\![\,p\,]\!]$ is that in view of the circumstances, something is not possible, ϕ will be that this something is not the case, which indeed includes $[\![\,p\,]\!]$, consequently, $[\![\,p\,]\!]$ fails to be excluded, and X has no effect.

And in fact, there is hardly any detectable difference in meaning between (63-a), with past perfect subjunctive, and its past indicative counterpart (63-b).

(63)   a.   . . . ein Wiederaufbau wäre   nicht möglich gewesen.[47] (German)
              . . . a   reconstruct   was.SUBJ not   possible been
              'Rebuilding was out of the question.'

        b.   . . . , ein Wiederaufbau war nicht möglich.[48]
              . . . , a   reconstruct   was not   possible
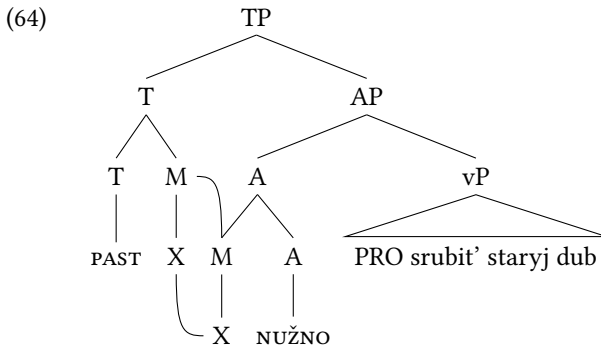   'Rebuilding was out of the question.'

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[46]Source: https://www.fjordabladet.no/nyhende/2018/05/21/Avviklar-butikken-16739116.ece

[47]Source: https://www.kakteenforum.com/t28633-ein-princess-gewachshaus-soll-es-sein

[48]Source: https://www.nw.de/lokal/kreis_hoexter/hoexter/6581220_Felsenkellerruine-ein-Dorn-im-Auge.html

5.4 A note on the syntax of the mood

Recall from section 2.1.1 that the non-actualistic mood is marked in various ways across Czech, Russian, German and Norwegian, often with a combination of mood (subjunctive) and tense (past or pluperfect) marking, where the mood marking may be verbal inflection or a particle or clitic, and sometimes with tense marking alone. This morphological realization must somehow be enabled in the syntax, and while there are several ways to go about it (see, e.g., Harizanov and Gribanova (2019) for a discussion of the general issues), I will adopt a simple version of head movement, where X merges internally into T.

(64) supplies an illustration of the syntax of the Russian paradigm example (47), elaborating on the rudimentary structure in (48) but omitting the insertion of O.[49]

(64)

```
                    TP
          ┌──────────┴──────────┐
          T                     AP
      ┌───┴───┐          ┌───────┴───────┐
      T       M ─┐       A               vP
      │       │  │    ┌──┴──┐      ┌──────┴──────┐
    PAST  X   M  A  PRO srubit' staryj dub
          │   │  │
          └─ X  NUŽNO
```

Here, the mood (M) feature X adjoins to T, and as a result, the material dominated by T – the temporal feature PAST and X – can spell out as *bylo* and *by*, i.e., the past (neuter) form of the copula and the subjunctive particle, at Phonetic Form.[50] As far as Logical Form is concerned, however, this adjunction operation is vacuous.

The German case (65) is a bit different insofar as the mood comes to expression in an *umlaut*, past tense form of a verb, the modal auxiliary *können* 'can', 'may':

(65)   . . . , obwohl   das Land   eigentlich reich sein könnte.[51]
        . . . , although the country actually   rich   be   can.PAST.SUBJ

        '. . . , although the country could have been rich.'

The form *könnte* thus spells out no less than three elements:

- the mood (X),
- the tense (PRES) and
- the finite modal auxiliary verb's root (KONN).

(66) may illustrate: a complex V dominating KONN and X adjoins to T hosting PRES, enabling a spellout as the word form *könnte* (note the right-branching structure).

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[49] Here, in (66) and in section 6.1, the categorization of the modal complement as vP should not be taken as definitive; it could be a TP instead (see the discussion in Arylova 2006, 35ff.).

[50] The assumption is that the copula is not a V but a spellout of a T without a V but with PAST or X or both (or FUT).

[51] Source: https://religion.orf.at/v3/radio/stories/3006043/

(66)
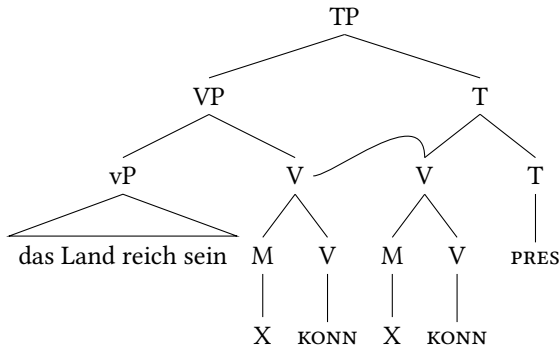
In Czech and Norwegian, the T material will regularly have a complex articulation, in Czech in the form of a subjunctive backward-shifting auxiliary and a participle, in Norwegian in the form of a backward-shifting auxiliary and a past participle or a past tense modal auxiliary and a perfect infinitive.

5.5 The robustness of the (non-)actuality entailment

Alternative-based implicatures are more or less strongly communicated, or robust. In principle, particularly if the alternatives are not at-issue, they can be 'canceled', 'suppressed' or 'suspended' – in terms of the grammatical theory, the exhaustifier O can be missing, or alternatives can remain inactive (Chierchia et al, 2012, 2317). But in practice, some implicatures, like the 'more than one' implicature generated by the plural according to Spector (2007), are relatively robust, and the implicature that has been ascribed to the X mood falls in this category: it is rarely absent when X is present (see, however, section 6.3 on non-excludable alternatives and section 7.1 on weakened implicatures in future contexts).

Chierchia et al (2012, 2317) note that on the assumption that exhaustification is obligatory, implicatures will be non-cancelable if alternatives have to be activated, as in the case of the 'more than one' implicature generated by plural morphology. More recently, moreover, scholars have suggested that implicatures are less robust when they require lexical substitutions, as do those that are based on quantifiers, than when they are constituents (see Gotzner and Romoli (2022) and references).

Notably, the alternative that can be activated by the X mood has to be activated because it is anchored in the meaning of a morpheme which has no other meaning; what is more, the alternative is indeed 'already there' as a constituent of the clause and does not have to be retrieved from the lexicon. These two factors may jointly account for the robustness of the (non-)actuality entailment as an implicature.

One case merits mention, however. So far, only declarative sentences have been considered, and the assumption has been that when a discourse move is made, it is an assertion and the non-actuality entailment is a part of it. But as soon as question moves are taken into account, (non-)actuality entailments are called into question too, particularly by polar interrogative sentences where the expressed proposition is paired with its complement (see, e.g., Farkas and Roelofsen 2017). As an example, (67) will be expected not to entail that the addressee did, or did not, stop:

(67)   Hättest du also gar   nicht halten müssen? [52] (German)
       had.SUBJ you ergo at-all not   halt   must

       'Weren't you obliged to stop at all then?'

And that is borne out: in the context, it is in fact common ground that the addressee did not stop, although a common ground where the addressee did stop would also be a good fit. This is further evidence that the entailment is not a presupposition – if it were, it would be expected to project from a polar interrogative context.

5.6 The site of exhaustification

Most of the examples that have been considered have been simple sentences, or in any case, the exhaustification operator has been assumed to attach at the top level. That is hardly the only level for O to attach at, however. In addition, intermediate clausal levels and non-clausal type t levels both seem to be of potential relevance.

As an example of the former possibility, consider the Norwegian sentence (68), where the non-actuality implicature cannot plausibly be computed at the top level, rather, exhaustification must be assumed to take place in the relative clause:

(68)   I 2001 var det to   hendelser som kunne fått alvorlige følger.[53]
       in 2001 was it   two incidents that could got serious   consequences

       'In 2001, there were two incidents which could have had grave outcomes.'

The preceding context states that there were six fatal accidents, so evidently, what is meant by (68) is that there were two incidents which could have had but did not have grave outcomes – a reading resulting from a local insertion of O.

In fact, a clausal boundary is not essential for a scope-bearing element to scope over O on the most accessible reading of a sentence. (68) could be a simple sentence – 'two incidents could have had grave outcomes' – and (69) is another case in point: O insertion at root level would add the entailment that I have never listened to him, in contradiction of the preceding context.

(69)   Noen ganger har   jeg hørt   på han, andre ganger ikke, . . . noen ganger
       some times   have I   heard on him other times   not   . . . some times

       burde jeg ha   gjort det.[54] (Norwegian)
       ought I   have done it

       'Sometimes I've listened to him, sometimes not, sometimes I should have.'

The natural site for O to attach is just below the adverbial *noen ganger* 'sometimes', resulting in the reading that sometimes, I should have listened to him but didn't.

To be sure, there is more to be found out about under what conditions O can or must attach at what type t levels as far as alternatives induced by X are concerned, but it is safe to say that the flexibility which is afforded by the grammatical theory in this regard (see, e.g., Chierchia et al (2012, 2318)) is welcome.

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[52]Source: https://www.fahrschulforum.de/fuehrerschein/Stopschild,110764_msg.html
[53]Source: https://banenor.brage.unit.no/banenor-xmlui/handle/11250/154372
[54]Source: https://www.ta.no/pulsen/mellom-barer-og-bedehus/s/1-111-5690207

6 Counterfactual conditionals

The non-actualistic mood has been defined as an operator that operates on modals (see section 5.2, in particular (45)). The notion of a modal is general: any expression with a denotation of type $(st)t$ or, in the composition scheme adopted in section 5.2 (see footnote 42), a meaning of type $(st)(st)$, mapping a proposition to a truth value or to another proposition. Such an expression may now be silent, more accurately, it may be that all that's audible of it is an 'if' clause; then the 'modal' is, following Kratzer, a silent necessity operator whose modal base is restricted by that clause or, following Lewis, a binary conditional operator halfway saturated.

In any case, we get a conditional, and if the non-actualistic mood X applies, it applies to the unary propositional operator that inputs the conditional consequent. In consequence, a non-actuality entailment will standardly be derived for this, the consequent, and in principle, nothing will be said about the antecedent. However, if a non-actuality entailment is indeed derived for the consequent, together with it the conditional will entail that the antecedent is non-actual too, per modus tollens. It can happen, though, that a non-actualistic entailment fails to get off the ground; this is the situation with 'semifactuals', where the alternative is 'non-excludable'.
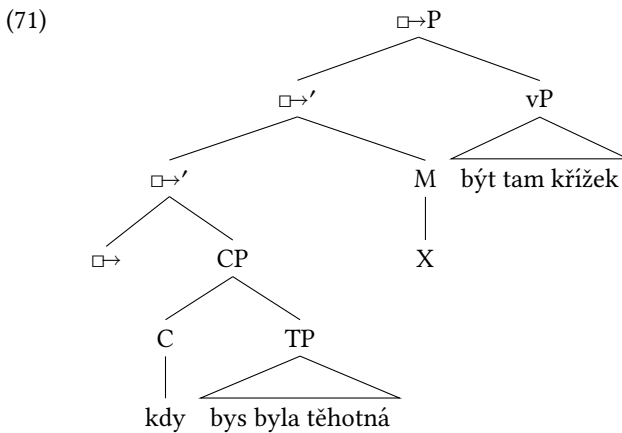
These and further issues are treated in more detail in the following subsections.

6.1 A standard case

Consider the Czech sentence (70):

(70) Kdybys   byla   těhotná, byl by   tam křížek.[55]
      if-are.SUBJ.2SG been.F pregnant been is.SUBJ there cross
      'If you were pregnant, there would be a plus sign.'

It can be assigned an LF as sketched in (71), broadly following Lewis (1973):

(71)

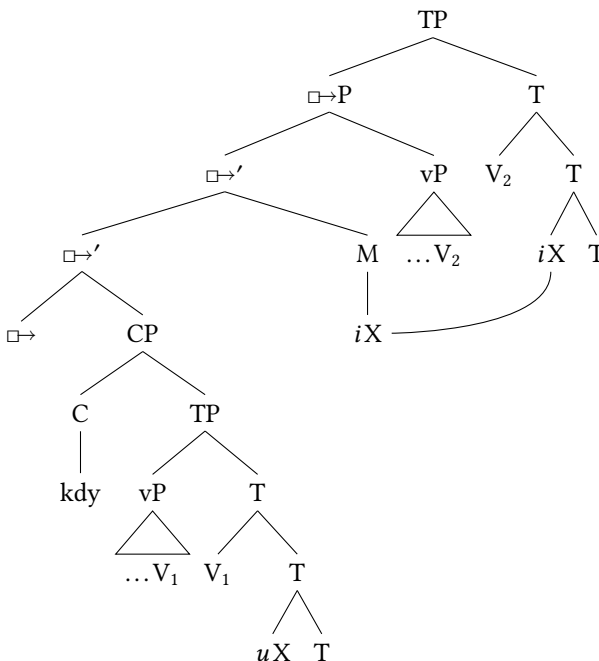[55]Source: https://www.zenysro.cz/blogy/vztahy-a-partnerstvi/dve-carky-povidka-dozvedet-se-vysledek-nemusi-byt-vzdycky-vyhra

Its alternative semantic value, the ASV, will be as outlined in (72):

(72) $[\![\,(70)\,]\!]^A$ = $\{\lambda w \,\square\!\!\rightarrow_w (\lambda v$ you are pregnant in $v)(\lambda v$ there is a plus sign in $v)$, λw there is a plus sign in $w\}$

When this and the ordinary semantic value, the OSV, are fed to the exhaustifier O, the OSV becomes as in (73):

(73) $\lambda w \,\square\!\!\rightarrow_w (\lambda v$ you are pregnant in $v)(\lambda v$ there is a plus sign in $v)$ ∩ λw there is no plus sign in w

In other words, the non-actualistic mood effects the non-actuality entailment that there is in fact no plus sign on the pregnancy test. And by modus tollens, which is valid on standard possible world analyses of conditionals (though see Yalcin (2012) for a critical discussion), it follows that you are also not pregnant.[56]

Note that the subjunctive marking in the antecedent clause is not in a position to be interpretable, as there is no modal there. But thanks to the modus tollens effect just noted, it is not necessary for it to be interpreted, as the antecedent inherits the non-actuality entailment from the consequent. Instead, the marking can and must be treated as a reflex of that in the consequent clause, as a case of 'mood concord'.

More specifically, the interpretable (i) - uninterpretable (u) concord relationship between matrix and 'if' clause mood marking has an illustration in (74).

(74)

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[56] Note that a similar effect of antecedent non-actuality obtains when the conditional is negated if there is a concomitant actuality entailment for the consequent: from NOT($\square\!\!\rightarrow(\phi)(\psi)$) and ψ one can conclude NOT(ϕ). But note also that such an actuality entailment can be preempted if the negation of the consequent is backgrounded, or non-at-issue, so that the negated conditional corresponds to a semifactual, cf. section 6.3.

That the non-actuality of the antecedent is only indirectly predicted when that of the consequent is implicated accords well with one of two arguments put forth by Stalnaker (1975) against a presupposition that the antecedent is non-actual:[57]

> Consider the argument, The murderer used an ice-pick. But if the butler had done it, he wouldn't have used an ice-pick. So the murderer must have been someone else. The subjunctive conditional premiss in this modus tollens argument cannot be counterfactual since if it were the speaker would be blatantly begging the question by presupposing, in giving his argument, that his conclusion was true.

While any theory where antecedent falsity is presupposed is indeed challenged by this argument, the hypothesis that antecedent falsity follows from the implicature of consequent falsity and the truth of the conditional as a whole is, on the contrary, strengthened by it, as the argument simply spells out that same sequitur.

6.2 Elliptical counterfactuals

A further argument in support of the proposal comes from sentences like (7), (8), (9) and (10), repeated here for convenience:

(7)   Jeg hadde vært død nå.
        I   had   been dead now
        'I would be dead now.'

(8)   Ich wäre   jetzt tot!
        I   was.SUBJ now dead
        'I would be dead now!'

(9)   Ja byl by   sejčas mertv.
        I was SUBJ now   dead
        'I would be dead now.'

(10)   Byl bych   ted' mrtvý . . .
        been am.SUBJ now dead
        'I would be dead now.'

The only way to read these sentences is as concealed, or elliptical, counterfactuals, and this receives a straightforward explanation under the proposed analysis.

Note that there is no modal of any kind in these sentences – no overt modal at any rate. However, the mood presupposes a modal of some kind insofar as it needs one to apply to, hence one must assume the covert presence of one. And the only kind of modal that can be covert, according to Kratzer (1978) and much later work, is the necessity modal that appears as the default operator in conditionals, where it is restricted by the antecedent – which in (7)–(10) is a zero pronoun. In this way, the mood sets off a chain of interpretive moves ending in a complete counterfactual.

Note that an elliptical counterfactual can be an overtly modalized clause.

(75)   My ne mogli snimat' na ulicah Peterburga, potomu čto nužno   bylo
        we not could shoot   on streets Petersburg because that necessary was
        by   blokirovat' ulicy, . . .[58]
        SUBJ block   streets
        'We couldn't shoot in the streets of Saint Petersburg because we'd have had to cordon off the streets, . . .'

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[57] The other argument is discussed in section 6.3.
[58] Source: https://paperpaper.ru/rezhisser-blokadnogo-dnevnika-o-s/

It can then be difficult to tell whether the overt modal is part of the consequent or is the modal that serves as conditional operator. On the one hand, the former case will certainly occur, since, as von Fintel and Iatridou (2020) write,

> There is no reason (nor means) to exclude … necessity modals from appearing in the consequent of a conditional.

On the other hand, in an anankastic case like (75), it seems that *nužno* is not affected by the non-actuality entailment but is the modal the mood modifies, whether there is a covert modal on top of it (as argued by Condoravdi and Lauer (2016)) or not.

6.3 Semifactuals and Anderson cases

It has often been noted that the consequent can stay untouched by any non-actuality inference from conditionals. This is particularly so with *semifactuals*, which contain a focus particle 'even' or an additive adverb 'still' associating with the 'if' clause, or more precisely, with the conditional operator including the 'if' clause, and triggering the presupposition of the same sentence under the substitution of the alternative – effectively, the actual world – for the associate.

The upshot is an actuality presupposition for the consequent. That this blocks any non-actuality entailment originating in the mood falls out naturally from the proposed analysis, once the definition of the exhaustification operator is modified to accommodate presuppositions. The key point is that the alternative whose exclusion is key to the non-actuality entailment turns out not to be excludable. Consider:

(76) Esli by Sundbju ne upal, vse ravno obošel   by   ego.[59] (Russian)
      if   subj Sundby not fell all same bypassed subj him

      'If Sundby hadn't fallen, I'd still have overtaken him.'

Let us say that in (76), the additive adverbial *vse ravno* introduces the presupposition that Ustjugov overtook Sundby in the salient alternative to the relevant accessible worlds where Sundby didn't fall and that this alternative is the world of evaluation, where Sundby did fall; (76) is thus only true if Ustjugov did overtake Sundby.

To see that this actuality presupposition overrides any non-actuality entailment for the same proposition, the consequent, (56) must be replaced by a definition of O where its argument is a partial $W \to \{0, 1\}$ function and excludable alternatives are characterized in terms of sets of worlds where ϕ and p are true – (77):

$$(77) \quad [\![\, O \, p \,]\!]^w = \begin{cases} 1 \text{ iff} & [\![\, p \,]\!]^w = 1 \text{ and } \phi^w = 0 \text{ for all } \phi \in [\![\, p \,]\!]^A \text{ such that} \\ & \lambda w' [\![\, p \,]\!]^{w'} = 1 \nsubseteq \lambda w'' \phi^{w''} = 1 \,, \\ 0 \text{ iff} & [\![\, p \,]\!]^w = 0 \text{ and } \phi^w = 1/0 \text{ for all such } \phi \,, \text{ or} \\ & [\![\, p \,]\!]^w = 1 \text{ and } \phi^w = 1/0 \text{ for all and 1 for some such } \phi \end{cases}$$

When O applies to (76), there will be no excludable alternatives, i.e., no $\phi \in [\![\, (73) \,]\!]^A$ s.t. $\lambda w' [\![\, (73) \,]\!]^{w'} = 1 \nsubseteq \lambda w'' \phi^{w''} = 1$, hence no non-actuality entailment will surface.

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[59]Source: https://vk.com/wall-101982925_3603203; I = Sergej Ustjugov

For if (76) is only true if its consequent is true, then the only distinct alternative – the consequent – will include the set of worlds where p is true, leaving O inert.

This reasoning carries over to cases where the consequent is evidently true, in the absence of additive particles or adverbials, including so-called 'arsenic cases' or 'Anderson cases', with reference to Anderson (1951): subjunctive conditionals used in support of the truth of the antecedent. Authentic examples are not easy to find, but (78) is one.

(78)   Ist die Feder der   Drosselklappe da?   Die Symptome wären   gleich,
        is the spring the.GEN throttlevalve   there the symptoms were.SUBJ equal
        wenn sie   fehlen würde.[60] (German)
        if   they miss   would
        'Is the throttle valve spring in place? Those would be the symptoms if it was missing.'

As in the examples constructed by Anderson, the consequent is an priori truth – a proposition true in every world of utterance: the symptoms of some engine are the same as they are in the world of utterance. As a subjunctive-activated alternative to the conditional, that proposition includes any set of worlds, hence the proviso built into (77) – $\lambda w' [\![p]\!]^{w'} = 1 \not\subseteq \lambda w'' \phi^{w''} = 1$ – cannot be satisfied. Consequently, nothing about the truth or falsity of the consequent *or antecedent* can be concluded.

6.4 Argument conditionals

Conditionals whose consequents presuppose their antecedents, discussed by, among others, Fabricius-Hansen (1980), Onea (2015) and Schwabe (2016), are a challenge to the proposed analysis. Sentences like (79) are cases in point.

(79)   Tolik   se nesleduj, kdybys   byla těhotná, test by   to ukázal.[61]
        so-much self not-watch if-are.SUBJ been pregnant test is.SUBJ it shown
        'Don't watch yourself so much, if you were pregnant, the test would show it.'

They are challenging because the predicted non-actuality entailment, denying the consequent, would seem to presuppose the antecedent; in the case at hand:

- Antecedent: that you are pregnant
- Consequent: that the test shows that you are pregnant
- Non-actuality entailment: that the test does not show that you are pregnant

And that would conflict with the inference that the hearer is not pregnant.

This tension can be resolved by leaning on the theory of presupposition set out by Schlenker (2008). Here, p̲q (q with p as a presupposition) is semantically equal to p&q (p and q without p as a presupposition). The pragmatics is different, though: to observe the maxim "Be Articulate!", p&p̲q is chosen over p̲q unless p is *transparent*, i.e., unless it is redundant given the context set and the local context.

Now p is indeed transparent when it is presupposed in a conditional consequent and identical to the antecedent. In this local context, therefore, p̱q is equal to p&q pragmatically and semantically, and (79) is equivalent with

(80)   if you were pregnant, you'd be pregnant and the test would indicate it

where the presuppositional verb *show* is replaced by the non-presuppositional verb 'indicate' (granting that this may not be a perfect minimal ±presuppositional pair).

This move shields cases like (79) from any inconsistency and explains how the antecedent is inferred to be false even if the consequent appears to presuppose it.

7 Discussion: Challenges

The proposed analysis leaves open some questions. These concern (i) the weakened non-actuality entailments that can be observed in cases of future time reference, (ii) a compositional dilemma when the mood seems to apply to a propositional attitude predicate instead of a full-fledged modal, and (iii) cases where apparently, the mood occurs in sentences without modalization. Some tentative answers are given below, but definitive answers will mostly have to await further research.

7.1 Non-actuality and future

There is a consensus in the literature that non-actuality entailments rooted in mood are less categorical when the temporal reference is to the future than when it is to the past or the present. Dobrušina (2016, 35, 13) thus writes:

> Buduščee, kak èto neodnokratno obsuždalos' v lingvistike, ne isključaet realizaciju nikakih, daže samyh neverojatnyh situacij (naprimer, "we cannot have a counterfactual to the future as the future is conceptualized as not yet fact" – Iatridou 2000).

> The future, as has been repeatedly discussed in linguistics, does not exclude the realization of any, even the most improbable, situations ...

> V strogom smysle slova v slučae referencii k buduščemu možno govorit' liš' o nizkoj verojatnosti osuščestvlenija situacii, a ne o ee kontrfaktivnosti, ...

> In the strict sense of the word, in the case of a reference to the future, one can only speak of a low probability of the situation occurring, and not of its counterfactuality, ...

In the same spirit, (Fabricius-Hansen et al, 2018, 56) write:[62]

> ...Konjunktiv hat bei Gegenwartsbezug des Modalverbs ... einen geringeren Effekt als bei vergangenheitsbezogener Modalisierung.

> ...When the modal auxiliary refers to the present, the subjunctive has a weaker effect than when the modalization has past time reference.

Weakened non-actuality could be modeled in terms of quantification over possible continuations in branching time (see, e.g., Condoravdi 2002 and Stojanovič 2014).

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[62]It is clear from their examples that this comparatively weak effect is primarily found with future reference. Relatedly, when von Fintel and Iatridou (2020) write that X-marking of necessity modals (in languages like Greek or Hungarian) "comes with a weakening of the modal claim", the examples they cite are future-oriented.

Actually doing so would take us too far afield in the present context, but let us take a close look at a case in point to get a somewhat clearer picture of the facts:

(81)   Man müsste   sofort   anfangen, Treibhausgasemissionen zu
       one   must.PAST.SUBJ immediately begin   greenhousegasemissions to
       reduzieren. Derzeit   sind wir aber auf einem Weg, der   das eigentlich
       reduce   presently are we but on a   way which that actually
       nicht anzeigt.[63] (German)
       not   indicates

       'It is imperative to start reducing greenhouse gas emissions at once, but at
       present we are not heading in that direction.'

The continuation to the modalized, mood marked sentence makes two points clear:

- It cannot be excluded that greenhouse gas emission reductions begin immediately, that is, some continuation of the actual world is contained in the prejacent,

- however: We are not on course for that, in other words, those continuations are not among those where events take their natural course, the 'inertia worlds' – see Dowty (1979, 148) for a locus classicus of this notion.

Thus one might say that the non-actuality entailment induced by the non-actualistic mood plays out as the negation of the prejacent relative to the inertia worlds as far as future time reference is concerned.

7.2 A composition problem: type (st)(et) 'modals'

It has been assumed that the mood needs to compose with something of the logical type of a modal – anything with a meaning mapping one proposition onto another (or a world to a set of propositions). This assumption faces a problem when by all accounts, there is an expression with a modal meaning for the mood to merge with, but that meaning maps a proposition to *a function from individuals to* propositions (or a world to a function from propositions to sets of individuals). Specifically, the mood would seem to attach to a propositional attitude predicate. (32) in section 4.1 was one case in point, and (82) is another.

(82)   Sie hätte   ihn küssen wollen, hielt sich   aber zurück.[64] (German)
       she had.SUBJ him kiss   wanted held herself but back

       'She wanted to kiss him but restrained herself.'

As observed in connection with (32) and as can be noted here, the expectation and the wish are real – the non-actuality inference concerns the complement clause in (32) and the control infinitival argument of the auxiliary *wollen* in (82). This would follow if the mood could apply to the attitude (auxiliary) verb after this has applied to the individual subject argument but before it applies to the proposition, but that runs counter to any conventional semantics for propositional attitudes.

There are three possible solutions to this dilemma:

1. Define another variant of $[\![\,X\,]\!]$, one that inputs functions from propositions to functions from individuals to propositions instead of propositions, and a corresponding variant of $[\![\,X\,]\!]^A$:

   $[\![\,X\,]\!]^A = \{\lambda P_{(st)(e(st))}\, P\, ,\, \lambda P_{(st)(e(st))}\, \lambda p \lambda x\, p\}$

2. introduce another composition principle, additionally to functional application, etc., to take care of the composition of X and a propositional attitude predicate:

   $[\![\,\alpha_{((st)(st))((st)(st))}\, \beta_{(st)(e(st))}\,]\!] = \lambda p_{st} \lambda x_e\, [\![\,\alpha\,]\!](\lambda q_{st}\, [\![\,\beta\,]\!](q)(x))(p)$

3. LF raise the complement clause and attach X below that but above the associated variable binder – as in this rudimentary LF for (82):

   $\mathrm{X}(\mu_i(\textsc{woll}(\phi_i)(\textsc{she})))(\textsc{kiss}(\textsc{he})(\textsc{she}))$
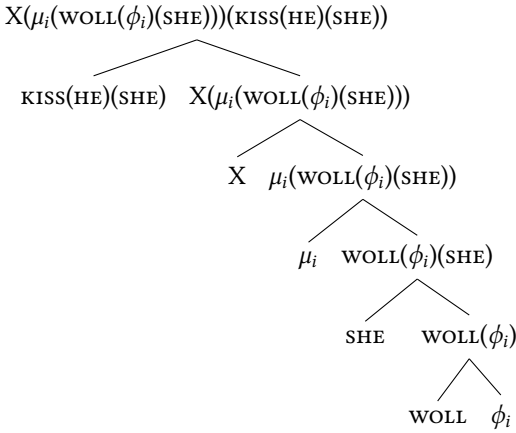
   μ abstracts over the variable left by the raised complement clause $\textsc{kiss}(\textsc{he})(\textsc{she})$ and thus creates the appropriate logical type for X to apply to.

All three solutions have some theoretical cost to them, but in a general perspective, all three also have precedents in the literature; for example, the first one is matched by the split adnominal/adverbal treatment of the intensifier *-self* by Eckardt (2001), the second has a model in the rule for combining transitive verbs with quantifiers defined by Barwise and Cooper (1981), and the third broadly mimics the generalized notion of QR employed by Grønn and von Stechow (2016) in connection with tense.

7.3 When a modal seems to be missing

As defined, the X mood requires a modal, even if this modal is only covertly present, as so often in conditionals, elliptical or not. But there are a couple of constructions which are usually X-marked yet lack an overt modal and where it is not clear how to posit a covert one. One is the free-standing 'if' clause in the role of an optative, another is the equative, or similative, 'as if' construction.

7.3.1 Insubordinate conditional clauses

Insubordinate conditional clauses used as exclamatives, more particularly optatives, are standardly X-marked. (83) and (84) are cited by Grosz (2012):

(83) Kdyby jen dnes pršelo!
      if-is.subj only today rained
      'If only it rained today!'

(84) Esli by ja tol'ko byl bogatym!
      if   subj I only was rich
      'If only I were rich!'

Grosz (2012) argues against a description of these clauses as elliptical conditionals where the matrix is elided, and for an analysis with an exclamation operator which maps a proposition to an expressive meaning. While this operator is not a modal in the narrower sense of an operation on propositions, we could define a version of X which activates the identity function as an alternative to it. But since this operator takes its argument from the truth conditional to the felicity conditional dimension, it would be unclear how to handle alternative semantic values and exhaustification.

The alternative is to regard the lone conditional clause as comprising a modal in the narrow sense after all, a covert necessity modal restricted by a null pronominal antecedent proposition p, as sketched in (85).

(85) $[[[\Box \rightarrow [_{CP}$ kdy $[_{TP}$ by dnes pršelo $]]]$ X $]$ $[_{vP}$ p $]]$

As before, the overt X mood is uninterpretable in its *kdy* 'if' CP; its c-commanding, covert counterpart in the matrix structure, on the other hand, is interpretable.

For such an analysis to be viable, the 'ellipsis' involved must be a case of 'deep', not 'surface', anaphora (see Hankamer and Sag 1976), and one must be able to show that the silent pronoun p will not always have a default value in terms of speaker preference but can be more narrowly contextually resolved. This point is borne out. (86) was written in response to a post by a tattooist advertising her services:

(86) Hätte   ich bloß Geld [65] (German)
      had.subj I   only money
      'If only I had the money'

In this case, p would be resolved to 'I book an appointment'. (87) now was spoken by the Roman emperor Trajan staring eastward across the Persian Gulf; p would in this case be resolved to 'I invade Persia'.

(87) Esli by tol'ko ja byl molože … [66] (Russian)
      if   subj only   I was younger
      'If only I were younger '

So-called exophoric uses (see Miller and Pullum 2013) also seem possible, where the non-linguistic context is what supplies the content of the null pronoun; for (86), we may think of a situation where speaker and hearer peer into a toy shop window, and (87) might be spoken by a person who hears a band strike up and *would dance.*

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[65]Source: https://www.facebook.com/2277074489235310/posts/2966485773627508/
[66]Source: https://history.wikireading.ru/2509

Interestingly, Bech (1951, 25) considered a contextually determined conditional consequent to be generally present with Czech insubordinate *kdyby* clauses:

> Bisweilen ist der *kdyby*-satz mit keinem übergeordneten satze verbunden. Es muss dann dem kontexte gemäss entschieden werden, was zu katalysieren ist.

> Sometimes the *kdyby* clause is not connected with any superordinate clause. Then it must be decided what to interpolate according to the context.

For Bech, the optative flavor is a secondary effect which may or may not occur.

Summarizing, while the account of X-marking proposed here is at odds with the theory of insubordinate X-marked conditional clauses put forth by Grosz (2012), a case can also be made for an alternative theory which would be a better fit. To lend further substance to this theory, it would also be necessary to address Grosz's core argument against an ellipsis approach (Grosz, 2012, 121ff.); that, however, would go beyond the scope of the present paper.

7.3.2 'As if' clauses

Another class of X-marked 'if' clauses which appear not to be parts of conditionals are those that form adverbials with an equative particle: German *als*, Russian *kak*, Norwegian *som*, Czech *jako*, as in (88).

(88) Musíte vypadat, jako kdybyste byl   upadl do neštěstí.[67] (Czech)
      must   look   as   if-are.SUBJ been fallen in unluck

      'You must look as if you had fallen into misery.'

Again, recent work argues against positing a conditional modal for the 'if' clause to restrict or halfway saturate: Bledin and Srinivas (2019) describe English *as if* as an atomic complementizer whose mother CP adjoins to VP. And again, that argument has to be countered for the X-marking to be accounted for along the present lines. While that would lead us too far, it is interesting to note that here, too, Bech (1951, 25) generally assumes a 'latent' conditional consequent:

> Das vorausgesetzte z-feld ist hier latent (katalysierbar); dass es wirklich latent vorliegt, ist ja ganz klar: man kann ohne weiteres einen konjunktivsatz ... ergänzen.

> The presupposed z field is here latent (can be interpolated); that it really is latently present is quite clear: a subjunctive clause can readily be supplemented.

(88) is thus equivalent with (89):

(89) Musíte vypadat, jak byste   vypadal, kdybyste byl   upadl do neštěstí.[67]
      must   look   as are.SUBJ looked   if-are.SUBJ been fallen in unluck

      'You must look as you would look if you had fallen into misery.'

In the present perspective, once a contextually determined conditional consequent is there, it can serve as the argument of a covert necessity modal restricted by the 'if' clause and modified by the mood.

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[67] Cited by Bech (1951, 25)

8 Conclusions

The task taken on in this paper is one of long standing: How to define the meaning of the mood, or the tense, or the combination of a mood and a tense, which can be observed – in the four languages Czech, Russian, German and Norwegian at least – to signal that something is not the case. The task is challenging for several reasons, but in part because the entailment of non-actuality is so volatile: It can be strong, or it can be weaker, and it can be missing altogether.

Two new observations have been added: the entailment can be one of *actuality*, and it can be about a proposition expressed in a clause *below* the 'X marked' one. These findings cast doubt on any theory where the mood applies to a proposition, and on any theory where the mood triggers a presupposition; they point instead to a theory where the mood applies to a modal and triggers an implicature.

Such a theory, transparent and compositional, has been proposed and shown to account for all the cases that have been central in the discussion, in particular with regard to conditionals, but also to cover a wider field empirically than conditionals.

Thus the lack of a non-actuality entailment for the consequent of a semifactual turns out to follow from the definition of the exhaustifier; so-called Anderson cases follow the same pattern. Generally, when non-actuality entailments fail to surface, the alternative is weaker than the ordinary semantic value and thus not excludable. When future events are at issue and entailments are there but less strongly, this is understandable against the background of a natural theory of future reference, and when non-actuality turns actuality in negative contexts, that is predictable given a location for the negation between the exhaustifier and the X mood.

Finally, when the mood, together with some kind of modal, is in a matrix clause while its entailment concerns the embedded clause, this is as it should be because a modal prejacent is always what the entailment concerns.

At a descriptive level, then, more predictions and more precise predictions are made by the proposed theory than by any previously proposed theory.

Theoretically, the proposal boils down to just one assumption: the mood has a vacuous ordinary semantic value but its alternative semantic value adds to that the function that maps any modal to the identity function. It boils down to this because all else follows from the general theory of alternatives and exhaustification.

That assumption is, to be sure, a stipulation, tailor-made to account for the facts, and as such it may not be as explanatory as one might wish for. But it is important to note that any direct definition of the meaning of a morpheme will be stipulative in this sense; it cannot be expected to have independent motivation or be rooted in anything more basic. Even so, note might also be made that the contrast between a modality, any modality, and actuality, 'grammaticalized' by the X mood morpheme, may seem as basic and natural a distinction for grammaticalization as any.

Loose ends do remain: Section 7 surveys some, but ends on inconclusive notes, and further questions, concerning, in particular, (i) the interaction of modality with temporality, (ii) interdependencies between the mood and different 'modal flavors', and (iii) the relationship between the proposed theory of non-actuality entailments and theories of actuality entailments, must also be left open for future research.

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