

*Find, must and conflicting evidence*¹

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Abstract. *Find*-verbs — English *find*, German *finden*, French *trouver* and their counterparts in other languages — have figured prominently in the literature on subjective language, as they only allow complements that are about matters of opinion, rather than fact. This paper focuses on a lesser-studied property of *find*-verbs: the ban on *must*-modals in their complements and their interaction with epistemics and evidentials at large. The *find-must* ban has been attributed to a clash in subjectivity, with *must*-modals assumed to not be of the right type. We argue instead that the *find-must* ban is of evidential nature: *find*-verbs convey directness, *must*-modals convey indirectness, and their combination is a semantic contradiction. We couch our proposal in terms of von Stechow and Gillies’s (2010) kernels, modal bases responsible for direct knowledge. We show that *find*-verbs ban a variety of indirect markers across languages and further argue that *find*-verbs can embed epistemic modals, but only those that do not semantically encode indirectness, and thus draw a line between semantic vs. pragmatic evidential effects.

Keywords: *find*, *must*, epistemic modality, evidentiality, directness, indirectness, subjective attitudes, semantics-pragmatics division of labor, cross-linguistic semantics

1. Introduction

Starting with Stephenson (2007) and Sæbø (2009), recent years have seen a lot of interest in the so-called *subjective attitudes*, English verbs *find* and *consider* and their counterparts in other European languages, e.g., German *finden* (Lande, 2009; Reis, 2013; Frühauf, 2015), French *trouver* (Bouchard, 2012), Norwegian *synes* (Lande, 2009; Sæbø, 2009) and Swedish *tycka* (Coppock, 2018). For shortness, we will use the term ‘*find*-verbs’ throughout. Such verbs are typically treated as subjective counterparts of *think*: unlike vanilla doxastics (1a), they only allow matters of opinion, rather than fact, in their complements (1b); see also (App.1) in the appendix.^{2,3}

- (1) a. I think that hobbits are ✓**endearing** / ✓**mortal**. [think]
b. I find hobbits ✓**endearing** [subjective] / #**mortal** [objective]. [find]

¹Our work is fully collaborative. The order of authors is alphabetical in odd-numbered publications, and reverse-alphabetical in even-numbered ones. We are eternally grateful to everyone who helped us with data: Todor Koev, Vesela Simeonova (Bulgarian); Josep Quer (Catalan); Erlinde Meertens (Dutch); Felix Frühauf, Robin Hörnig, Sven Lauer (German); Fabrizio Cariani, Paolo Santorio (Italian); A.K. Polster (Norwegian). For feedback on this work, we would like to thank Igor Yanovich, anonymous reviewers at *SALT 30* and *SuB 25*, and audiences at the following venues: the workshop *Evaluative language* (Paris, 2019); Konstanz (2019); Tübingen (2020); Pompeu Fabra University (2020); Web Summer School for Language, Logic and Information (2020); *SuB 25*. We find that any remaining errors must be entirely our own.

²Due to space limitations, the bulk of our data is contained in the appendix: <https://osf.io/nsm32/>. Examples throughout the paper are labeled as follows: (1) for those in the main text and (App.1) for those in the appendix.

³Norwegian *synes* and Swedish *tycka* are dedicated verbs of opinion. Some other *find*-verbs, including in English, also have a discovery sense, which we do not discuss (see Vardomskaaya 2018). Note also that some *find*-verbs, e.g., in German (Frühauf, 2015), have *consider*-like uses, as in *I #find/✓consider Elves immortal*. We leave such uses aside.

English subjective *find* only takes small clauses (Borkin, 1973). Other *find*-verbs can—or must, as in Norwegian and Swedish—take full CPs, but only those that denote matters of opinion (2).⁴

(2) Magda synes NORWEGIAN
Magda be.of.opinion

at kjempesequoiatre-et er et ✓**elegan-t** / #**eviggrøn-t** tre.
COMP giant.sequoia.tree-DEF.N be.PRES INDEF.N **elegant-N** / **evergreen-N** tree
≈ ‘Magda is of the opinion that the giant sequoia is an ✓elegant / #evergreen tree.’

Intuitively, it is clear that *mortal* and *evergreen* are objective characteristics, while *endearing* and *elegant* are in the eye of beholder. Across languages, *find*-complements feature a host of expressions that either are inherently subjective or can be contextually construed as such (Kennedy and Willer, 2016; Reis, 2013):

- textbook predicates of personal taste (PPTs): *delicious, fun* (Stephenson, 2007);
- subjective non-PPT predicates (=evaluatives in Bierwisch 1989): *authentic, mediocre* (1b);
- gradable predicates (*high, tall*) with degree modifiers (Bylina, 2017; Solt, 2018): (8a);
- appearance (*tastes/looks like*) claims (Coppock 2018, see also Rudolph 2020);
- normative claims (Sæbø, 2009; Coppock, 2018), e.g., with deontic modals (3bii, App.17).

However, one class of expressions is systematically bad under *find*-verbs: epistemic *must*-modals. We will call this phenomenon the *find-must* ban. Consider (3). German *müssen*, like *must*, can have epistemic (3ai) and non-epistemic readings (3aii). *Müssen* under *finden* can be read deontically (3bii), but not epistemically (3bi).⁵ Both interpretations are available under *glauben* ≈ ‘think’ (3c) and other doxastics (cf. Lande, 2009:16).

(3) The *find-must* ban GERMAN

- a. Der Tee **muss** aus Japan sein. [matrix clause]
DEF.M tea **□.3SG.PRES** from Japan be.INF
‘This tea must be from Japan.’
(i) ✓**epistemic**: e.g., the taste and color strongly imply that the tea is Japanese;
(ii) ✓**deontic**: e.g., it is an imperative to serve a Japanese tea for certain picky guests.
- b. Magda **findet**, dass der Tee aus Japan sein **muss**. [find]
Magda **find.3SG.PRES** COMP DEF.M tea from Japan be.INF **□.3SG.PRES**
(i) #**epistemic**: ‘Magda is of the opinion that the tea must be from Japan.’
(ii) ✓**deontic**: ‘Magda is of the opinion that the tea has to be from Japan.’
- c. Magda **glaubt**, dass der Tee aus Japan sein **muss**. [think]
Magda **think.3SG.PRES** COMP DEF.M tea from Japan be.INF **□.3SG.PRES**
(i) ✓**epistemic**: ‘Magda thinks that the tea must be from Japan.’
(ii) ✓**deontic**: ‘Magda thinks that the tea has to be from Japan.’

⁴Unless indicated otherwise, examples come from our work with native speakers. Glosses used: 1,3 person, COMP complementizer, DEF definite, DIR direct, F feminine, IND indirect, INDEF indefinite, INF infinitive, INFER inferential, N neuter, PL plural, PRES present, PRT participle, REP reportative, SG singular, SUBJ subjunctive.

⁵For some speakers, a deontic reading of (3b) is bad as well because *müssen* implies objective necessity and therefore may not be licensed under *finden*. Subjective deontics, e.g., *sollen* ≈ ‘should’, are good under *finden* even for those speakers (App.17). We thank Martina Wiltschko and Louise McNally for pointing this out to us.

Note that *müssen-under-finden* is bad even when paired with a subjective predicate *lecker* ‘delicious’ (4a), even though *must+delicious* is a felicitous combination on its own (4b).

(4) The *find-must* ban, continued GERMAN

a. #Magda **findet**, dass der Tee **lecker** sein **muss**.
 Magda **find.3SG.PRES** COMP DEF.M tee **delicious** be.INF **□.3SG.PRES**
 Intended: ‘Magda is of the opinion that the tea must be delicious.’

b. ✓Der Tee **muss** **lecker** sein.
 DEF.M tee **□.3SG.PRES** **delicious** be.INF
 ‘The tea must be delicious.’ (e.g., it is freshly brewed and the color is just right)

Find-verbs in several other languages behave the same way and ban epistemic *must*-modals in their complements, as shown in the appendix (App.2-5); see also Coppock (2018) on Swedish and Sæbø (2009) on Norwegian.⁶ In this paper, we focus precisely on this lesser-studied property of *find*-verbs, as well as on their interaction with epistemics and evidentials at large.

Prima facie, *must* should be licensed under *find*, given that epistemic modals are generally expected to be licensed under doxastic attitudes (Hacquard and Wellwood, 2012; Anand and Hacquard, 2013). The existing literature offers a type-theoretic explanation of the *find+must* ban. Embedding under *find* has been argued to be the most reliable diagnostic of linguistic subjectivity, one that has to be treated in a special way by the grammar, e.g., as being relativized to a judge/assessor (see discussion in Kennedy 2013; Bylinina 2017; Coppock 2018, Anand and Korotkova forth.). To this end, *find*-verbs have been analyzed as selecting for subjective propositions and *must*-modals have been considered simply not to supply the right type of complement (Sæbø, 2009; Coppock, 2018).

We take a different route. We assume that epistemic modals as a class can be subjective, at least based on their patterns of conversational disagreement (Egan et al., 2005; Stephenson, 2007; MacFarlane, 2014; Khoo, 2015). As such, those modals should be prime candidates for embedding under *find*. We argue that the ban on *must*-modals is orthogonal to subjectivity and is due to an evidential clash. *Find*-verbs encode directness (first proposed, but not shown, by Stephenson 2007), *must*-modals encode indirectness (von Stechow and Gillies, 2010, 2021), and the resulting combination is contradictory. The evidential explanation of the *find-must* ban has been mentioned in Frühauf (2015) and rejected in van Wijnbergen-Huitink (2016), but, to the best of our knowledge, the idea has not been fully spelled out before. We provide the first formal proposal of the evidential incompatibility between *find*-verbs and *must*-modals and support it by novel data from Bulgarian, Catalan, Dutch, German, and Italian. We further argue that *find*-verbs can embed epistemic modals but only those that do not semantically encode indirectness, and thus draw a line between semantic vs. pragmatic evidential effects.

We proceed as follows. Section 2 provides evidence for the directness of *find*-verbs and demonstrates that they ban a variety of indirect elements, including bona fide evidentials. Section 3 introduces the formal proposal, couched in the frameworks of von Stechow and Gillies 2010; Anand and Hacquard 2013; Anand and Korotkova 2018. Section 4 overviews broader implications of our view for non-evidential modals and non-indirect evidentials. Section 5 concludes.

⁶Epistemic *must* is licensed under ‘discovery’ *find* in English: We **find** that [the date] **must have been** a few thousand million years ago, in general agreement with the [...] age of the universe. (Gamow 1948, *Nature* 162).

2. Empirical landscape

Our approach to the puzzle relies on the notions of directness and indirectness that originate in the literature on evidentiality (Willett 1988 and later work). In languages that have grammatical means to indicate how a proposition was acquired, there is a ubiquitous distinction between information that was learned *directly*, often via perceptual channels, and information learned *indirectly*, e.g., via inference or hearsay (see discussion and references in Aikhenvald 2018). We propose that this distinction plays a central role in the domain of subjective attitudes. Our proposal has two core components: (i) that *find*-verbs semantically encode directness and (ii) that their complements are semantically incompatible with markers of indirectness, including *must*-modals. This section provides empirical evidence for each of the two.

2.1. Directness of *find*-verbs

The idea that *find*-verbs have something to do with directness is not new. It has been first proposed by Stephenson (2007) based on the contrast between English *find* and *think*. Consider (5). Only (5a), but not (5b), commits the speaker to having tried matsutake mushrooms, a rare delicacy, which suggests that *find*, but not *think*, imposes a firsthand experience requirement. We will call this requirement an Acquaintance Inference (AI).

- (5) a. I **find** matsutake mushrooms **delicious**, #though I have never eaten them.
b. I **think** that matsutake mushrooms are **delicious**, ✓though I have never eaten them.

Examples like (5) have later come under scrutiny. Bylinina (2017) and Muñoz (2019) argue that English *find* does not encode any firsthand experience, but rather selects for predicates that do. Indeed, classic PPTs such as *delicious* come with their own AI, as (6) shows (see references and discussion in Anand and Korotkova 2018; Ninan 2020).

- (6) Matsutake mushrooms are **delicious**, #though I have never eaten them.

However, as already discussed in Section 1, *find* does not exclusively select for predicates that convey experience, such as PPTs. As the contrast in (7) shows, the presence of *find* triggers an AI even with predicates that do not require it otherwise, such as *authentic*. Unlike (7b), the bare use in (7a) does not require firsthand experience and only commits the speaker to having *some* evidence for their claim (as per the norm of assertion; Williamson 2000). Therefore, only (7a), but not (7b), can be used in a scenario where the speaker lacks direct evidence.⁷

- (7) Context 1 (direct): The speaker has eaten at this restaurant.
Context 2 (indirect): The speaker read reviews about this restaurant on TripAdvisor.
- a. Food in this restaurant is **authentic**. ✓Context 1, ✓Context 2
b. I **find** food in this restaurant **authentic**. ✓Context 1, # Context 2

Solt (2018) reports a similar contrast for gradable predicates in the comparative (infelicitous under *find* in the positive degree): no AI in bare uses (8a), an AI under *find* (8b).

⁷An anonymous reviewer suggests that contrasting *find* with *think* may be more instrumental than with bare uses. However, *think* makes the AI go away even for those predicates that have it otherwise, shown by the contrast between 5b and 6 (Anand and Korotkova, 2018; Ninan, 2020). *Think* (and other attitudes) is thus not informative, so we will stick to bare uses.

- (8) Context 1 (direct): The speaker has ridden a bike over the two streets.
Context 2 (indirect): The speaker has seen the description of the streets' surface.
- a. Weserstrasse is **bumpier** than Friedelstrasse. ✓Context 1, ✓Context 2
b. I **find** Weserstrasse **bumpier** than Friedelstrasse. ✓Context 1, # Context 2
(adapted from Solt, 2018:83)

The pattern in (7) and (8) is robust across languages: *find*-verbs trigger an AI even with those predicates that do not require it on their own (App.7-8). We thus conclude that *find*-verbs semantically encode firsthand experience, in line with Stephenson's (2007) initial observation.

Before we proceed, there is one caveat to this discussion. van Wijnbergen-Huitink (2016) remarks that *find* cannot encode directness because it is easily compatible with abstract concepts (9, App.9), and it is not immediately clear what the AI would look like in those cases.

- (9) **Trovo** **scandaloso** che ITALIAN
find.1SG.SUBJ outrageous.N COMP
tutti noi qui in Europa distogliamo lo sguardo ...
all.PL we here in Europe divert.1PL.SUBJ DEF.M.SG look
'I find it absolutely appalling that all of us in Europe are averting our eyes ...'
(https://www.europarl.europa.eu/doceo/document/CRE-7-2011-06-08-INT-3-538-000_IT.html)

We do not see (9) as contradicting our claim. First, depending on one's views on cognitive phenomenology, examples like (9) can be treated as instances of intellectual acquaintance, with a mental experience also counted as direct experience (cf. Franzén 2018; Vardoms kaya 2018). Second, directness does not always require firsthand perceptual experience: direct evidentials can be also used for claims for which there cannot be any perceptual evidence (10).

- (10) Dios kan=**mi**. CUZCO QUECHUA
God be=**DIR**
'God exists.'
(adapted from Faller 2002:132)

To this end, directness can be broadly construed as having the most reliable evidence for a given proposition (Faller, 2002; Krawczyk, 2012; McCready, 2015). In light of this, (9) in fact can be viewed as supporting our claim that there is a connection between *find*-verbs and direct evidentiality. We suggest that when a direct perceptual experience cannot be available, e.g., with abstract concepts (9, App.9) or deontic modals (3bii, App.4, App.17), *find*-verbs convey that the subject has the most reliable information for the complement. We leave a precise formulation of the distinction between perceptual vs. reliable non-perceptual evidence for the future, and will continue using the term 'directness' in the rest of the paper.

2.2. Indirect markers under *find*-verbs

Following von Fintel and Gillies (2010, 2021) (see also Lassiter 2016; Mandelkern 2019; Roberts 2019), henceforth fVG, we assume that epistemic *must*-modals are incompatible with direct evidence, as they can only be used in inferential scenarios (11a). Bare assertions (11b), on the other hand, are compatible both with direct and inferential evidence (the latter with some restrictions; Menéndez-Benito and Moulton 2021).

- (11) Context 1 (direct): The speaker, looking out of the window, sees a downpour.
Context 2 (inference): The speaker, in a windowless room, sees soaked people entering.

- a. It **must** be raining outside. # Context 1, ✓Context 2
b. It's raining outside. ✓Context 1, ✓Context 2

(adapted from von Fintel and Gillies, 2010:353)

As shown in the appendix (App.10), epistemic *must*-modals in other languages behave the same way and are infelicitous in direct-evidence scenarios (cf. also a remark to this end in von Fintel and Gillies 2010:368). In what follows, we will assume that this restriction is part of their semantics (as opposed to being encoded pragmatically, as in Mandelkern 2019); see the arguments for a semantic treatment in von Fintel and Gillies (2021) and also in Section 4.

The crux of our proposal is that the *find-must* ban is a result of an evidential clash: *find*-verbs require direct evidence for their complement, *must*-modals require lack of direct evidence for their prejacent, and the same proposition is expected to be both known directly and not known directly. This view predicts that other elements associated with indirectness would be also banned under *find*-verbs. This prediction is borne out: *find*-verbs do not license expressions independently known to be indirect, even when those are paired with a subjective predicate.

We illustrate the ban on indirect markers under *find*-verbs for Bulgarian indirect evidential (12a), Dutch hearsay *schijnen* (12b), and German inferential *wohl* (12c). For each of those, corresponding examples without indirect markers in the complement are felicitous.

(12) Indirect markers under *find*-verbs

- a. Indirect evidential (see Izvorski 1997 on its semantics) BULGARIAN
#**Namiram**, če torta-ta (e) bi-**I**-a **vkusn-a**.
find.1SG COMP cake-DEF.F be.3SG.PRES be-**IND**-F **tasty-F**
Intended: 'I am of the opinion that, as I hear/infer, the cake is tasty.'
- b. Hearsay *schijnen* (see Koring 2013 on its semantics) DUTCH
#Ik **vind** dat het eten hier **goed schijnt** te zijn.
I **find** COMP DEF food here **good REP.3SG** INF be
Intended: 'I am of the opinion that the food here is said to be good.'
- c. Inferential *wohl* (see Zimmerman 2008 on its semantics) GERMAN
#Ich **finde**, dass der Tee **wohl lecker** ist.
I **find.1SG** COMP DEF tea **INFER** **delicious** be.3SG
Intended: 'I am of the opinion that the tea is presumably delicious.'

Furthermore, just like with *müssen* (4b) and other *must*-modals (App.6), subjective predicates are perfectly compatible with markers of indirectness on their own, as in (13); see also Anand and Korotkova (2018). In the same vein, those combinations are embeddable under *think* (App.11).

- (13) a. ✓Torta-ta e bi-l-a vkusn-a. BULGARIAN
 cake-DEF.F be.3SG be-IND-F tasty-F
 ≈‘As I hear/infer, the cake is tasty.’
- b. ✓Het eten hier schijnt goed te zijn. DUTCH
 DEF food here REP.3G good INF be
 ≈‘The food here is said to be good.’
- c. ✓Der Tee ist wohl lecker. GERMAN
 DEF cake be.3SG INFER delicious
 ≈ ‘The tea is presumably delicious.’

Given that subjective predicates freely combine with expressions signalling indirectness, we take it that the root of the infelicity in (12) is precisely the presence of such expressions under *find*-verbs. The next section derives this infelicity compositionally.

3. Proposal

We argue that the *find-must* ban is a result of an evidential clash, a claim supported by a more general ban on markers of indirectness under *find-verbs* in languages we have looked at. In a nutshell, we propose that there is a semantic contradiction between (a) the requirement of *must*-modals for the prejacent to not be known directly, and (b) the requirement of *find*-verbs for the complement to be known directly.

3.1. The framework

The key idea is that certain linguistic constructions are sensitive to the distinction between propositions known directly, e.g., via perception, and propositions known indirectly, e.g., via inference (cf. the fundamental epistemological distinction between different sources of knowledge).⁸ To formalize this distinction, we will use kernels (von Fintel and Gillies, 2010), special modal bases responsible for direct knowledge. For any given kernel K , $\bigcap K$ represents all knowledge, both direct and indirect, and is a Kratzerian epistemic modal base.

(14) KERNELS

- a. A kernel K is a set of propositions that are known directly.
- b. The proposition $\bigcap K$ is a vanilla epistemic modal base: the set of worlds compatible with what is known directly and indirectly.

So, for example, if $K = \{p, q, r\}$, where $p = \{w_1, w_2, w_3, w_7\}$, $q = \{w_2, w_3, w_8, w_{40}\}$ and $r = \{w_2, w_3, w_8\}$, then $\bigcap K = p \cap q \cap r = \{w_2, w_3\}$. If there is only one proposition known directly, as in $K = \{p\}$, then all knowledge equals direct knowledge, $\bigcap K = K$, and there is no indirect knowledge. Indirect knowledge, as we discuss below, is always secondary in this system. If there are no propositions known directly and $K = \emptyset$, then nothing is known at all and $\bigcap K = \emptyset$.

We diverge from vFG’s original proposal, where modal bases are part of the context, and treat kernels as part of the evaluation sequence; see also a related relativist framework in Anand and

⁸‘Direct knowledge’ sometimes refers to knowledge obtained via introspection, rather than perception (Lyons, 2017). Following vFG and the linguistic literature on evidentiality we use the term differently here.

Korotkova 2018, where kernels are part of the index. The basic set-up is thus as follows:⁹

$$(15) \quad \llbracket \cdot \rrbracket^{c,g,w,K}$$

So far, we have said nothing about how direct knowledge is encoded. Formally, this is done through direct settlement, which we define in (16) below. Owing to a more general framework in Yalcin (2007), we adopt a view such that any expression ϕ is evaluated in the context of a knowledge state $\cap K$ relative both to all substates $q' \subseteq K$ and all worlds $w' \in q'$.

(16) DIRECT SETTLEMENT (DS) (adapted from von Fintel and Gillies, 2010:374)

$$\text{For } c \text{ and } g, DS(K, \phi) \leftrightarrow \\ \exists q \in K [[\forall q' \subseteq q. \forall w \in q'. \llbracket \phi \rrbracket^{c,g,w,\{q'\}}] \vee [\forall q' \subseteq q. \forall w \in q'. \llbracket \neg \phi \rrbracket^{c,g,w,\{q'\}}]]$$

In order for a proposition to be known directly and thus be part of the kernel, the kernel must directly settle either this proposition or its complement. In addition to knowledge acquired via perception, the kernel includes propositions that are part of general knowledge. $\cap K$ may entail propositions that aren't entailed by any q in K : this is indirect knowledge. Such propositions can be jointly entailed by a conjunction of propositions known directly or indirectly ($\cap K$ is closed under entailment). As an illustration of indirect knowledge, consider (17), uttered by a character well-known for his impeccable reasoning.

(17) Mr. Spock: I speak from pure logic. If I let go of a hammer on a planet that has a positive gravity, I need not see it fall to know that it has in fact fallen.

(American TV Series *Star Trek: The Original Series*, Episode “Court Martial”)

In (17), $K = \{ \text{‘that the hammer was let go on Planet Y’}, \text{‘that Planet Y has positive gravity’}, \text{‘that positive gravity makes objects fall’} \dots \}$. In this case, $\cap K$ will also entail the proposition ‘that the hammer fell’, as it is jointly entailed by the propositions in K .

3.2. The semantics for *must*

As we stated earlier, one core component of our solution to the *find-must* ban is the indirectness of epistemic *must*-modals. To capture this requirement, we analyze *must* as presupposing the lack of direct settlement for its prejacent (18).

$$(18) \quad \llbracket \text{must } \phi \rrbracket^{c,g,w,K} = \forall w' \in \cap K. \llbracket \phi \rrbracket^{c,g,w',\{\cap K\}}, \text{ defined if } \neg DS(K, \llbracket \phi \rrbracket^{c,g,w,K}).$$

(adapted from von Fintel and Gillies, 2010:372)

Modulo how kernels enter the computation, this semantics follows the one offered by vFG. In particular, we make the following assumptions. First, we treat *must* as a marker of epistemic necessity. Weak analyses of *must* would get our data as well, provided that they have an evidential component (e.g., Lassiter 2016 and Kratzer 2012, but not Giannakidou and Mari 2016; Goodhue 2017), since we predict that all markers of indirectness behave the same way with respect to embedding under *find*-verbs (Section 4). Second, we treat the evidential signal as hard-wired. This is an essential part of our account. Third, the evidential signal is a presupposition (18). This is done for expositional purposes only, and a more refined semantics where

⁹We use worlds of evaluation instead of indices for simplicity of representation. Nothing hinges on this.

the evidential signal is a different type of not-at-issue content would work as well; see Roberts (2019) on epistemic modals and Korotkova (2020) on evidential meaning and not-at-issueness.

Given (18), we can derive (11a), repeated below as (19). *Must*-claims will only be defined in those contexts where the kernel does not directly settle the prejacent, thus excluding contexts where the speaker perceives the raining situation.

(19) #Context 1 (direct): The speaker, looking out of the window, sees a downpour.

✓Context 2 (inference): The speaker, in a windowless room, sees soaked people.

It **must** be raining outside. [=11a]

$r =$ ‘that it is raining outside’

(20) $\llbracket (19) \rrbracket^{c,g,w,K} = \forall w' \in \cap K.r(w')$, defined if $\neg DS(K,r)$.

a. Undefined in Context 1:

$K = \{$ ‘that water is falling from the sky’, ‘that people get soaked in a rain’ ... }

b. Defined in Context 2:

$K = \{$ ‘that soaked people are entering’, ‘that people get soaked in a rain’ ... }

In Context 1, the kernel directly settles whether it is raining (the proposition ‘that water is falling from the sky’ entails itself) and *must* is undefined in this context. In Context 2, on the other hand, the propositions in the kernel jointly entail that it is raining, but none of them does so on its own. The prejacent is thus not settled directly and *must* is defined in this context.

For the purposes of this paper, it is sufficient to say that natural language has various expressions that are semantically sensitive to the distinction between direct vs. indirect knowledge and that *must*-modals belong in this—not necessarily homogeneous—group. We therefore remain agnostic about the relationship between semantic categories of evidentiality and epistemic modality; see references and discussion in Matthewson (2015, 2020); Korotkova (2016, 2021).

3.3. The semantics for *find*

The second component of our analysis is the directness of *find*-verbs. We formalize it in (21) as a requirement that the proposition in the complement of *find* be directly settled. Other aspects of its meaning are based off standard Hintikka semantics for *think* and *believe*.

(21) $\llbracket \text{find } \phi \rrbracket^{c,g,w,K} = \lambda y.\forall w' \in DOX_{y,w,t} \llbracket \phi \rrbracket^{c,g,w',K_{y,w,t}}$, defined if $DS(K_{y,w,t}, \llbracket \phi \rrbracket^{c,g,w',K_{y,w,t}})$, where $DOX_{y,w,t}$ are worlds compatible with what y thinks in w at t .

We make the following assumptions. First, even though we started in the beginning with the observation that *find*-verbs only take subjective complements, subjectivity is omitted for clarity in our semantics. To get the full picture, our worlds can be easily replaced with Coppock’s (2018) outlooks. Second, we treat the directness of *find* as a classic presupposition, as first proposed in Stephenson (2007) and argued for in detail in Anand and Korotkova (2018). Third, we treat *find* as an intensional operator, as in Stephenson (2007); Kennedy and Willer (2016); Coppock (2018) (though see Sæbø 2009 for an extensional approach). It shifts the world of evaluation and also the kernel, in line with the idea that representational attitudes, including

doxastics, quantify over information states (Hacquard, 2006; Yalcin, 2007; Anand and Hacquard, 2013). Finally, so far we have remained silent as to whose knowledge state is tracked by *must*-modals and other kernel-sensitive elements. In vFG’s original proposal and other contextualist frameworks (e.g., Kratzerian semantics), the knower can be retrieved from context. Ours is a relativist account in which kernels can be manipulated by vanilla intensional quantifiers, including attitude verbs. Once in their scope, the initial kernel, typically anchored to the speaker due to pragmatic defaults, is replaced by the attitude subject’s kernel, thus making that individual the relevant knower. We refer the reader to MacFarlane (2014) for further discussion of relativism about epistemic modality.

Let us see how this works. (22) is an interpretation for a *find*-claim (modified from 7).

- (22) ✓ Context 1 (direct): Magda has eaten at this restaurant.
 # Context 2 (indirect): Magda read reviews about this restaurant on TripAdvisor.

Magda **finds** the food in this restaurant authentic.

$r =$ ‘that food in this restaurant is authentic’

- (23) $\llbracket (22) \rrbracket^{c,g,w,K} = \forall w' \in DOX_{M,w,t}.r(w')$, defined if $DS(K_{M,w,t}, r)$.

a. Defined in Context 1:

$K = \{ \text{‘that Magda tried the food’, ‘that reviews are trustworthy’} \dots \}$

b. Undefined in Context 2:

$K = \{ \text{‘that reviews say the food is authentic’, ‘that reviews are trustworthy’} \dots \}$

The part that we are interested in is the presupposition. As (23) shows, (22) is only defined if the kernel of *find*’s subject, Magda, directly settles whether the food at this restaurant is authentic. Tasting the food is the best way to settle the issue, therefore, the sentence is defined in Context 1. In Context 2, on the other hand, the kernel does not contain a single proposition that entails whether the food is authentic, therefore, *find* is undefined in this context.

3.4. Conflicting evidence

We are now in a position to derive the *find-must* ban, illustrated again in (24).

- (24) Magda **findet**, dass der Tee aus Japan sein **muss**. [=3bii]
 Magda **find.3SG.PRES** COMP DEF.M tea from Japan be.INF **□.3SG.PRES**
 #**epistemic**: ‘Magda is of the opinion that the tea must be from Japan.’
 $r =$ ‘that the tea is from Japan’

We argue that the epistemic interpretation is not available because the indirectness of epistemic *müssen* clashes with the directness of *finden*. Let us start with the interpretation of (24).

- (25) $\llbracket (24) \rrbracket^{c,g,w,K}$
 $= \forall w' \in DOX_{M,w,t}. \llbracket \text{must}(r) \rrbracket^{c,g,w',K_{M,w,t}}$, defined if $DS(K_{M,w,t}, [\text{must}(r)])$ [via (21)]
 $= \forall w' \in DOX_{M,w,t}. \forall w'' \in \cap K_{M,w,t}. \llbracket r \rrbracket^{c,g,w'', \{ \cap K_{M,w,t} \}}$,
 defined if $DS(K_{M,w,t}, [\text{must}(r)])$ and if $\neg DS(K_{M,w,t}, r)$ [via (18)]
 $= \forall w' \in DOX_{M,w,t}. \forall w'' \in \cap K_{M,w,t}. r(w'')$,
 defined if $DS(K_{M,w,t}, [\text{must}(r)])$ and if $\neg DS(K_{M,w,t}, r)$

We are interested in the resulting evidential requirement, repeated below in (26) (the presupposition of *müssen* projects, so we have a conjunction of two presuppositions):

$$(26) \quad DS(K_{M,w,t}, [\text{must}(r)]) \wedge \neg DS(K_{M,w,t}, r)$$

We argue that (26) is in fact contradictory. Let us unpack this statement. We will start with the second conjunct in (26), the indirectness requirement of *must*-modals.

$$(27) \quad \textbf{Lack of direct settlement for the prejacent of } \textit{must}\text{-modals: } \neg DS(K_{M,w,t}, r)$$

- a. $\xrightarrow{\text{via}(16)} \neg \exists q \in K_{M,w,t} [[\forall q' \subseteq q. \forall w' \in q'. \llbracket r \rrbracket^{c,g,w',\{q'\}}] \vee [\forall q' \subseteq q. \forall w' \in q'. \llbracket \neg r \rrbracket^{c,g,w',\{q'\}}]]]$
- b. $\leftrightarrow \neg \exists q \in K_{M,w,t} [[\forall q' \subseteq q. \forall w' \in q'. r(w')] \vee [\forall q' \subseteq q. \forall w' \in q'. \neg r(w')]]$
- c. $\leftrightarrow \neg \exists q \in K_{M,w,t} [[\forall q' \subseteq q. q' \subseteq r] \vee [\forall q' \subseteq q. q' \subseteq \neg r]]$
- d. $\leftrightarrow \neg \exists q \in K_{M,w,t} [[q \subseteq r] \vee [q \subseteq \neg r]]$

Now let us look at the first conjunct in (26), which encodes the directness of *find*-verbs. This requirement amounts to the following in our framework:

$$(28) \quad \textbf{Direct settlement for the complement of } \textit{find}\text{-verbs: } DS(K_{M,w,t}, [\text{must}(r)])$$

- a. $\xrightarrow{\text{via}(16)} \exists q \in K_{M,w,t} [[\forall q' \subseteq q. \forall w' \in q'. \llbracket \text{must}(r) \rrbracket^{c,g,w',\{q'\}}] \vee [\forall q' \subseteq q. \forall w' \in q'. \llbracket \neg \text{must}(r) \rrbracket^{c,g,w',\{q'\}}]]]$
- b. $\xrightarrow{\text{via}(18)} \exists q \in K_{M,w,t} [[\forall q' \subseteq q. \forall w' \in q'. \forall w'' \in q'. \llbracket r \rrbracket^{c,g,w'',\{q'\}}] \vee [\forall q' \subseteq q. \forall w' \in q'. \neg \forall w'' \in q'. \llbracket r \rrbracket^{c,g,w'',\{q'\}}]]]$
- c. $\leftrightarrow \exists q \in K_{M,w,t} [[\forall q' \subseteq q. \forall w'' \in q'. \llbracket r \rrbracket^{c,g,w'',\{q'\}}] \vee [\forall q' \subseteq q. \exists w'' \in q'. \neg \llbracket r \rrbracket^{c,g,w'',\{q'\}}]]]$
- d. $\leftrightarrow \exists q \in K_{M,w,t} [[\forall q' \subseteq q. \forall w'' \in q'. r(w'')] \vee [\forall q' \subseteq q. \exists w'' \in q'. \neg r(w'')]]]$
- e. $\leftrightarrow \exists q \in K_{M,w,t} [[\forall q' \subseteq q. q' \subseteq r] \vee [\forall q' \subseteq q. [q' \cap \neg r] \neq \emptyset]]]$

The crucial step, baked into our formulation of direct settlement in (16), is that an expression is evaluated both relative to all knowledge substates $q' \subseteq q$ and to all worlds $w' \in q$ (cf. also related moves in Anand and Hacquard 2013 and the downward closure operator in inquisitive semantics; Ciardelli et al. 2019). Because of this, the second conjunct in (28e) is stronger than the claim that some element q of the kernel intersects $\neg r$. It in fact requires that $q \subseteq \neg r$. Every world w in q defines a knowledge substate: $\forall w'. [w' \in q] \leftrightarrow [\{w'\} \subseteq q]$. Therefore, if $\forall q' \subseteq q. [q' \cap \neg r] \neq \emptyset$, then $\forall w'. [w' \in q'] \rightarrow [w' \in \neg r]$, or $q' \subseteq \neg r$.¹⁰

- (28) e. $\leftrightarrow \exists q \in K_{M,w,t} [[\forall q' \subseteq q. q' \subseteq r] \vee [\forall q' \subseteq q. [q' \cap \neg r] \neq \emptyset]]]$
- f. $\leftrightarrow \exists q \in K_{M,w,t} [[\forall q' \subseteq q. q' \subseteq r] \vee [\forall q' \subseteq q. q' \subseteq \neg r]]]$
- g. $\leftrightarrow \exists q \in K_{M,w,t} [[q \subseteq r] \vee [q \subseteq \neg r]]]$

¹⁰The same can be proved by contradiction. Let us assume that the above is not true, namely, that $[q' \cap \neg r] \neq \emptyset$ and that $\neg [q' \subseteq \neg r]$. Then $\exists v. [v \in q'] \wedge [v \notin \neg r]$. Then $\neg [[\{v\} \cap \neg r] \neq \emptyset]$. However, $\{v\} \subseteq q'$ (every world is related to a substate), which means that we have reached a contradiction and that $q' \subseteq \neg r$.

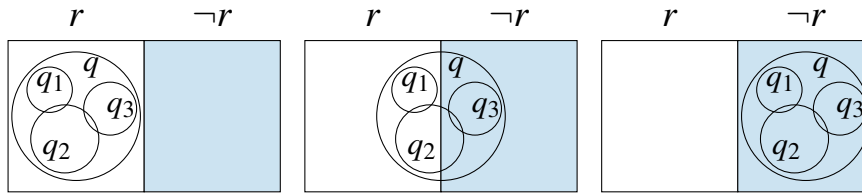


Figure 1: A q entirely inside r or $\neg r$ (end panels) directly settles [must r], since all q_i subsets are inside r or intersect $\neg r$. However, a q that intersects both r and $\neg r$ (middle panel) does not directly settle [must r], since there are q' that aren't subsets of r (q_2, q_3) and q' that do not intersect $\neg r$ (q_1).

Due to the move in (28e,f) the presupposition of *finden* trivializes the presence of *müssen* in its complement. As a result, the joint presupposition of the *finden-müssen* claim in (24) is thus equivalent to the conjunction of requirements that (a) there is a proposition in the kernel that entails r or its complement, and that (b) there is no proposition in the kernel that entails r or its complement. This is also visualized in Figure 1.

(29) **The *find-must* ban**

$$DS(K_{M,w,t}, [\text{must } (r)]) \wedge \neg DS(K_{M,w,t}, r) \\ \leftrightarrow \exists q \in K_{M,w,t} [[q \subseteq r] \vee [q \subseteq \neg r]] \wedge \neg \exists q \in K_{M,w,t} [[q \subseteq r] \vee [q \subseteq \neg r]]$$

Our goal was to prove that the *find-must* ban is of evidential nature. (29) accomplishes this.

There could be alternatives to our solution. One could, for example, pursue a pragmatic route and claim that there is something intrinsically wrong with juxtaposing direct and indirect markers. However, if we are right in assuming that *delicious* and other PPTs have a directness requirement (cf. 6), pure pragmatics will not work, given that the combination *must+delicious* is felicitous across languages. Another alternative would be to have a more refined understanding of direct settlement, one that captures at an epistemological level (and not a semantic one) why one cannot have direct evidence for a modal claim, but seemingly can for other abstracta, like deontic claims and abstract concepts. Yet another alternative, suggested to us by Louise McNally (p.c.) is to treat the relation of direct settlement as downward-entailing on its second conjunct. We leave exploring those options for future research. Whatever the solution, our main claim is that the culprit of the infelicity of sentences like (24)—an infelicity robust across languages (App.4,5)—is not a conflict of subjectivity but a conflict of evidence.

4. Outlook

In this paper, we proposed a novel account of the cross-linguistically robust *find-must* ban. It is rooted in independently motivated evidential restrictions associated with *find*-verbs and *must*-modals, as opposed to previous accounts which treat *must*-modals as not subjective enough to be licensed under *find*-verbs. Furthermore, our view is supported by the behavior of other markers associated with indirectness in Bulgarian, Dutch and German. To our knowledge, this is the first systematic investigation of evidential markers under *find*-verbs (though see a remark in Frühauf 2015:34 on the infelicity of reportative *sollen* under *finden*). Our view makes the following prediction for the distribution of epistemic expressions under *find*-verbs: we expect elements that semantically encode indirectness to be banned under *find*-verbs, for the same

reasons that *must*-modals are. We discuss ramifications of this general prediction below.

Are all epistemic modals banned under *find*-verbs? Consider the contrast between (a) epistemic adjectives, e.g., English *likely*, *probable*, *possible*, and (b) epistemic possibility modals, which we will call ‘*might*-modals’. The former are common under *find*-verbs (30, App.12).

- (30) Descartes **findet** es **wahrscheinlich**, dass Gott GERMAN
 Descartes **find.3SG.PRES** this **likely** COMP God
 die Welt von Beginn an so gemacht hat, wie sie sein sollte.
 DEF world from beginning on so make.PRT have.3SG.PRES how she be.INF should
 ‘Descartes finds it likely that from the start God created the world the way it should be’.

(<http://www.cosmologica.de/metaphysik/descartes1inh.htm>)

Might-modals, on the other hand, are systematically licensed under *find*-verbs only in their non-epistemic guise, as (31b) illustrates for German (cf. also Frühauf 2015:33) and (App.15) for other languages. In matrix clauses (31ai, App.13)¹¹ and under vanilla doxastics (App.14), the epistemic interpretation is available.

- (31) The *find-might* ban GERMAN
- a. Der Tee **kann** aus Japan sein. [matrix clause]
 DEF.M tea ◇ from Japan be.INF
 ‘The tea may be from Japan.’
 (i) ✓**epistemic**: we don’t know where the tea is from, it can also be from Japan;
 (ii) ✓**deontic**: e.g., the tea served for picky guests is allowed to be Japanese.
- b. Magda **findet**, dass der Tee aus Japan sein **kann**. [find]
 Magda **find.3SG.PRES** COMP the tea from Japan be.INF ◇
 (i) #**epistemic**: ‘Magda is of the opinion that the tea might be from Japan.’
 (ii) ✓**deontic**: ‘Magda is of the opinion that a Japanese tea is allowed.’

Both epistemic adjectives and existential possibility modals have been frequently analyzed along similar lines (see references and discussion in Lassiter 2017). At the same time, English *might* has also been classified as a weak indirect evidential (von Fintel and Gillies, 2010; Matthewson, 2015), similar to grammatical evidentials in, e.g., Cuzco Quechua (Faller, 2002) or Cheyenne (Murray, 2017). But if evidential effects of *must* are fairly noticeable through the contrast with bare assertions (11), the picture is less clear with *might*. It is difficult to tease apart indirectness and low degree of certainty (even though conceptually those are distinct), therefore, the evidence regarding the indirectness of *might*-modals has been inconclusive. We propose that the cross-linguistically robust contrast between (30, App.12) and (31b, App.15) indicates that *might*-modals, but not epistemic adjectives, have an evidential component in their semantics. We argue that it is this component that inflicts the *find-might* ban.

¹¹ *Könnte* ≈ ‘could’ (the subjunctive of *können*) is more natural in the epistemic interpretation in (31a), but it does not allow a deontic reading, furthermore, the subjunctive itself may introduce potential semantic complications. For example, Reis (2013:12) mentions examples with seemingly epistemic interpretations of *könnte* under *finden*, but it is not clear if those are truly epistemic or circumstantial. This is the reason we use *kann* in (31). Its most natural interpretation is as a deontic modal but it can also be used epistemically, especially with the addition of modal particles: *Der Tee kann schon auch aus Japan sein*. We thank Felix Frühauf for discussion.

Let us assume that, in addition to being an existential counterpart of *must*, *might*-modals also presuppose that their prejacent is not known directly.

$$(32) \quad \llbracket \text{might } \phi \rrbracket^{c,g,w,K} = \exists w' \in \cap K. \llbracket \phi \rrbracket^{c,g,w',\{\cap K\}}, \text{ defined if } \neg DS(K, \llbracket \phi \rrbracket^{c,g,w,K}).$$

(adapted from von Stechow and Gillies, 2010:373)

The derivation for (31b) mirrors (25), so we omit it for brevity and concentrate below on the resulting evidential requirement for the *finden-können* claim (33).

$$(33) \quad DS(K_{M,w,t}, [\text{might}(r)]) \wedge \neg DS(K_{M,w,t}, r)$$

(33) is, of course, reminiscent of (26) and the second conjunct, which encodes the indirectness of *might*, is computed in the same way as (27). Let us now look at the first conjunct, the requirement for *might*(*r*) to be settled directly.

$$(34) \quad \begin{aligned} \text{a. } & DS(K_{M,w,t}, [\text{might}(r)]) \\ & \xleftarrow{\text{via (16)}} \exists q \in K_{M,w,t} [[\forall q' \subseteq q. \forall w' \in q'. \llbracket \text{might}(r) \rrbracket^{c,g,w',\{q'\}}] \\ & \quad \vee [\forall q' \subseteq q. \forall w' \in q'. \llbracket \neg \text{might}(r) \rrbracket^{c,g,w',\{q'\}}]] \\ \text{b. } & \xleftarrow{\text{via (32)}} \exists q \in K_{M,w,t} [[\forall q' \subseteq q. \forall w' \in q'. \exists w'' \in q'. \llbracket r \rrbracket^{c,g,w'',\{q'\}}] \\ & \quad \vee [\forall q' \subseteq q. \forall w' \in q'. \neg \exists w'' \in q'. \llbracket r \rrbracket^{c,g,w'',\{q'\}}]] \\ \text{c. } & \leftrightarrow \exists q \in K_{M,w,t} [[\forall q' \subseteq q. \exists w'' \in q'. \llbracket r \rrbracket^{c,g,w'',\{q'\}}] \\ & \quad \vee [\forall q' \subseteq q. \neg \exists w'' \in q'. \llbracket r \rrbracket^{c,g,w'',\{q'\}}]] \\ \text{d. } & \leftrightarrow \exists q \in K_{M,w,t} [[\forall q' \subseteq q. \exists w'' \in q'. r(w'')] \vee [\forall q' \subseteq q. \neg \exists w'' \in q'. r(w'')]]] \\ \text{e. } & \leftrightarrow \exists q \in K_{M,w,t} [[\forall q' \subseteq q. \exists w'' \in q'. r(w'')] \vee [\forall q' \subseteq q. \forall w'' \in q'. \neg r(w'')]]] \\ \text{f. } & \leftrightarrow \exists q \in K_{M,w,t} [[\forall q' \subseteq q. [q' \cap r] \neq \emptyset] \vee [\forall q' \subseteq q. q' \subseteq r]] \\ \text{g. } & \xleftarrow{\text{via (28e,f)}} \exists q \in K_{M,w,t} [[\forall q' \subseteq q. q' \subseteq r] \vee [\forall q' \subseteq q. q' \subseteq \neg r]] \\ \text{h. } & \leftrightarrow \exists q \in K_{M,w,t} [[q \subseteq r] \vee [q \subseteq \neg r]] \end{aligned}$$

(34) is equivalent to (28) and the embedding of *might*-modals under *find*-verbs yields the same—contradictory—results as for *must*-modals. The evidential conflict is repeated in (35).

(35) **Find-verbs and conflicting evidence**

$$DS(K_{M,w,t}, [\text{might}(r)]) \wedge \neg DS(K_{M,w,t}, r) \leftrightarrow DS(K_{M,w,t}, [\text{must}(r)]) \wedge \neg DS(K_{M,w,t}, r)$$

$$\leftrightarrow \exists q \in K_{M,w,t} [[q \subseteq r] \vee [q \subseteq \neg r]] \wedge \neg \exists q \in K_{M,w,t} [[q \subseteq r] \vee [q \subseteq \neg r]]$$

In our framework, the factor deciding whether an expression can appear under *find*-verbs is the presence of an indirectness requirement in its semantics (modulo subjectivity). Whenever such requirement is present, we predict an evidential clash. Thus, as we stated earlier in Section 2, our analysis is fully compatible with weak *must*, as in Lassiter (2016) or Kratzer (2012). More generally, our solution does not depend on quantificational force and is thus applicable to a wide variety of evidential markers (including the ones in (12)), which are known to differ in strength/commitment (Murray 2017:17-21, Matthewson 2020).¹² This is a welcome result.

¹²Hearsay evidentials in many languages (AnderBois, 2014), including Dutch *schijnen* in (12b) (Koring, 2013), do not require that the prejacent is even considered a possibility, unlike with *might*-modals. Our system can account

Based on the fact that epistemic adjectives are felicitous under *find*-verbs across languages (30, App.12), we propose that they do not have an evidential component. Such adjectives may seem indirect and are indeed not licensed in direct-evidence scenarios (36, App.16). However, this is a conflict of confidence, not evidence: they simply do not meet the certainty threshold associated with direct perceptual evidence (see Lassiter 2017; Cariani et al. 2018 on their semantics).

- (36) #Context 1 (direct): The speaker, looking out of the window, sees a downpour.
 ✓Context 2 (inference): The speaker, in a windowless room, sees soaked people.
 It is **likely/possible** that it raining outside.

One could argue that epistemic adjectives, but not epistemic modal auxiliaries, are subjective and therefore licensed under *find*-verbs. For all we know, there is no empirical evidence to back this up.¹³ And if embedding under *find*-verbs is to be counted as such, then the argument would become circular. We maintain that *find*-verbs ban semantically indirect expressions in their complements and allow epistemic modals that are not semantically indirect. We thus draw a line between semantic vs. pragmatic evidential effects, which brings us to the next question.

Are all evidential expressions banned under *find*-verbs? In our framework, an expression would be banned under *find*-verbs if it is (a) indirect and if (b) the evidential signal is hard-wired. We thus predict that some evidentials may be allowed under *find*-verbs.

First, evidentiality—broadly construed—is not always analyzed as a semantic phenomenon, and there are accounts of indirectness that derive it pragmatically as an implicature (Faller, 2004; Davis and Hara, 2014; Bowler, 2018; Altshuler and Michaelis, 2020). We predict that such expressions could occur under *find*-verbs (with a caveat, see below). Notably, Mandelkern (2019) argues that the indirectness of *must* is also an implicature. If our take on the *find*-*must* ban is correct, then it is an additional argument against Mandelkern’s pragmatic view.

Second, we only argue that *find*-verbs conflict with indirect markers. To this end, we predict that markers signalling direct evidence, such as Cuzco Quechua =*mi* (10), would not be prohibited. However, we do not expect evidentials to be licensed under *find*-verbs on their own for the following reason. Evidentials have been argued to encode self-knowledge, rather than matters of opinion (Korotkova, 2016, 2019). And other expressions of self-knowledge are odd with *find* and other opinion predicates (37).

- (37) a. # I find myself hungry / lonely / in pain. [good only in the discovery sense]
 b. ?I am of the opinion that I am hungry / lonely / in pain.

We predict that direct evidentials would be licensed under *find*-verbs, but only when paired with a subjective predicate (38).

- (38) a. # I **find** [that [the giant sequoia is **evergreen**] **DIRECT**]] [objective]
 b. ✓ I **find** [that [the giant sequoia is **elegant**] **DIRECT**]] [subjective]

So far we have considered *find*-verbs only in a handful of European languages. We are not yet aware of a language that has both (a) morphologically marked direct evidentiality, as in Cuzco

for that by fine-tuning the information state different markers are relativized to, a task we leave for the future.

¹³English epistemic adjectives, but not *must* and *might*, are gradable, but gradability alone does not a subjective expression make: *I find this paper #short/✓too short*; see Section 1.

Quechua, and (b) a *find*-verb. We hope to be able to find such data in the future.

5. Conclusions

This paper provides a novel account of the *find-must* ban and along the way looks at the distribution of epistemics and evidentials in the complements of *find*-verbs, summarized in (39).

- (39) **The distribution of epistemic and evidential expressions under *find*-verbs**
- a. *must*-MODALS: # epistemic (3bi, App.4), ✓ non-epistemic (3bii, App.4);
 - b. *might*-MODALS: # epistemic (31bi, App.15), ✓ non-epistemic (31bii, App.15);
 - c. EPISTEMIC ADJECTIVES: ✓(30, App.12);
 - d. SEMANTIC EVIDENTIALS: # indirect (12), ✓direct (modulo subjectivity, 38);
 - e. PRAGMATIC EVIDENTIALS: ✓(modulo subjectivity).

Our main claim is that *must*-modals are banned because they are semantically indirect while *find*-verbs are direct. Crucial aspects of our proposal depend on the notions we borrow from von Stechow and Gillies (2010): kernels and direct settlement. It is likely that both need further refinement, as the concept of directness received comparatively little attention even in those works that decompose the notion of evidence (Krawczyk, 2012; McCready, 2015). We can only say this: stay tuned.

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