Mapping irreality

Kilu von Prince

Göttingen, 16 May 2018

Background The actual, the	e counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Structure of the talk

Background

The irrealis debate

2 The actual, the counterfactual and the possible Daakaka: a tripartite system

A tripartite branching-time model

3 A new understanding of counterfactuality Counterfactual implicatures The meaning of English Simple Past

Epistemic modality

The puzzle of *must* Tense and modal flavors

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The realis/irrealis distinction: Nanti

- (1) a. o=pok-Ø-i maika
 3.NONM.SBJ=come-IPFV-REAL.I now
 "She is coming now."
 b. o=n-pok-Ø-e kamani
 3.NONM.SBJ=IRR-come-IPFV-IRR.I tomorrow
 "She will come tomorrow."
 c. te=ra o=n-pok-e
 - c. *te=ra o=n-pok-e chapi* NEG.REAL=TEMP 3.NONM.SBJ=IRR-come-IRR.I yesterday "She did not come yesterday."

from Michael (2014)

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Irrealis: definitions

• de Haan (2012): the set of unreal events

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- de Haan (2012): the set of unreal events
- · Cristofaro (2012): unrealized states of affairs

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 - potential events

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 - · potential events
 - · conditionals (indicative, counterfactual)

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 - · events qualified by modality

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 - commands

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 - (negation)

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 - · events qualified by modality
 - commands
 - (negation)
 - (habituals)

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 - · events qualified by modality
 - commands
 - (negation)
 - (habituals)
 - (interrogatives)

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Irrealis: The criticism

• It is not clear that *unrealized states of affairs* should be a cognitive primitive (Cristofaro, 2012).

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Irrealis: The criticism

- It is not clear that *unrealized states of affairs* should be a cognitive primitive (Cristofaro, 2012).
- In many languages, the realis/irrealis distinction is not a binary one (Bybee *et al.*, 1994).

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Irrealis: The criticism

- It is not clear that *unrealized states of affairs* should be a cognitive primitive (Cristofaro, 2012).
- In many languages, the realis/irrealis distinction is not a binary one (Bybee *et al.*, 1994).
- The label *irrealis* is assigned cross-linguistically to elements without any semantic overlap (Bybee, 1998; de Haan, 2012).

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The irrealis deba	te		

The proposal

• In this talk, I will motivate that the distinction between realis and irrealis is in fact a cognitive primitive ...

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- ...but the domain of irrealis can further be split into the possible and the counterfactual. ...

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- In this talk, I will motivate that the distinction between realis and irrealis is in fact a cognitive primitive ...
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- and languages may differ with respect to which temporal-modal domains they distinguish.

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The proposal

- In this talk, I will motivate that the distinction between realis and irrealis is in fact a cognitive primitive ...
- ...but the domain of irrealis can further be split into the possible and the counterfactual. ...
- and languages may differ with respect to which temporal-modal domains they distinguish.
- The proposed approach also sheds new light on our understanding of counterfactuality and modality that goes beyond the scope of mood-prominent languages.

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A view from Melanesia



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Daakaka TAM markers

	enclitic	proclitic	monosyllabic
Pos. Realis Neg. Realis	<i>=m</i>	mw=	mwe/mV to
Pos. Potential Neg. Potential	=p =n	<i>W</i> =	wV nV
Distal	= <i>t</i>	t=	tV
(Open Polarity (Change of State			doo) bwet)

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Daakaka realis

- (2) Na=m vyan stoa.
 - 1s=REAL go store
 - a. 'I'm going to the store.'
 - b. 'I went to the store.'
 - c. 'I was going to the store.'
 - d. 'I've been to the store.'
 - e. 'I go to the store.' (on a regular basis)

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Daakaka potential

(3) Eya ma ka: "Da=p lyung vyan pyan!"
 white-eye REAL say 1D.IN=POT bathe go under
 'The white-eye [bird] said: "Let's dive!" (sto04:32)

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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- (3) Eya ma ka: "Da=p lyung vyan pyan!"
 white-eye REAL say 1D.IN=POT bathe go under
 'The white-eye [bird] said: "Let's dive!" ' (sto04:32)
- (4) *barvinye swa ka we luk teve-sye m-ada em* grass one ASR POT grow side.of-3s.POSS 3-1D.IN house 'a grass will grow next to our house' (sto17:13)

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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- (5) bat-en ka wa pe~pyo vyen head-3s.poss ASR POT REDUP~white probably 'its head is white, I think' (exp50:138)

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Daakaka distal

 (6) meu=an na nenyu te melumlum, live=NM ATT yesterday DIST quiet
 'the life of before was easy, it was easy, [but the life of today is hard]' (con02:90)

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Daakaka distal

- (6) meu=an na nenyu te melumlum, live=NM ATT yesterday DIST quiet
 'the life of before was easy, it was easy, [but the life of today is hard]' (con02:90)
- (7) ko=m ongane ma ge myane uli-sye te pwer 2s=REAL hear REAL be.like with skin-3s.Poss DIST stay 'it feels as if it had a skin' (exp50:36) (sto47:72)

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Daakaka distal

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 2s=REAL hear REAL be.like with skin-3s.Poss DIST stay
 'it feels as if it had a skin' (exp50:36) (sto47:72)
- (8) ka ko=p pwer tevy-an yaapu en=te, te bili ka COMP 2SG=POT stay side.of-3SG.POSS man DEM=MED DISC time say s-amaa mani nyoo tu puo. CL3-2D.POSS money 3PL DIST be.plentiful "If you had married this man, you would have been very rich." (fortune-teller_SB:38)

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Summary: Daakaka moods

- · Realis: actual events of the present or past
- · Potential: future events, possibilities of the present
- Distal: actual (discontinuous) past,¹ counterfactuality

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Unrestricted branching time



• Time can be thought of as a partial order of *indices* (world-time pairs).

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Unrestricted branching time



- Time can be thought of as a partial order of *indices* (world-time pairs).
- I assume that indices can be grouped into sets of synchronous indices (e. g.{i|t(i) = t(i₂)})

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Unrestricted branching time



- Time can be thought of as a partial order of *indices* (world-time pairs).
- I assume that indices can be grouped into sets of synchronous indices (e. g. {i|t(i) = t(i₂)})
- In contrast to previous approaches, I do not assume that quantification is restricted to branches passing through the actual present (von Prince, under review).

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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The actual, the counterfactual and the possible

The precedence relation generates the following three-way distinction:

- (9) a. the actual (past or present): $\{i | i \le i_c\}$
 - b. the counterfactual (past, present or future): $\{i | i \leq i_c, i_c < i\}$
 - c. the possible (future): $\{i | i_c < i\}$



Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Carving up the modal-temporal space



Background 1	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Carving up the modal-temporal space: binary



Nanti:

Irrealis: future; indicative and counterfactual conditionals Realis: actual past and present
Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Carving up the modal-temporal space: tripartite



Daakaka:

Potential: possible future, possibilities of the present; Distal: discontinuous past, counterfactuality Realis: actual past and present

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Up to six distinctions



Close candidate: German

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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The "irrealis" label

(10) Limbu (Tibeto-Burman)

- a. yaŋ kɔtt-u-ŋ-gɔ:ni iŋ-u-ŋ-ba. money have-3P-1sc.AC-IRR buy-3P-1sc.AG-IPF "If only I had the money, I would buy it."
- b. *mɔ-lɔ:s-u-lle gɔ: mis-u-ŋ-mɔn* Ns.As-know-3p-subj then Ns.As-do-3p-cond "They would do it if they knew how."
- (11) Hualapai (Pai, Yuman)
 - a. *olo-h-ch ha: thi:-hi-k-wi* horse-DEM-SUB water 3/3.drink-IRR-SS-AUX/be "The horse is going to drink the water."
 - b. *misi' qech-ch nyi-mi:-k-tho mi-yigo-'* girl 3.be.little-sub 3.sub-cry-ss-cond 2/3-carry-imp "If the baby girl cries, carry her!"

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Carving up irreality: Limbu

- It seems that the irrealis marker in Limbu is restricted to counterfactual contexts of the past.
- The marker labeled as COND might be restricted to counterfactual developments of the future, and also to conditional environments.



Background 0000	The actual, the counterfactual and the possible	A new understanding of counterfactuality 000 000	Epistemic modality 0000 00000
A tripartite brar	nching-time model		

Hualapai

- The description of Hualapai is too sparse to determine the exact reference of IRR.
- · But it seems to refer primarily to the imminent future



Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Irrealis in Limbu and Hualapai





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A tripartite branching-time model					
A tripartite brai	nching-time model	000	00000		

• The branching-time model provides a plausible notion of irreality as a cognitive primitive.

Background 0000	The actual, the counterfactual and the possible	A new understanding of counterfactuality 000 000	Epistemic modality 0000 00000	
A tripartite branching-time model				

- The branching-time model provides a plausible notion of irreality as a cognitive primitive.
- It also allows for a more than binary distinction, which fits with the observation that many mood systems have more than two distinctions.

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- The branching-time model provides a plausible notion of irreality as a cognitive primitive.
- It also allows for a more than binary distinction, which fits with the observation that many mood systems have more than two distinctions.
- It also lets us chart a more precise map of modal-temporal references that could lead to more accurate and less impressionistic application of labels.

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- The branching-time model provides a plausible notion of irreality as a cognitive primitive.
- It also allows for a more than binary distinction, which fits with the observation that many mood systems have more than two distinctions.
- It also lets us chart a more precise map of modal-temporal references that could lead to more accurate and less impressionistic application of labels.
- Other factors, such as semantic type, paradigmatic effects, interaction with aspect, evidentiality, sentence mood and polarity remain to add more complications to the classification of TAM markers.

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- The branching-time model provides a plausible notion of irreality as a cognitive primitive.
- It also allows for a more than binary distinction, which fits with the observation that many mood systems have more than two distinctions.
- It also lets us chart a more precise map of modal-temporal references that could lead to more accurate and less impressionistic application of labels.
- Other factors, such as semantic type, paradigmatic effects, interaction with aspect, evidentiality, sentence mood and polarity remain to add more complications to the classification of TAM markers.
- But at least the core meaning of many tense and mood markers may be understood far more clearly within the proposed system.

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Ramifications: counterfactuality

What follows builds on von Prince (under review).

- (12) If Aisha had taken the train, she would have arrived at 3pm. \rightsquigarrow Aisha did not take the train.
- (13) If Jones had taken arsenic, he would have shown just exactly those symptoms which he does in fact show.
 - Certain types of conditionals and other expressions come with a counterfactual implicature.

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- (13) If Jones had taken arsenic, he would have shown just exactly those symptoms which he does in fact show.
 - Certain types of conditionals and other expressions come with a counterfactual implicature.
 - · How does that happen?

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- (13) If Jones had taken arsenic, he would have shown just exactly those symptoms which he does in fact show.
 - Certain types of conditionals and other expressions come with a counterfactual implicature.
 - How does that happen?
 - What does past have to do with this?

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Implications: counterfactuality

(14) If Aisha had taken the train, she would have arrived at 3pm. \rightsquigarrow Aisha did not take the train.

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Implications: counterfactuality

- (14) If Aisha had taken the train, she would have arrived at 3pm.
 → Aisha did not take the train.
 - Imagine that the QUD for (14) is When did Aisha arrive?

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Implications: counterfactuality

- (14) If Aisha had taken the train, she would have arrived at 3pm.
 → Aisha did not take the train.
 - Imagine that the QUD for (14) is When did Aisha arrive?
 - This is a question about actual indices, not counterfactual ones.

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Implications: counterfactuality

- (14) If Aisha had taken the train, she would have arrived at 3pm.
 → Aisha did not take the train.
 - Imagine that the QUD for (14) is When did Aisha arrive?
 - This is a question about actual indices, not counterfactual ones.
 - Therefore, the answer in (14) does not directly address this question, and the addressee has to figure out why the speaker would say this.

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Counterfactual implicatures: failure to address the QUD

- (15) Q and A are trying to figure out when Aisha arrived. A knows that she did not take the train, but that she had considered taking the train at 9am.
 - Q: When did Aisha arrive?
 - A: If Aisha had taken the train, she would have arrived at 3pm. → Aisha did not take the train.

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Counterfactual implicatures: failure to address the QUD

- (15) Q and A are trying to figure out when Aisha arrived. A knows that she did not take the train, but that she had considered taking the train at 9am.
 - Q: When did Aisha arrive?
 - A: If Aisha had taken the train, she would have arrived at 3pm. → Aisha did not take the train.
 - \rightsquigarrow Aisha probably arrived at some point around 3pm.

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Counterfactual implicatures: failure to address the QUD

- (15) Q and A are trying to figure out when Aisha arrived. A knows that she did not take the train, but that she had considered taking the train at 9am.
 - Q: When did Aisha arrive?
 - A: If Aisha had taken the train, she would have arrived at 3pm. → Aisha did not take the train.

 \rightsquigarrow Aisha probably arrived at some point around 3pm.

...is similar to ...

- (16) Q: How tall is Tracy?
 - A: Her identical twin Stacy is one meter tall. → Tracy's height is about one meter.

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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The puzzle: past and counterfactuality

(17) If Öslem trained more, she would be stronger.

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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The puzzle: past and counterfactuality

(17) If Öslem trained more, she would be stronger.



Figure: Left: Remoteness-based approaches;

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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The puzzle: past and counterfactuality

(17) If Öslem trained more, she would be stronger.



Figure: Left: Remoteness-based approaches; right: backshifting approaches.

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Proposal: a different lexical definition of ESP





Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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Interim conclusions

• Counterfactuality is a property of indices rather than propositions.

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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- Counterfactuality is a property of indices rather than propositions.
- The counterfactuality implicature can be derived as a failure to address the QUD directly.

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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- Counterfactuality is a property of indices rather than propositions.
- The counterfactuality implicature can be derived as a failure to address the QUD directly.
- ESP encodes both counterfactuality and past, but not other modal-temporal references, because of its lexical definition.

Background 0000	The actual, the counterfactual and the possible 000000 0000000000	A new understanding of counterfactuality 000 000	Epistemic modality ●000 ○0000

- (18) Ezra must be in her office.⊢ Ezra is in her office.
 - The sentence in (18) gets an interpretation of epistemic necessity.

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- (18) Ezra must be in her office. \vdash Ezra is in her office.
 - The sentence in (18) gets an interpretation of epistemic necessity.
 - This means traditionally, that in all worlds that are compatible with the speaker's knowledge, Ezra is in her office.

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 - The sentence in (18) gets an interpretation of epistemic necessity.
 - This means traditionally, that in all worlds that are compatible with the speaker's knowledge, Ezra is in her office.
 - But the commitment by the speaker to Ezra being in her office seems significantly weaker than its implication.

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 - This means traditionally, that in all worlds that are compatible with the speaker's knowledge, Ezra is in her office.
 - But the commitment by the speaker to Ezra being in her office seems significantly weaker than its implication.
 - Why should that be so?

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 - This means traditionally, that in all worlds that are compatible with the speaker's knowledge, Ezra is in her office.
 - But the commitment by the speaker to Ezra being in her office seems significantly weaker than its implication.
 - Why should that be so?
 - Some previous answers:

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- (18) Ezra must be in her office. \vdash Ezra is in her office.
 - The sentence in (18) gets an interpretation of epistemic necessity.
 - This means traditionally, that in all worlds that are compatible with the speaker's knowledge, Ezra is in her office.
 - But the commitment by the speaker to Ezra being in her office seems significantly weaker than its implication.
 - Why should that be so?
 - Some previous answers:
 - von Fintel & Gillies (2010): *must* carries an evidential signal.

Background 0000	The actual, the counterfactual and the possible 000000 00000000000	A new understanding of counterfactuality 000 000	Epistemic modality ●000 ○0000

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 - Why should that be so?
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 - Lassiter (2016): proposes "a new model that embeds an existing scalar theory into a probabilistic model of informational dynamics structured around questions and answers".

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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The proposal: another clash with the QUD

(19) Q: Did Georgia smoke after dinner yesterday?A: Georgia ALWAYS smokes after dinner.
Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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 - Yet, even though the assertion is stronger than the simple sentence *Georgia smoked after dinner yesterday*, the speaker commitment appears weaker.

Background	The actual, the counterfactual and the possible	A new understanding of counterfactuality	Epistemic modality
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 - Apparently, the same observations that apply to *must* also apply here:
 - The answer in (19) logically implies that Georgia did smoke after dinner that day.
 - Yet, even though the assertion is stronger than the simple sentence *Georgia smoked after dinner yesterday*, the speaker commitment appears weaker.
 - Violation of Grice's maxim of relation: The QUD is specifically about yesterday. The answer is not. So even though the answer implies an actual answer to the question, it does not represent one itself.

Background 0000	The actual, the counterfactual and the possible 000000 0000000000	A new understanding of counterfactuality 000 000	Epistemic modality

The proposal: another clash with the QUD

- (20) Q: #? Where must Ezra be?
 - Q: Where is Ezra?
 - A: Ezra must be in her office.



Background 0000	The actual, the counterfactual and the possible 000000 0000000000	A new understanding of counterfactuality 000 000	Epistemic modality 000● 00000

Interim conclusions

• Similar to counterfactual conditionals, utterances qualified by *must* usually fail to directly address the QUD.

Background 0000	The actual, the counterfactual and the possible 000000 0000000000	A new understanding of counterfactuality 000 000	Epistemic modality

Interim conclusions

- Similar to counterfactual conditionals, utterances qualified by *must* usually fail to directly address the QUD.
- This is because *must* refers to both actual and counterfactual indices, but most QUDs are about actual indices only.

Background 0000	The actual, the counterfactual and the possible 000000 0000000000	A new understanding of counterfactuality 000 000	Epistemic modality 000● 00000

Interim conclusions

- Similar to counterfactual conditionals, utterances qualified by *must* usually fail to directly address the QUD.
- This is because *must* refers to both actual and counterfactual indices, but most QUDs are about actual indices only.
- The inference is one of epistemic uncertainty or indirect evidence.

Background 0000	The actual, the counterfactual and the possible 000000 0000000000	A new understanding of counterfactuality 000 000	Epistemic modality ○○○○ ●○○○○

Modal flavors



Background 0000	The actual, the counterfactual and the possible 000000 0000000000	A new understanding of counterfactuality 000 000	Epistemic modality

The epistemic interpretation: temporal reference

(21) a.	l must go now.	non-epistemic
b.	I must have misplaced my pen.	epistemic
(22) a.	You may leave now.	non-epistemic
b.	You may have lost your pen on the train.	epistemic
(23) a.	llias will go to the park.	non-epistemic
b.	Ilias will have gone to the park.	epistemic

Background 0000	The actual, the counterfactual and the possible 000000 0000000000	A new understanding of counterfactuality 000 000	Epistemic modality

Looking forward, looking back



Background 0000	The actual, the counterfactual and the possible 000000 0000000000	A new understanding of counterfactuality 000 000	Epistemic modality

Conclusions

· Modality is quantification over non-actual indices.

Background The actu	al, the counterfactual and the possible 0 000000	A new understanding of counterfactuality 000 000	Epistemic modality

- Modality is quantification over non-actual indices.
- Irrealis is (reference to) a specific modal-temporal domain that can be divided into subdomains.

Background The actu	al, the counterfactual and the possible 0 000000	A new understanding of counterfactuality 000 000	Epistemic modality

- Modality is quantification over non-actual indices.
- Irrealis is (reference to) a specific modal-temporal domain that can be divided into subdomains.
- In contexts that are concerned with actual indices, modal expressions create inferences.

Background 0000	The actual, the counterfactual and the possible 000000 00000000000	A new understanding of counterfactuality 000 000	Epistemic modality

- Modality is quantification over non-actual indices.
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- Quantification over both actual and non-actual indices creates an implicature of ignorance, in most contexts.

Background 0000	The actual, the counterfactual and the possible 000000 0000000000	A new understanding of counterfactuality 000 000	Epistemic modality

- Modality is quantification over non-actual indices.
- Irrealis is (reference to) a specific modal-temporal domain that can be divided into subdomains.
- In contexts that are concerned with actual indices, modal expressions create inferences.
- Quantification over both actual and non-actual indices creates an implicature of ignorance, in most contexts.
- This ignorance implicature is the essence of epistemic modality.

Background 0000	The actual, the counterfactual and the possible 000000 0000000000	A new understanding of counterfactuality 000 000	Epistemic modality ○○○○ ○○○○●

Thank you for listening!

Definition: simultaneity

- 1 Every index *i* has a time value t(i).
- 2 There is a strict linear order on time values, such that for every pair t(i), t(i') either t(i) = t(i') or t(i) < t(i') or t(i') < t(i).
- **3** For all *i*, *i*' if i < i' then t(i) < t(i').

Counterfactual implicatures: Anderson conditionals

(24) If Jones had taken arsenic, he would have shown just exactly those symptoms which he does in fact show.

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