Wondering about Mood in Romance: the view from Italian inquisitive predicates

MSc Thesis *(Afstudeerscriptie)*

written by

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Abstract

This thesis considers formal approaches to accounting for the distribution of verbal mood (indicative/subjunctive) in Romance languages. Our language of focus is Italian, the most rebellious of the main Romance languages with respect to verbal mood. Italian is widely known to present a puzzle when it comes to belief: for Italian licenses, with a strong preference for, the subjunctive in the complement of *credere* 'to believe'. Yet, a related new puzzle which to date has received no formal treatment is that Italian is also an outlier when it comes *chiedersi* 'to wonder' for here too is the subjunctive licensed and preferred contra to what is seen across the board in Romance for 'to wonder'. In the example below, the mood licensing properties of 'to believe' and 'to wonder' in Italian and French are contrasted:

(1) a. Daniel si chiede se Sandra sia.SUBJ/è.IND colpevole.
b. Daniel se demande si Sandra est.IND/*soit.SUBJ coupable.
'Daniel wonders whether Sandra is guilty'
c. La giuria crede che Sandra sia.SUBJ/??è.IND innocente.
d. Le jury croit que Sandra est.IND/*soit.SUBJ innocente.
'The jury believes that Sandra is innocent'

Whilst current formal approaches to the indicative and subjunctive do not discuss inquisitive predicates, we seek to fill this gap and along the way try to address several other puzzles. Crucially, the two aforementioned puzzles that arise from Italian do not exhaust the number of puzzles that Italian presents in this area. For adding to the complexity of trying to account for Italian is that the language is seen as exhibiting high mood flexibility (as is seen with the emotive factives which license both moods but with no attributable difference in meaning).

In addressing the cross-linguistic puzzles of 'to believe' and 'to wonder', we build on existing work by Mari and Portner 2021 which regards the subjunctive licensing of *credere* to depend on the question of the complement $?p$ being raisable in the common ground but we use the framework of Inquisitive Semantics (Ciardelli, Groenendijk, and Roelofsen 2018) in order to yield predictions for predicates which embed interrogatives.

Our main contributions are as follows: we extensively review three current families of approaches to verbal mood (Chapter 3); we introduce novel cross-linguistic data on inquisitive predicates and discuss the prospects for extending the theories from the previous chapter (Chapter 4); we introduce an implicational map in the style of Haspelmath (Chapter 5) and in Chapter 6 we present a comparison-based theory which can handle embedded interrogatives and thereby give predictions for the mood licensing of inquisitive predicates. Thus providing the first formal account of inquisitive predicates in the verbal mood literature.

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I'd also like to thank Floris Roelofsen for his early encouragement and enthusiasm of the idea to pursue using Inquisitive Semantics in modelling the mood licensing of *chiedersi* – apologies that what started out as a tentative idea for a term paper grew into a thesis! Thanks also to Terry Regier for sharing the code used in Regier, Khetarpal, and Majid 2013 with me and to Rodrigo and Marta, Mayra, and Simon for patiently putting up with me asking for their linguistic judgments in Portuguese, Spanish and French respectively.

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Dedica

A mio zio, per cui, durante circa il ultimo decennio, sognavamo sempre che tutto fosse diverso e, di cui parlavamo usando un modo irrealis più spesso che avessimo desiderato.

Contents

1 Introduction

In everyday life, we care all the time about people's attitudes towards propositions: whether they are sure that they switched the oven off, whether they are happy that Marcelo Bielsa returned Leeds United to the Premier League, whether they think that the 2030 Climate Target will be met, whether they regret that they did not send a particular message. In logic, we are mostly interested in what people believe, in what they know, and, albeit to a lesser extent, what they are wondering about. Such propositional attitudes proliferate our everyday language and a full account of what characterises their meaning, their semantics, rests, in part, on understanding how they vary with so-called verbal mood selection. In Romance languages, verbal mood typically manifests itself visibly in the rich morphology that marks the grammatical categories of the indicative and the subjunctive. Where mood selection and licensing get interesting is that there is significant interlinguistic variation across Romance languages and, in languages such as Italian, also intralinguistic mood flexibility.

To give a flavor of the key puzzle in the literature and to motivate why we desire a theory which is applicable cross-linguistically, consider an Italian speaker learning French. They will soon encounter the fact that, at least in non-negated contexts, 'to believe' in French (*croire*) is followed by the indicative mood in the complement clause whereas in their native Italian *credere* is followed by the subjunctive. They might then ~~pester~~ ask their French teacher for an explanation and be dissatisfied by their hand-wavy response that does not square with Italian. (Years later, they might still be searching for answers and even end up writing a thesis on the matter!)

Now ideally, we would like our formal semantics to result in saying that 'believe' in Italian (*credere*) is not wholly different to 'believe' in French (*croire*). However, as we have just seen a glimpse of, their mood choice patterns vary. Puzzles such as this, among others arising from other predicates, are the subject of this thesis.

In this chapter, we will first discuss mood generally (in doing so we will follow Portner 2018's distinction between verbal mood and sentence mood) and we will then, in Chapter 2, give an overview of the data of key verbal mood patterns in Italian. In this overview, it will become clear that Italian is a particularly heterogeneous and rebellious Romance language with respect to mood selection and licensing.

Then turning to Chapter 3 and focusing on verbal mood, we give an extensive review of previous accounts of the indicative/subjunctive distinction in Romance languages

and highlight the ways in which Italian is resistant to the application of several theories that have been proposed for French and Spanish.

In Chapter 4, we turn our attention to a class of predicates understudied in the verbal mood literature thus far - inquisitive predicates. We discuss the (partial) cross-linguistic pattern as highlighting the idiosyncrasy of Italian. Then we turn to understanding such a pattern from the perspective of Inquisitive Semantics as well as different verbal mood theories' predictions for inquisitive predicates. In Chapter 5, we present an implicational map (hitherto absent from the literature) for mood licensing across Romance for a variety of predicates. In Chapter 6, we present our theory which we arrive at by highlighting that when it comes to certain Italian predicates the raisability of the question of the complement they embed plays a central role in the licensing conditions.

1.1 Modality, Sentence Mood and Verbal Mood

In this section, we give, following Portner 2018's recent overview of studies on MOOD, broad definitions of the following key notions: MODALITY, MOOD, VERBAL MOOD and SENTENCE MOOD. These definitions form important preliminaries to the subject at hand (i.e. verbal mood in Romance) and also serve to establish (a) why mood is, and in particular why verbal mood should be, of interest to logicians, (b) it allows us to see certain existing contributions in logic in terms of providing a partial account of SENTENCE MOOD and (c) it allows us to see some of our contributions as taking the tools from one area of mood (namely, sentence mood) and fruitfully applying them to another (i.e., verbal mood).

Beyond the fact that verbal mood crops up in the complements of propositional attitudes, there is another, more fundamental, reason why mood selection is of interest to logicians: namely, that mood is typically understood as having a close connection to modality – a concept that has received much more extensive treatment in both philosophy and in logic. Portner defines modality as "the linguistic phenomenon whereby grammar allows one to say things about, or on the basis of situations which need not be real" (Portner 2009, p.1).

Now for our purposes it is important to note that modalities are classified[1], according to the linguistic level at which they operate, into the following categories: sub-sentential modality, sentential modality, and discourse modality.

In logic, the standard approach to modality both on a sentential and on a sub-sentential level is to invoke a possible world semantics. This is what Hintikka 1962 did for the sub-sentential modalities that underlie the semantics of the propositional

[1]Of course, they are also classified according to their meaning e.g. deontic, buletic, ability, alethic, epistemic, logical, metaphysical etc. but such distinctions are not the focus of the present discussion. They will, however, be relevant later on in considering the selection of appropriate modal bases in a Kratzerian framework. For reference, Portner uses the broad categories of EPISTEMIC, PRIORITY and DYNAMIC modalities.

attitudes of belief and knowledge and Kratzer's work on ordering semantics from 1977 onwards can readily be seen as an extension of a possible worlds approach to modality.

Turning to MOOD, Portner spells out the close connection between MOOD and MODALITY viewing MOOD as a linguistic means of *expressing* modality and defines MOOD as follows:

"MOOD is an aspect of linguistic form which indicates how a proposition is used in the expression of modal meaning." (Portner 2018, p.4)

At present, the sheer generality of this definition may make it difficult to think of examples of MOOD in action - we'll see some examples in a second. But let's stay on the point of its generality for a moment - its generality allows Portner to differentiate between VERBAL MOOD and SENTENCE MOOD. This distinction is highly useful for our purposes as Inquisitive Semantics is primarily concerned with accounting for the latter and the objective of this thesis is to extend Inquisitive Semantics' use to assisting in a key part of the former.

VERBAL MOOD is an aspect of linguistic form that plays a role in "indicating how the proposition is to be used in the computation of subsentential modal meaning" (Portner 2018, p.48).

In studying VERBAL MOOD we are chiefly concerned with the indicative/subjunctive distinction but certain infinitival structures also come into play when there is subject agreement in the matrix and embedded verb – this is particularly prevalent in languages such as French, Italian and Spanish.[2] We give a comprehensive overview of the distribution of VERBAL MOOD in Italian in chapter 2, for now for simplicity let us see the marking of verbal mood in a minimal pair whose matrix predicate can license both the indicative and the subjunctive:

(1) a. Chiara è contenta che oggi sia venerdì.
Chiara BE.IND happy that today BE.SUBJ Friday.
'Chiara is happy that today is Friday'

b. Chiara è contenta che oggi è venerdì.
Chiara BE.IND happy that today BE.IND Friday.
'Chiara is happy that today is Friday'

Whilst Portner 2018 emphasises that verbal mood operates at the subsentential level, it is worth noting however, that not all formal accounts of verbal mood view it as operating at this level. Indeed in Portner and Rubinstein 2020 a view of verbal mood is put forward which can be viewed as closer to the theory of sentential modality (Portner and Rubinstein 2020, p.379) since it attributes a key role to semantic composition.

In Italian, verbal mood is marked on the verb itself; typically, for regular verbs, the verbal mood marking is given by the suffix. However, whilst Italian, French, Spanish

[2]N.B. This phenomenon is typically called 'subject obviation' but it will not feature heavily in this thesis. Not because such effects don't exist in Italian - they do! - but because it clearly involves the integration of more complex concerns e.g. a treatment of indexicals and PRO constructions which is outwith our current focus.

and Portuguese mark mood on the verb itself, not all languages that have verbal mood do this. Beyond Romance, in Balkan languages (such as Modern Greek (Giannakidou and Mari 2021, p.12)) and Korean (see Kang and Yoon 2022) verbal mood is not marked on the verb but through a richer system of complementizers. Because of such data, the nomenclature is somewhat of a misnomer. However, we will continue to use it as (a) verbal mood in Italian is genuinely 'verbal', and (b) it is useful for our purposes to maintain the verbal-mood–sentence-mood distinction.

Let's now turn to the other key type of mood. Portner identifies SENTENCE MOOD as follows: "SENTENCE MOOD is an aspect of linguistic form conventionally linked to the fundamental conversation functions within semantic/pragmatic theory." (Portner 2018, p.122).
To give some intuition for the functions of verbal mood and sentence mood respectively, Portner (2018) glosses their division of labour as follows: verbal mood indicates how a sentence's proposition is to be used privately – "within the compositional computation of meaning, to describe an individual's mental life" (Portner 2018, p.5) whilst sentence mood has a more public role in indicating how a sentence's proposition is to be used "in a multi-party exchange, to achieve specified communicative functions" (Ibid). To see verbal mood and sentence mood in action in simple settings using only root clauses, consider the following examples in Italian:

(2) a. Ritorna Antonio ad Amsterdam?
returns.PRES.IND Antonio to Amsterdam?
'Is Antonio returning to Amsterdam?'
b. Che Antonio ritorni ad Amsterdam?
that Antonio returns.PRES.SUBJ to Amsterdam?!
'Antonio is returning to Amsterdam?!'

Here we have two root clauses but whilst in the first example we have an interrogative sentence mood with an indicative verbal mood, in the second example we have a non-declarative non-interrogative sentence mood but with a subjunctive verbal mood. In the second example, the speaker conveys astonishment that Antonio is to return to Amsterdam but is neither contributing the information to the common ground nor requesting information in the form of a polar question. The two examples above also motion us toward bringing out the distinction between sentence mood and clause type. Portner 2018 stresses that since clause types are often referred to as being declarative, interrogative or imperative, the two notions of clause type and sentence mood can often get conflated. However, clause types and sentence mood can be teased apart in that, as Portner goes on to distinguish the two, the clause type of a sentence is principally a product of grammatical form whereas its sentence mood is principally a product of its semantics. The point is made even clearer when we look beyond root clauses and consider a sentence with a subordinate clause. This can be seen in the following example of Portner 2018 and we provide the Italian translation to give the reader some

familiarity with Italian interrogative complementizers. In this example, the embedded clause ('who won the race'/'chi ha vinto la gara') can be of an interrogative clause type and yet is arguably devoid of sentence mood as it does not perform the function of actually asking a question.

(3) Everybody knows **who won the race**. (Portner 2018, p.123)
Tutti sanno **chi ha vinto la gara**.

As we shall see, however, in Italian there are reasons to believe that the idea of verbal mood as private and sentence mood as public demands some blurring. The same data also supports the use of formal tools typically employed to give a (partial) account of sentence mood to be extended to give an account of verbal mood. The framework of Inquisitive Semantics (Ciardelli, Groenendijk, and Roelofsen 2018) was introduced to capture sentences with interrogative mood. In Chapter 6 we give a formal analysis of the Italian indicative and subjunctive in a wider range of embedded contexts than previous theories have considered for such theories have not had the machinery to model predicates which can embed interrogatives. In addressing this gap in the literature, we make use of the treatment of propositions from Inquisitive Semantics. In this vein, a key research question we have is: to what extent can formal tools be cross-applied to yield a unified account of core mood?

1.2 Road Ahead

Firstly, in Chapter 2 we present the distribution of the data – concentrating on Italian but also giving the cross-linguistic data; We then, in Chapter 3, review three current families of approaches to verbal mood; we introduce, in Chapter 4 novel cross-linguistic data on inquisitive predicates and discuss the prospects for extending the theories from Chapter 3; in Chapter 5 we introduce an implicational and, finally, in Chapter 6 we present a comparison-based theory which can handle embedded interrogatives and thereby give predictions for the mood licensing of inquisitive predicates. Thus providing the first formal account of inquisitive predicates in the verbal mood literature.

2

Overview of Verbal Mood in Italian

To give the reader an overview of verbal mood in complement clauses in Italian we devote this chapter to the distribution of the data. Verbal mood in Italian is used in the complements of propositional attitudes, with concessives, in the protasis or the antecedent of certain conditionals, among other uses. The thesis is primarily concerned with accounting for verbal mood in expressing propositional attitudes. Thus, we present only the distribution of verbal mood in complement clauses in the main body of the thesis; the rest of the subjunctive's main uses are given in the appendix.

2.1 Verbal Mood and Propositional Attitudes

In this part we largely follow Giannakidou and Mari 2021's extensive delineation of the Italian verbal mood patterns in the embedded clauses of propositional attitudes. With respect to licensing patterns, there are five classes in which we can situate verbs in the indicative-subjunctive selecting spectrum:

I. Strictly indicative selecting

II. Licenses both: mostly indicative, subjunctive allowed

III. Licenses both: mood shift and mood optionality

IV. Licenses both: mostly subjunctive, indicative allowed

V. Strictly subjunctive selecting

Note that verbs belonging to category III can be further sub-divided depending on whether or not the contribution of mood either comes laden with a different interpretation or has licensing conditions that may depend for example on the common ground; alternatively, the interpretation and the licensing conditions may be identical. In cases of the former we will endeavour to talk of *mood shift*, in cases of the latter we will talk of *mood optionality*. In this section, however we will largely use *mood shift* in the way of Giannakidou and Mari 2021 i.e. as a catch-all term for verbs belonging to categories II, III and IV. The cleaned up terminology we will use outside of this section is: *mood flexibility* for categories II, III and IV, *mood shift* when the interpretation or licensing conditions differ and *mood optionality* when there is no difference in interpretation.

2.1.1 Strictly indicative selecting

In Giannakidou and Mari 2021's section on strict patterns of verbal mood selection they say that *sapere* ('to know') is indicative-selecting and is the *only* verb to be strictly so. However, even considering only *sapere* to be strictly indicative selecting is a somewhat tentative characterisation as a polarity subjunctive is observable here with *sapere* since under negation both the indicative and the subjunctive are possible. There are also further polarity operators that license the subjunctive for *sapere*: namely, those found in questions and in *if*-clauses (see Manzini 2000 p.242 for further polarity operators that license the subjunctive for *sapere*). In addition, when *sapere* under high negation embeds an indirect interrogative, the subjunctive preferred (at least in italiano standard (1c); in neo-standard (1d) is acceptable.) Only the indicative is used in positive contexts also for embedded interrogatives e.g. (1.b).

(1) a. Davide sa che Diemen non è/*sia una parte del comune di Amsterdam.
'Davide knows that Diemen is not a part of the Amsterdam municipality'
b. Papà sa se i bambini sono/*siano andati a scuola.
'Dad knows whether the children have gone to school'
c. Non so perchè tu sia così agitato, ma cerca di calmarti.
'I don't know why you are.SUBJ so annoyed, but try to calm yourself (down).'
d. Non so perchè sei così agitato, ma cerca di calmarti.
'I don't know why you are.IND so annoyed, but try to calm yourself (down).'

2.1.2 Strictly subjunctive selecting

There is a strictly complement class to the class above (i.e. to the class consisting only of *sapere*). In this class, we follow Giannakidou and Mari 2021 in identifying the strictly subjunctive selecting verb classes in Italian as the following (p.17) to which we add *richiedere (che)*[1]:

- volitionals: *volere* (want)
- directives: *ordinare* (order), *richiedere (che)* (demand that)
- modal verbs: *essere possible, necessario* (be possible, necessary)
- permissives: *impedire* (forbid)

Note that whether *volere* should be classified as a strictly subjunctive selector can certainly be challenged as some Northern speakers consider the indicative acceptable with *volere*, see also data in Portner and Rubinstein 2020; it is however, typically classified as subjunctive-only.

[1]This is a point of commonality with the limited English subjunctive: 'I demand that you be here'

2.1.3 Mood shift

In Italian, there are a plethora of verbs and verb classes which belong to categories II, III and IV (i.e. verbs and verb classes which exhibit *mood flexibility* (*mood shift* in Giannakidou and Mari 2021's terminology)).

In category II we have pure assertives (e.g. *dire* 'to say') and predicates of certainty (e.g. *essere certo*, *essere convinto*, 'to be certain', 'to be convinced) for these mostly take the indicative but which also allow the subjunctive:

(2) Magnus dice che le brioscine svedesi alla cannella sono/siano pronte.
Magnus say.IND that the Swedish kanelbullar be.IND/be.SUBJ ready.
'Magnus says that the Swedish kanelbullar are ready.'

(3) Jorge è certo che Budapest è/sia la capitale dell'Ungheria.
Jorge is certain that Budapest be.IND/SUBJ the capital of Hungary.
'Jorge is certain that Budapest is the capital of Hungary'

(4) Fiona è convinta che Rafael Nadal è/sia il migliore tennista sulla terra battuta.
Fiona is convinced that Rafael Nadal be.IND/SUBJ the best tennis player on clay
'Fiona is convinced that Rafael Nadal is the best tennis player on clay.'

In category III we have predicates of consciousness (e.g. *essere cosciente*[2]), verbs of denial (e.g. *negare*), fiction verbs (e.g. *immaginare, sognare*) and memory verbs (e.g. *ricordare/ricordarsi*). N.B to stick to the present tense we use (5c) which has a habitual reading (assuming it is not uttered an omniscient speaker). Whereas (5c) has an oniric interpretation, (5d) has a bouletic interpretation which is closer to 'want' or 'hope'[3] Cross-linguistically, mood shift with *dream* is also observable in (Québécois) French (see Mari and Portner 2021, p.37). Regarding the memory verbs, Giannakidou and Mari 2021 discuss only the case in which a declarative is embedded (i.e. a case like (5e) not like (5f)). The indicative is licensed when the embedded proposition (i.e. the content of the memory) is part of the common ground or when it is contained in the speaker's memory space (Giannakidou and Mari 2021, p.296). The subjunctive is licensed when the speaker wishes to mark that the attitude holder's memory is fuzzy or when the content of the memory is not a part of the common ground (ibid).

(5) a. Max è consapevole/cosciente che il cioccolato è/sia velenoso per i cani.
'Max is aware that chocolate is poisonous to dogs.'
b. I politici negano che i scienziati abbiano/hanno ragione.
'The politicians deny that the scientists are right.'

[2]In general, we prefer to use *consapevole* in (5a) but Giannakidou and Mari 2021 only discuss *consciente* so both are included for completeness

[3]Mari and Portner 2021, (p.37) consider it to have an interpretation equivalent to 'want' but also note its future-orientation.

c. Fiona sogna che perde.IND i denti.
'Fiona dreams that she loses her teeth'/'Fiona dreams about losing her teeth' (habitual)
d. Fiona sogna che non perda.SUBJ mai i denti.
'Fiona hopes that she never loses her teeth'
e. Maria ricorda che Laura sia/è bella.
'Maria remembers that Laura is beautiful'
(ex. (78) in Giannakidou and Mari 2021, p.29)
f. Si ricorda se Pietro abbia/ha spento il forno.
'They (sgl.) remember whether Pietro turned the oven off'

In category IV we have the verbs and verb classes which mostly take the subjunctive but which allow indicative. The emotive factives (e.g. *essere contento*, *rimpiangere*) and non-factive doxastics (e.g. *credere, pensare*) belong to this category. This category is of particular interest as it is here that we see Italian exhibit particularly idiosyncratic behaviour compared to the other main Romance languages. For the emotive factives, Italian allows both moods with no obvious difference in meaning (i.e. we have what we call *mood optionality*); French and Spanish allow the subjunctive only and Romanian allows the indicative only.

(6) a. Maria è contenta che Paul venga.SUBJ/viene.IND al seminario di MLC.
b. Maria est heureuse que Paul vienne.SUBJ/*vient.IND au séminaire de MLC.
c. Maria está feliz que Paul venga.SUBJ/*viene.IND al seminario de MLC.
'Maria is happy that Paul is coming to the MLC seminar'
d. Ion e trist că Maria e.IND/*fie.SUBJ bolnavă
'Ion is sad that Maria is sick' (Farkas 2003, p.2)

Also in category IV are non-factive doxastics such as *credere* and *pensare*. The pattern with *credere* will be discussed in greater detail in our section on Mari and Portner 2021 in the following chapter. But for the moment, we will just highlight it as the chief verb of interest in the literature to date, that marks Italian out as not conforming to an otherwise homogeneous pattern in Romance. Both *credere* and *pensare* show a strong preference for the subjunctive yet the subjunctive under their French and Spanish counterparts is ungrammatical.

(7) a. Francesca crede/pensa che Jannick Sinner stia.SUBJ/?sta.IND per vincere l'Australian Open.
b. Francesca croit/pense que Jannick Sinner va.IND/*aille.SUBJ a gagner l'Open d'Australie.
c. Francesca cree/piensa que Jannick Sinner va.IND/*vaya.SUBJ a ganar el Abierto de Australia.
'Francesca believes/thinks that Jannick Sinner is going to win the Australian Open'

However, both of these verbs in French and Spanish exhibit a polarity subjunctive. Under negation, the indicative becomes ungrammatical:

(8) a. Francesca ne croit/pense pas que Jannick Sinner aille.SUBJ/*va.IND a gagner l'Open d'Australie.
b. Francesca no cree/piensa que Jannick Sinner vaya.SUBJ/*va.IND a ganar el Abierto de Australia.
'Francesca does not believe/think that Jannick Sinner is going to win the Australian Open'

Not discussed by Giannakidou and Mari 2021 nor treated anywhere else in the literature is that of inquisitive predicates. We discuss the data extensively for these in chapter 4. For now, we will just alert the reader to the fact that a similar cross-linguistic pattern is observable with *chiedersi* 'to wonder' as with *credere* 'to believe' in that, crucially, Italian is set apart from the rest of the major Romance languages for Italian strongly prefers the subjunctive which in French is ungrammatical:

(9) [Context: Hugh is a Londoner who has never been to Scotland but plans to hike the West Highland Way]
a. Hugh si chiede se ci siano.SUBJ/sono.IND volpi in Scozia.
b. Hugh se demande si il y a.IND/*ait.SUBJ loups en Écosse.
'Hugh wonders whether there are wolves in Scotland'

In summary, Italian exhibits a high degree of mood flexibility and we can visualise the Italian mood spectrum in the following diagram:

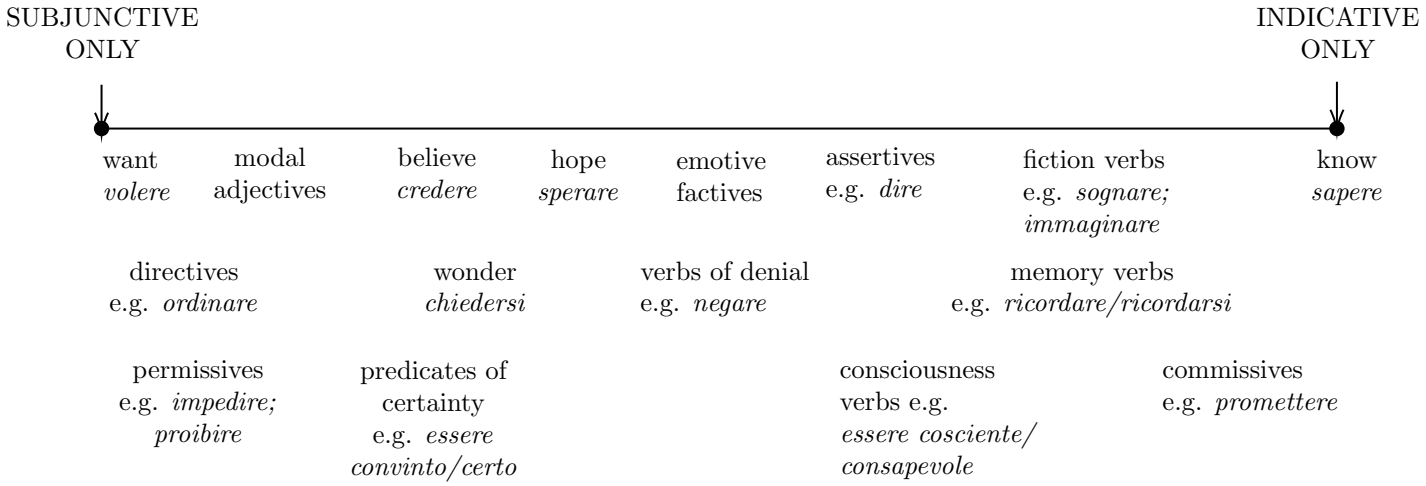


Figure 2.1: Italian Mood Spectrum

2.1.4 Overview of the cross-linguistic distribution in Romance

To close this section we give a summary of the cross-linguistic picture of the distribution of mood licensing in the complement clauses of propositional attitudes within Romance as it stands in the current literature.

	ITALIAN	FRENCH	SPANISH	ROMANIAN	PORTUGUESE	CATALAN
want	subj(%ind)	subj	subj	subj	subj	subj
hope	subj(ind)	ind	subj	ind/subj?	ind/subj*	subj
know	ind(±)	ind	ind(±)	?ind?	ind(±)	ind
believe	subj(ind)	ind(±)	ind(±)	ind(±)	both	ind(±)
assertives e.g. 'say'	both	ind	ind	ind	ind	ind
memory ('remember')	both	(ind)	(ind)	(ind)	ind	(ind)
verbs of denial 'deny'	both	subj(ind)	both	?	subj	?
fiction verbs ('dream')	ind(**subj)	ind	ind	ind	ind	ind
commissives e.g. 'promise'	ind/fut	ind(inf^{SO-})	ind(fut)	ind(subj^{SO-})	ind	ind
modal adjectives	subj	subj	subj	subj	subj	?
directives ('order')	subj	subj	subj	subj	subj	subj
emotive factives	subj/(ind)	subj***	subj***	ind	subj	subj(ind)
regret	subj(ind)	subj(ind)	both	ind	subj	?
permissives & interdictives (e.g. 'to forbid')	subj	subj	subj/(inf)	?	subj	?
predicates of certainty	subj(ind)	ind	ind	ind	ind	ind
consciousness ('to be aware')	both	ind(?)	ind(?)	?	both	?

Key for Table 2.1:

We use ± to denote a polarity subjunctive i.e. indicative for non-negated environments and subjunctive for negated environments
We use % when the following mood is available for a minority of speakers
We use ? when there is no data in the literature for a verb or verb class.
* The mood licensing of 'hope' in Portuguese is tense dependent. We give the most common tense-mood pairing in the table. See Portner and Rubinstein 2020 for further details
** Some fiction verbs (e.g. *sognare* and *immaginare* in Italian can take the subjunctive but there is always a change in interpretation (see Mari and Portner 2021)
*** For both the French and Spanish data, there is disagreement in the literature regarding whether or not the indicative is licensed in addition to the subjunctive.
For 'to promise', we use the subscript $^{SO-}$ for the mood used when the subject of the matrix and embedded verb coincide.

Table 2.1: Mood selection across Romance

In the following table, we summarise the sources used to gather the data in the table above:

Languages	**Data sources**
ITALIAN	All verbs and verb classes in the table above are discussed in Giannakidou and Mari 2021. Data points come from primarily Giannakidou and Mari 2021 and our judgements; *credere* and *chiedersi* supported by Mari and Portner 2021. *Minority* acceptance of indicative for *volere* from Portner and Rubinstein 2020.
FRENCH	Indicative-licensing of epistemics and doxastics, predicates of certainty, assertives, and fiction verbs come from Farkas 1992 as does subjunctive-only licensing for modal adjectives and directives and indicative-licensing (infinitive-licensing when there is not subject obviation) for commissives such as *prometter*. For Schlenker 2005, the indicative in the complement of *regretter* is degraded; Schlenker 2005 also says that whilst *nier* 'to regret' can license either mood, the subjunctive is preferred. Prescriptively from looking at French grammar for foreigners, we know that *interdire* 'to forbid' certainly licenses the subjunctive but we do not have the descriptive data to confirm that it is selected. Özyıldız et al. 2023 has indicative-only for *ignorer* ('to be unaware'); only found indicative for *être coscient(e)* on ContextReverso.
SPANISH	For all data points in common with Catalan see Quer 1998 and Quer 2001. Subjunctive-licensing with *saber* under negated environments comes from Montero and Romero 2023. See Özyıldız et al. 2023 for *negar* ('typically used with the subjunctive'); indicative-only licensing of commissives comes from Villalta 2008, Subjunctive-only for modal adjectives and *prohibir* 'to forbid'. Data for *lamentar* comes from Quer 1998 and Özyıldız et al. 2023 in the latter both moods are used. In Özyıldız et al. 2023 only the indicative was used with *desconocer* 'to be unaware'; ContextReverso showed only indicative for *conocer* (with the 'to be aware' interpretation).
ROMANIAN	From Farkas 1992: indicative-selection of doxastics, epistemics, predicates of certainty, assertives, commissives ('to promise'), fiction verbs and memory verbs; subjunctive-selection of 'to want', directives, and modal adjectives (see also Farkas 2003). Indicative-only for emotive factives comes from Farkas 1992.
PORTUGUESE	All from Marques 2010 except for 'to deny', modal adjectives, emotive factives, permissives and predicates of consciousness for which we used informant data. N.B. Marques 2010 notes a difference between BP and EP for fiction verbs as EP is indicative-only for *imaginar* but BP "may select" the subjunctive (Marques 2010, p.92). Portner and Rubinstein 2020 data for 'to hope'.
CATALAN	Quer 2001 & Quer 1998 for epistemics, doxastics ('to believe'), 'to want', memory verbs, fiction verbs, 'to promise'. Subjunctive for *ordenar* 'to order' and 'to regret' comes from MECORE (Özyıldız et al. 2023). N.B MECORE database considers both subjunctive and indicative to be grammatical for *negar* 'to deny' – the subjunctive version has a bouletic interpretation, the indicative an epistemic interpretation. Data for 'to hope' comes from Portner and Rubinstein 2020. Interestingly, Quer 1998 notes that whilst the memory verb *recordar*, licenses the indicative only in declaratives, in a question the subjunctive is grammatical (indicative not discussed). Verbs of saying exhibit mood shift as the subjunctive has a directive interpretation (Quer 2001). Indicative-only for predicates of certainty is inferred from Mari and Portner 2021 and confirmed MECORE data (N.B from MECORE the subjunctive is licensed in addition under negation).

Table 2.2: Languages and their data sources

Note that some languages from Romance have received greater attention in the literature than others and so for this reason for some verbs or verb classes we do not have entries for every language of the family – the data is sparsest for Portuguese and

Catalan. Our data for every language for WANT and HOPE comes from Portner and Rubinstein 2020. Regarding the emotive factives, Italian exhibits high mood flexibility which distinguishes it from both French and Spanish in which the subjunctive is generally regarded as the only licensed mood (N.B. as indicated in the table, there is some disagreement here) and from Romanian which licenses only the indicative. In terms of (anti-)rogativity and responsivity we have a mix of predicates under investigation. The responsive predicate of *know* exhibits a polarity subjunctive in the majority of Romance languages. The anti-rogative predicate *believe* is largely homogeneous with respect to mood. However, Italian and Portuguese are the anomalies. In (European) Portuguese, as Marques 2010 explains, the mood shift of *acreditar* is explained as selection varies with the "degree of belief" being expressed. Accordingly, use of the indicative signals a high degree of belief whereas the subjunctive a low degree of belief. Rogative predicates have so far been unexplored in relation to verbal mood selection, we extend the study of verbal mood by investigating the rogative predicate *wonder* starting with Italian (*chiedersi* in Italian). Table 2.3 presents the preliminary data on the mood variation of inquisitive predicates in Romance:

	ITALIAN	FRENCH	SPANISH	ROMANIAN	PORTUGUESE	CATALAN
inquisitive predicates ('to wonder')	subj (ind)	ind	ind/conditional	?	ind/conditional	?

Table 2.3: Partial distribution of 'to wonder' in Romance

Thanks to Mayra Huespe (p.c.) and Rodrigo Almedia (p.c.) for their judgements on 'to wonder' in (Argentinian) Spanish and (European) Portuguese respectively.

2.1.5 Taking stock

We can extract three key puzzles that theories of mood licensing will have to account for. All of these puzzles are are observable in Italian mood licensing in complement clauses of propositional attitudes but they are not all observable in any other Romance language.

- Belief in Italian: Italian is unique in favouring the subjunctive with 'to believe' with the indicative almost ungrammatical (we'll return to this in 3.4). Moreover this is also observable with *ritenere* 'to hold to be true'.
- Bouletics: 'want' v.s. 'hope': whilst 'want' is nearly a subjunctive-selector across Romance, 'hope' shows cross-linguistic variability.
- Emotive factives: mood optionality

To highlight the last puzzle from the list above. The emotive factives present a particularly pertinent problem for Italian which arguably does not exist for the majority of other languages and which poses a significant problem to finding adequate licensing conditions. The emotive factives are particularly problematic to capture for they are

not cases of mood shift (but rather mood optionality) as they are cases in which no difference in meaning can be attributed to the mood morpheme in the relevant minimal pairs. From this, we identify the following problem:

THE GOLDILOCKS PROBLEM OF EMOTIVE FACTIVES

The dilemma: we need to define mood licensing conditions which are sufficiently weak in order obtain licensing of both moods for the Italian emotive factives. But, we also need our mood licensing conditions to be sufficiently strong so that predicates (e.g. 'want' or 'know') which only license (i.e. select) one mood, select respectively only the subjunctive or only the indicative.

A word is in order for the non-Italian-speaking English-speaking reader, a natural question to arise here is: could the subjunctive choice of mood by the speaker correspond to an (epistemic) modal weakening? I refer to this as 'The Lazy Englishman's (Misguided) Approach to the Italian subjunctive')[4]. If it could, there would be a genuine difference in meaning and this could be more straightforwardly brought out in the licensing conditions (i.e. this would not constitute a case in which the predicate would simultaneously have to license both the subjunctive and the indicative). The intuition would be that whilst (11a) would correspond to (10a), (11b) would correspond to (10b) or (10c).

(10) a. I'm glad that you are coming to the party.
b. I'm glad that you may come to the party
c. I'm glad that you might come to the party.

(11) a. Sono contenta che vieni.IND alla festa.
b. Sono contenta che tu venga.SUBJ alla festa.

The idea the English-speaker might put forward is that use of the subjunctive might mark a weaker modal. This is also not so ridiculous a suggestion as Giannakidou and Mari 2019 identify Modern Greek's subjunctive complementizer *na* as equivalent to *might*. However, the intuition is misguided as unfortunately, no such route is available: both (11b) and (11a) are readibly translated as (10a). No such covert modal is there. The lazy Englishman might push back and say that perhaps a sort of modal concord (Zeijlstra 2007) happens with the modal contribution of the subjunctive disappearing through concord with the lexical semantics of the emotive factives. However, such a strategy would leave subjunctive selection of 'want' unexplained and the idea that 'want' could embed a hidden epistemic possibility modal is contra to findings by Anand and Hacquard 2013 who demonstrate that non-representational attitudes (i.e. desideratives like 'want' and directives) do *not* allow epistemic modals of both possibility and necessity strength in their complement.

[4]Although this might seem a rather disparaging name, it's in homage to Schlenker's seminal paper 'The Lazy Frenchman's Approach to the Subjunctive' (Schlenker 2005)!

The three puzzles we have taken stock of are common problems in the literature and provide the minimum criteria against which formal theories are to be assessed. There is one further puzzle that Italian, at least according to our findings, uniquely presents: namely, the licensing and preference of the subjunctive for 'to wonder'. However, in the next chapter, we delineate and review state-of-art theories against the basic benchmark that the literature has implicitly considered to date and return to the consideration of inquisitive predicates in chapter 4.

3 Theories of the indicative/subjunctive

Before we delve into the literature from formal semantics on the indicative/subjunctive distinction, a brief word is in order for how the distinction has been treated in the more traditional descriptive grammar literature. One pervasive idea about verbal mood is that verbal mood provides the morphological means by which to express reality status. The albeit crude idea is that the indicative is used for *realis* and subjunctive for *irrealis*. The crudeness of this intuition becomes glaringly apparent when we look beyond Spanish and Portuguese. Whilst both Spanish and Portuguese have a future subjunctive, there is no such tense-mood pairing in French nor in Italian nor in their common ancestor of Latin (see de Haan 2012). However, if the reality status hypothesis about verbal mood selection were true, then we would expect a future subjunctive to be realised across a wider range of Romance languages. The contribution of the future tense is to refer to events which are either unreal or unactualized. But if all there were to verbal mood were reality status then we should predict, contrary to what is observed, that the future tense is paired with the subjunctive mood.

We now turn to approaches which are not only more theoretical but also more formal in nature. Let us note at the outset that verbal mood in Romance languages has received comparatively little formal treatment when compared to the other morphosyntactic verbal categories of tense and aspect (Quer 2010, p.163). Portner (2018) delineates two intuitions which have guided theories of verbal mood in the formal semantics literature: **comparison** and **truth**. Sketching these two intuitions with respect to only the indicative and subjunctive moods, the comparison intuition focuses on the subjunctive mood and broadly speaking says that this mood is associated with "grammatical contexts which express a comparison between alternatives in which the clause is true and some other relevant alternatives" (Portner 2018, p.70). By contrast, the truth intuition focuses on the contexts in which the indicative is found and says that in these contexts the truth of the clause is implied across a specified set of possible worlds. (Portner 2018, p.70)

These two intuitions are not intended by Portner to be a strict means of categorising theories of the subjunctive/indicative distinction as some theories can be mixed with respect to incorporating both of these guiding intuitions (Giannakidou's early work (1994, 1995, 1997) or neither (see Portner and Rubinstein 2012 who argue

that contextual commitment governs mood selection). Indeed concerning the latter, commitment-based approaches, we will look at a recent follow-up (namely, Silk 2018) in this chapter.

It is important to note that the mood that is the main object of analysis typically varies across these approaches. Given that the subjunctive is not, by and large, the mood of main clauses, the reader may take it as read that it is the bizarre and funky subjunctive that is the mood that demands explicit characterisation. However, some semanticists have deemed the distribution of the subjunctive to be intractable to a neat semantic analysis. In lieu of this, they have thus proposed that the subjunctive is actually the default mood that is invoked when presuppositions for the subjunctive's competing moods of the indicative and the infinitive are not met. This is the truth-based approaches of Portner 1997 and Schlenker 2005 who give the subjunctive a vacuous semantics and instead characterise the indicative, and in the case of Schlenker, the infinitive too. Although different approaches vary according to which mood they treat as marked, often approaches can implicitly satisfy the guiding principle of a family of approaches that they are not most readily thought of as belonging to. This fact is important to stress (and will be made clearer in the course of this chapter) and the lack of solid divisions between the families paves the way for the feasibility of a hybrid account.

In the following sections of this chapter we will zoom in on what can be considered to be the best theory in each of the following families: comparison-based (Portner and Rubinstein 2020), commitment-based (Silk 2018) and truth-based (Giannakidou and Mari 2021). In the final section of the chapter we discuss an approach to the verbal mood licensing of 'to believe' in Italian (Mari and Portner 2021), which is a comparison-based approach complementary to that of Portner and Rubinstein 2020, whose underlying idea most directly motivates the subject of our Chapter 4.

3.1 Comparison-based: Portner and Rubinstein 2020

The recent approach of Portner and Rubinstein 2020 belongs to the family of comparison-based approaches and, in accounting for some of the cross-linguistic variation, is a rather sophisticated approach. So, before we dive into the approach of Portner and Rubinstein 2020 we first introduce the basics of the comparison-based family. The comparison-based approach originates from Giorgi and Pianesi 1997's seminal text on tense, aspect and mood which has Italian as the main language of study. The guiding principle underlying this family of approaches can be surmised as follows:

$\mathbf{P_{COMP}}$: A predicate P selects the subjunctive iff it has a comparative semantics. How approaches vary among this family is by how they spell out formally what it means for a predicate to have a comparative semantics. Typically, and Giorgi and Pianesi 1997 is the first example of this, the approaches of this family employ Kratzer's (1981, reprint (2015)) theory of modality. Starting from the observation that the basic tools of modal logic – two quantifiers $\forall$ and $\exists$, the two dual operators of $\Box$ and $\Diamond$ and the

accessibility relation R – are insufficient to capture the semantics of many modal expressions in natural languages, Kratzer 1981 enriched the *structure* of the set of worlds that an accessibility relation gives rise to. Kratzer 1981 developed a theory of ordering semantics which *ranks* the relevant possible worlds; this was achieved by building on her own earlier work in Kratzer 1977 where Kratzer introduced the formal notions of conversational backgrounds. Now a conversational background is a function whose domain can be taken à la Kratzer to be worlds or à la Portner to be situations. For exposition, we'll stick with situations as this makes the most sense for understanding Portner and Rubinstein 2020 but the difference is formally (though not of course metaphysically) immaterial. A conversational background is then a function from situations to sets of propositions. Kratzer 1981 exploits the fact that conversational backgrounds can have two uses:

1. To specify a set of relevant possible worlds - in which case we regard the conversational background as a MODAL BASE.
   For any situation s, a conversational background f functioning as a MODAL BASE identifies the set of relevant worlds $\bigcap f(s)$
   (Def. adapted from Portner 2018, p.18).

2. To rank these relevant possible worlds according to some norm - in which case we regard the conversational background as a ORDERING SOURCE.
   For any situation s, a conversational background g functioning as an ORDERING SOURCE defines an ordering $\leq_{g(s)}$: for any worlds $w, v \in W$, $w \leq_{g(s)} v$ iff for all $p \in g(s)$, if $v \in p$, then $w \in p$.[1]
   (Def. adapted from Portner 2018, p.18)

As far as Italian is concerned, the original comparison-based theory is that of Giorgi and Pianesi 1997 which makes use of Kratzer's conversational backgrounds as well as the two key different roles a conversational background can have. Their account begins with the idea that a predicate having a non-null ordering source is the key to subjunctive selection. Quickly, they realise that this idea is too strong: for in order to obtain the subjunctive with *credere* it would either have to be posited that 'to believe' in Italian really does have a comparative semantics or that there are further conditions which are at play that result in *credere*'s licensing and preference of the subjunctive. Their approach makes use of various relational properties that a conversational background can have with the common ground. However, the key property governing mood selection goes undefined (and it is unclear which defined property it is to be the complement of (see Portner 2018's discussion, p.83)). An even more important issue in the account concerns what object is even to have this property: the authors take complement clauses as giving rise to a CONTEXT OF EVALUATION; however, this notion gets conflated as the authors sometimes take it to be a set of worlds and sometimes as a

[1] At first glance it may look as though the inequality is the wrong way around. However, when we are ranking worlds we are effectively assigning them an ordinal number so the world assigned to the lowest ordinal is the one which respects the ordering source the most.

set of propositions (ibid).
Putting consideration of Italian to one side for the moment, the comparison-based theory has enjoyed particular success when applied to Spanish – most notably by Villalta 2008 – and it seems as though the key intuition behind the Spanish subjunctive is having a comparative semantics. However, Villalta 2008's view ends up zooming in on focus sensitivity as the key property underpinning subjunctive licensing. As Portner 2018 (p.90) notes, focus is so broad that it is difficult to use it as a basis for creating formal licensing conditions. Portner 2018 also points out the class of focus-sensitive operators that trigger the subjunctive needs to be constrained as *only* by itself is not sufficient to trigger the subjunctive (ibid). Let's now turn to Portner and Rubinstein 2020's theory.

Overview of Portner and Rubinstein 2020

The two key premises of Portner and Rubinstein 2020's approach are: firstly, that different verbal moods are modal operators whose difference lies in the fact that they encode different degrees of modal necessity (with the indicative encoding a stronger necessity than the subjunctive); secondly, the grammar can manipulate modal backgrounds – this means that, under certain well-defined circumstances, in some languages two modal backgrounds can function as one to produce the indicative where the subjunctive may be expected purely on the basis of that predicate's lexical entry.

We will see such a proposal in action in a moment, but first, we devote discussion to the key puzzle that Portner and Rubinstein 2020 are concerned with. Portner and Rubinstein 2020 is focused upon explaining the cross-linguistic variation of verbal mood in the desire verbs of 'want' and 'hope' in French and Spanish. The reason for concentrating on these two languages is that they intra-linguistically have the simplest patterns of the Romance languages but are also cross-linguistically at the most extreme as Spanish is the language which most readily selects the subjunctive and French most readily the indicative. As a result, the challenge is low from an intra-linguistic perspective but high from a cross-linguistic perspective. Extending their mechanism to Italian involves raising the bar of the intra-linguistic challenge. The basic key data Portner and Rubinstein 2020 are trying to account for are the Spanish and French data of the following pattern and we include the Italian pattern (the data for which also comes from Portner and Rubinstein 2020):

Since Portner and Rubinstein 2012 a key puzzle in the literature on mood variation of desire predicates is accounting for the difference between 'want' and 'hope'. The key example comes from Portner and Rubinstein 2012:

(1) a. I want to marry Alice and I want to marry Sue.
b. [??] I hope to marry Alice and I hope to marry Sue.

	'to want'	'to hope'
SPANISH	SUBJ	SUBJ
FRENCH	SUBJ	IND
ITALIAN	SUBJ((%IND))	SUBJ(%IND)

Table 3.1: Mood selection of 'to want' and 'to hope' in Spanish, French and Italian; simplified w.r.t semantic temporal orientation pairings

The point of this example is that it is possible to want incompatible things (assuming monogamy to be a background assumption in these examples(!)) but not to hope for incompatible things. In Portner and Rubinstein 2020 the difference is attributed to 'want' taking a weak modal force. The modal force specifies the extent of the quantification over worlds. In the Kratzerian framework, SIMPLE NECESSITY involves universal quantification and has since Hintikka 1961 been considered the strength of necessity underlying 'believe'[2], resulting in the following semantics:

$[\![believe]\!] = [\lambda p \lambda a \lambda s.a$ is the experiencer of $s \wedge sn(p, dox, s)]$,
where the function sn (i.e. simple necessity) is defined as follows:

Definition (**Simple necessity**)**.** For any proposition p, modal background f, and situation s: $sn(p, f, s) = 1$ iff $\bigcap f(s) \subseteq p$

When it comes to 'want' the precise nature of the doxastic base has been debated with two variants on DOX proposed, namely DOX^* which comes from Heim 1992 which consists of the agent's beliefs irrespective of how they choose to act and DOX^+ which gives the set of propositions which are compatible with the agent's beliefs (Portner and Rubinstein 2020, p.352). A preliminary stab for 'want' involves human necessity which is a strength of necessity that is weaker than simple necessity and requires **two** modal backgrounds:

Definition (**Human necessity**)**.** For any proposition p, modal backgrounds f and g, and situation s:

$hn(p, \langle g, f \rangle, s) = 1$ iff $Best(g, f, s) \subseteq p$, where the function $Best$ is defined as:
$Best(g, f, s) = \{w : w \in \bigcap f(s) \wedge \neg\exists v[v \in \bigcap f(s) \wedge v <_{g(s)} w]\}$

'want' is then given the following analysis using human necessity per von Fintel 1999, which combined with Giorgi and Pianesi 1997's adoption of dox^+ (rather than dox or dox^*) results in the following:
$[\![want]\!] = [\lambda p \lambda a \lambda s :$
a. $\bigcap dox^+(s) \cap p \neq \emptyset \wedge \bigcap dox^+(s) \setminus p \neq \emptyset$ [diversity condition]
b. a is the experiencer of $s \wedge hn(p, \langle bul, dox^+ \rangle, s)]$

[2]Note, as we shall see, the rigidity of this assumption about 'believe' is challenged by Mari and Portner 2021

However, on such an analysis, the marriage example above which differentiates 'want' from 'hope' predicts that the sentence (1a) with 'want' is false, contra to the intuitive acceptability of it. An effective way of accounting for the fact the, contrary to with 'hope', it is possible to want incompatible things, without running into further issues (e.g. being unable to predict upward monotonicity[3] of 'want' (see Portner and Rubinstein 2020, p.353 for further details) is to say that 'want' involves a strength of necessity which is weaker still than human necessity. Portner and Rubinstein 2020 take this route by arguing that 'want' involves LOCAL NECESSITY.

Definition (**Local necessity**)**.** For any proposition p, modal backgrounds f and g, and situation s:

$ln(p, \langle g, f\rangle, s) = 1$ iff $\exists w \in \bigcap f(s)$ s.t. $\forall v \in \bigcap f(s)$ if $v \leq_{g(s)} w$, then $v \in p$.

These considerations lead Portner and Rubinstein 2020 to give their guiding principle of mood selection to be specified as follows:

$\mathbf{P_{PR2020}}$: A predicate P selects the subjunctive iff its semantics involves local necessity.

Recall, from Giorgi and Pianesi 1997 the basic idea that indicative-selecting predicates have a null ordering source; i.e. they have a single modal background, the modal base. As we said, this idea was in need of refinement as it is far too simplistic for belief in Italian. However, staying on French and Spanish for a moment, the proposal by Portner and Rubinstein 2020 is that indicative-selecting predicates involve only the modal base and involve the strongest modal force – that of simple necessity; whereas, subjunctive-selecting predicates employ two modal backgrounds (one as a modal base and one as an ordering source) which means that the modal force they involve is local necessity (or human necessity in the case that the modal backgrounds are consistent.) To account for the difference in mood selection of 'hope' in French and Spanish, Portner and Rubinstein 2020 argue that it reflects different processes of semantic composition. Crucially, they contend that such a route is not available for 'want' due to the semantic differences between 'want' and 'hope' namely that (1) 'want' allows incompatible desires but 'hope' does not and we can want things which are impossible or certain but we cannot hope for them (see Portner and Rubinstein 2020, p.357 for data supporting this from Portner 1992; Scheffler 2008; Anand and Hacquard 2013) and (2) 'hope' has a doxastic assertion that 'want' lacks (see Portner and Rubinstein 2020, pp.359-360 for discussion thereof).

Analysis

We now turn to the nitty gritty of Portner and Rubinstein 2020's account. Firstly, the account assumes the following: at the syntax/semantic interface, a neo-Davidsonian semantics, in which arguments are severed from the verb, is adopted, and the event

[3]N.B. whether bouletics do indeed exhibit monotonicity has been a point of heated debate which we will return to in the course of Chapter 6; see von Fintel 2018 and Yan 2023 for relevant discussion.

relativity of modal backgrounds. The arguments of attitude verbs are linked via thematic relations and as we shall see the thematic relations will be language-specific with the thematic relations of Spanish being more straight-forward than those of French:

(2) Moods in Spanish (**bold** mine for emphasis):
$[\![[\theta_{indic(Sp)}]]\!] = \lambda p \lambda s[\mathbf{sn}(p, content(s), s)]$
$[\![[\theta_{subj(Sp)}]]\!] = \lambda p \lambda s[\mathbf{ln}(p, content(s), s)]$

((45) in Portner and Rubinstein 2020. p.363)
Portner and Rubinstein 2020 introduce the operation of UNIFICATION which allows modal backgrounds to be combined provided they are consistent with one another.

(48) **Unification of modal backgrounds** (Portner and Rubinstein 2020, p.364):

- If M is a pair of modal backgrounds $\langle g, f \rangle$ and
  $\forall s[s \in domain(f) \rightarrow (s \in domain(g) \wedge \bigcap(g(s) \cup f(s)) \neq \emptyset)]$, then
  $\mathsf{unify}(M) = [\lambda s : s \in domain(f) \ . \ g(s) \cup f(s)]$
- Otherwise: $\mathsf{unify}(M)$ is undefined.

(49) **Equivalence of** *sn* **and** *ln* **after unification** (ibid):

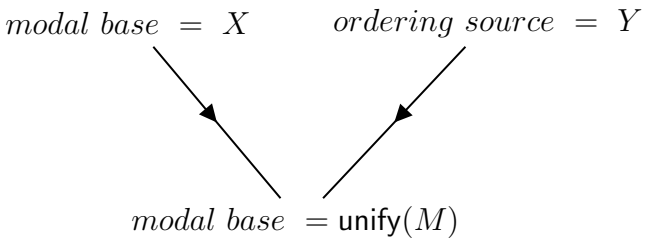
- For any pair of modal backgrounds $\langle g, f \rangle$: If $\mathsf{unify}(\langle g, f \rangle)$ is defined, then: for every proposition p and situation s, $sn(p, \mathsf{unify}(\langle g, f \rangle), s) = ln(p, \langle g, f \rangle, s)$

Crucially, this equivalence allows us to say that 'hope' in French and 'hope' in Spanish will still mean the same thing despite their differing mood patterns.

In order for semantic composition to still be possible, we require a type-shift operation that applies unification whenever and only when unify is defined. This type-shift operation is labelled SIMPLIFICATION (spl) by Portner and Rubinstein 2020 and defined as follows (ibid):

(50) For any sequence of modal backgrounds M:
  a. If $\mathsf{unify}(M)$ is defined: $\mathsf{spl}(M) = \mathsf{unify}(M)$.
  b. Otherwise: $\mathsf{spl}(M) = M$.

We can visualise unification of modal backgrounds as follows:



N.B here $M = \langle Y, X \rangle$

With the two operations defined, Portner and Rubinstein 2020 apply them to an account of mood in French. In doing so they assume that SIMPLIFICATION is part of both the thematic relations associated with the indicative and the subjunctive respectively.

(3) Moods in French ((51) in Portner and Rubinstein 2020, p.364)):
a. $[\![[\theta_{indic(Fr)}]]\!] = \lambda p \lambda s[sn(p, \mathsf{spl}(content(s)), s)]$
b. $[\![[\theta_{subj(Fr)}]]\!] = \lambda p \lambda s[ln(p, \mathsf{spl}(content(s)), s)]$

Note that including spl in the semantics of the thematic relations of both the indicative and the subjunctive renders SIMPLIFICATION to be a very strong operation in French; it says that whenever a pair of modal background are unifiable, they are simplified to the unification of those modal backgrounds[4]. Thus, for a verb whose lexical entry ordinarily consists of a modal base and an ordering source, if they are unifiable, then, as a result of type-mismatch, it is predicted that in French this verb followed by subjunctive in the complement is ungrammatical. The Italian data with 'hope', and with other predicates exhibiting mood optionality, make clear that spl cannot be incorporated into Italian's grammar with as strong a force as in French.

Although the account does not explicitly give an account for Italian (this is in part due to the fact that, as Portner and Rubinstein 2020 show, Italian has more variation than Spanish and French w.r.t tense.), in order to obtain both moods (i.e. the correct predictions) for *sperare* 'to hope', we posit an extension of their account as follows:

(4) Moods in Italian:
a. $[\![[\theta_{indic(It)}]]\!] = \lambda p \lambda s[sn(p, \mathsf{spl}(content(s)), s)] = [\![[\theta_{indic(Fr)}]]\!]$
b. $[\![[\theta_{subj(It)}]]\!] = \lambda p \lambda s[ln(p, content(s), s)] = [\![[\theta_{subj(Sp)}]]\!]$

In other words, Italian follows the Spanish in its subjunctive but French in its indicative.

Predictions

In the following, we give the predictions that Portner and Rubinstein 2020 make for Spanish and French as well as those of our Italian extension.

Belief

Note that according to this analysis, a believing situation is considered to have only *dox* as its content. Consequently, spl has no transformative effect when we apply it to the indicative thematic role and the modal force *ln* requires a pair of modal bases so 'believe'+subjunctive will result in failure of semantic composition, which can be interpreted as a prediction of ungrammaticality. As a result, whilst this makes the correct indicative-only licensing for French and Spanish, another operation (the natural dual of unification) is needed to account for the familiar Italian pattern. (N.B. we will return to a successful account of *credere* within a comparison-based framework in the section 3.4) The key point to raise here is that an additional operation will be required for the canonical mood of the subjunctive for *credere* remains unpredicted.

[4]See p.368 where the authors make clear that if spl applies then it should apply to perform unification of modal backgrounds

Desire predicates

For Spanish, the situation for both key verbs is straight-forward: the indicative with both 'want' and 'hope' is predicted to be ungrammatical as a result of a type-mismatch: the key relation *sn* (present in the indicative role but not the subjunctive role) anticipates that the *content(s)* part of its argument is a single modal background. However, situations of wanting and hoping, have a pair of modal backgrounds as their content. So, the indicative is predicted to be ungrammatical and, since no such type-mismatch arises with the *ln* component of the subjunctive role, the subjunctive is grammatical.
'want' The modal backgrounds of a wanting situation are the pair *bul* and dox^+ so the content of the situation is the pair $\langle bul, dox^+ \rangle$. For French, for $\mathsf{spl}(content(s))$ we again take *bul* and dox^+ but they cannot be unified as the combination of dox^+ and *bul* allows that the beliefs and desires of a wanting situation can be inconsistent. So $\mathsf{spl}(content(s))$ remains a pair, meaning that *sn* cannot be applied and hence 'want'+indicative is ungrammatical in French too. Rather, as $\mathsf{spl}(content(s))$ is a pair, *ln* can be applied and so 'want'+subjunctive is grammatical in French. I.e. we obtain the same pattern as in Spanish. Turning to Italian, we by and large obtain the correct prediction (of the subjunctive only), but Portner and Rubinstein 2020 noted in their preliminary research that for a minority of speakers the indicative was also grammatical. Such facts cannot be resolved simply without saying that either for these speakers 'want' is closer in meaning to 'hope' e.g. perhaps for them 'want' also uses bul^c the set of consistent desires or that for these speakers the simplification operation is part of their grammar in the thematic role of the subjunctive as well. Further empirical investigation is required to resolve which of these situations is the case.
'hope' The modal backgrounds of a hoping situation are bul^c and *dox* so the content of the situation is the pair: $\langle bul^c, dox \rangle$. But the modal backgrounds are unifiable as bul^c and *dox* are consistent. Thus, after unification $\mathsf{spl}(content(s))$ is a singleton and so *sn* can be applied. Hence, 'hope'+indicative is predicted to be grammatical for French. Similarly, because $\mathsf{spl}(content(s))$ is a singleton, 'hope'+subjunctive is predicted to be ungrammatical for French as *ln* cannot be applied. Turning to Italian, our extension predicts the correct data for both moods are acceptable (with the subjunctive preferred) and the extension predicts both moods to be licensed for the extension takes the modal force with which the type-shift operations are applied in Italian to be weaker than in French.

Emotive factives

Regarding the emotive factives, Portner and Rubinstein 2020 yield mixed success cross-linguistically. We will concentrate on the results for emotive factives for which the bouletic and doxastic bases are compatible, e.g. a predicate like 'to be happy', for this is the only case in which (assuming as is commonly assumed that the emotive factives involve two modal backgrounds) SIMPLIFICATION may give rise to differing cross-linguistic predictions. For Spanish, their account delivers the correct prediction of the subjunctive. However, it delivers an incorrect prediction for French since, it predicts the indicative only and which per Schlenker 2005 is only licensed with a speech

act reinterpretation. Of particular note, is that our proposed extension for Italian, at least when we restrict our attention to the emotive factives for which the bouletic and doxastic bases are compatible, our account predicts the high mood flexibility of the emotive factives as both the subjunctive and the indicative will be licensed. This is of significant import for when it comes to capturing the subjunctive and indicative formally, obtaining the correct predictions for Italian emotive factives has been particularly elusive.

Attitude	**Correct prediction for Spanish?**	**Correct prediction for French?**	**Correct prediction for Italian?**
'to believe'	✓	✓	No, the canonical mood for *credere* i.e. the subjunctive is not predicted.
'to want'	✓	✓	By and large yes.
'to hope'	✓	✓	✓
Emotive factives	✓	×	✓

Table 3.2: Predictions summary for extended Portner and Rubinstein 2020

Outlook

In the presentation of Portner and Rubinstein 2020 given above we have stuck with their preferred version of their theory. However, they do present two versions of the theory: one pursuing a compositional approach and the second giving a lexical analysis. It is the second approach which can be most readily combined with Mari and Portner 2021's account which gives the correct predictions for 'believe' in Italian. However, Portner and Rubinstein 2020 disprefer the lexical approach for two main reasons:

(1) They would have to make additional (somewhat undesirable) assumptions in order to maintain the assumptions of neo-Davidsonian and event relativity of attitude verbs. Abandoning both assumptions and instead supposing that attitude verbs directly pick out the modal backgrounds (rather than doing so indirectly by referring to the content of a situation) is one way to construe a lexical approach but which then admits a degree of adhocness into the account.

(2) Though we have kept things simple here and stuck with consideration of the present tense in both the matrix verb and embedded verb, Portner and Rubinstein 2020 observe that the inter-linguistic pattern exhibits a lot of variation w.r.t tense) (Portner and Rubinstein 2020, pp.366-367). As Portner and Rubinstein 2020 point out, for languages with a more complex pattern with respect to tense, such as Italian and Portuguese, the desirability for an account capable of capturing such patterns is ever more pertinent. The lexical approach has a rigidity to it in so far as it would

specify the modal backgrounds that a verb V has which would typically be constant w.r.t tense.
Portner and Rubinstein 2020 discuss one further consideration when weighing up which implementation of the theory is to be preferred which they view as a being an advantage of the lexical approach: namely, that the compositional approach will say that since French grammar has the simplification operation then any French verb that is associated (qua what type of situation it is) with two modal backgrounds which are consistent, will indeed undergo simplification and select the indicative. The lexical account is more fine-grained when it comes to being able to predict variation within such verbs with it just being specified on a individual basis which verbs lack or have spl in their lexical entry to obtain the empirically correct verbal mood prediction. There is however, another way to view this which turns this objection on its head: the compositional approach allows the account to have greater predictive power whilst the lexical approach admits of a significant degree of adhocness and will struggle to account for patterns between classes of verbs.

In Portner and Rubinstein 2020, we've seen an operation which allows us to combine two modal backgrounds (provided that they are consistent). Later in the chapter, we'll see another mechanism which allows us to go from one modal background to two. The other mechanism will be crucial for the comparison-based account for giving an adequate cross-linguistic account of doxastics as well as other predicates such as some fiction verbs.

3.2 Commitment-based: Silk 2018

We now turn to another family of theories, the commitment-based family, which has been proposed primarily for French. We can gloss the guiding principle of the family of commitment-based approaches as follows:

$\mathbf{P_{COMMIT}}$: A predicate P selects the indicative iff
the semantics of P presupposes that the agent of P is committed
to a modal background h in event e.

Again, how the notion of COMMITMENT is spelled out formally is where there is variation amongst this family of approaches. Portner and Rubinstein 2012 construe the notion of an agent having CONTEXTUAL COMMITMENT to a modal background as being that they "are prepared to defend it, in a context, as a good basis for action." (Portner 2018, p.107) Somewhat more formally:

"An individual a is COMMITTED to a modal background h in event e iff a is disposed/prepared to argue for $h(e)$ in a conversationally appropriate way (e.g. by arguing that it is rational/proper/sensible/wise) in any relevant conversation c."
(Portner and Rubinstein 2012, ex(40))

Whilst Portner and Rubinstein 2012's approach works well for a subset of the French data (e.g. it makes the correct subjunctive-selection for *vouloir* 'want', as well as indicative-selecting predicates of assertion *dire* 'say' and doxastics *croire* 'believe' and *savoir* 'know'; in addition, it makes the correct indicative-selection of modal adjectives in French), even staying within French, there are a number of desiderata for which the account is empirically inadequate. These are the following (highlighted by Silk 2018, p.127):

1. Emotive factives: subjunctive-selection but standard views of their lexical semantics hold that they imply attitude subject commitment. So Portner and Rubinstein 2012's account predicts indicative-selection.

2. Fiction verbs: indicative-selecting but obviously the attitude holder cannot be reasonably held to defend the content of a dream in any relevant conversation. So Portner and Rubinstein 2012's account predicts subjunctive-selection.

3. Variation among desire verbs: in particular, accounting for indicative-selection of 'hope' in French (*espérer*) and subjunctive-selection of 'want' *vouloir* whilst still maintaining that the semantics of both involve evaluative comparison of alternatives. (See our aforementioned discussion on the difference between *want* and *hope* in our section on Portner and Rubinstein 2020).

4. Differing mood patterns of commissives and directives: indicative-selection of *promettere* 'promise' v.s. subjunctive-selection of *ordonner* 'order'.

Silk 2018 provides a new commitment-based approach which performs better with respect to some key data for French than the previous commitment-based approach put forward by Portner and Rubinstein 2012. Key data for which Silk makes the correct predictions for in French are: indicative selection with *croire*, *rêver*, *espérer*, *dire*, *promettre*; subjunctive selection with emotive factives, *vouloir*, *ordonner*. The account also makes subjunctive-selection predictions for the basic modal adjectives *possible* and *nécessaire*.

Overview of Silk 2018's analysis

Silk's state-of-mind account, like Portner and Rubinstein 2020's comparison-based approach, Silk 2018 also employs event relativity. This means that, as we saw with Portner and Rubinstein 2020's comparison-based account, modal backgrounds are derived from events. It is the nature of the type of event in question that determines the modal base and the ordering source (whether the latter is null or not). The key difference is that whereas on Portner and Rubinstein 2012's commitment-based account, commitment is construed as an attitude held by individuals, on Silk 2018's account we are concerned with whether or not a certain relation represents one of commitment. The relation in question is held between a predicate's modal backgrounds and a relevant overall state of mind. Informally, we can gloss Silk 2018's guiding principle as follows:

P$_{\text{SILK}}$: A predicate P selects the indicative iff its modal backgrounds are "live" from the state of mind that characterises the event described by the predicate.

The other commonality with Portner and Rubinstein 2020 to note is that it is also assumed that a predicate is linked to its argument via thematic roles.

Now the key insight of Silk 2018 is to follow Hacquard's (Hacquard 2006, 2010; Anand and Hacquard 2014) work on the content characterising events and in particular, to take up the idea of attitude and speech events as having informational content. The state-of-mind approach makes use of the idea that the state of mind that characterises an event can involve both an informational and evaluative aspect. In Silk 2018's terminology a MODAL STATE is an unordered pair consisting of a body of information and a body of priorities we can characterise both concrete discourse events and attitudes as modal states. The central claim is that French mood selection is determined by whether or not a relation exists between the modal state derived from predicate's modal backgrounds and the modal state which represents the so-called state of mind characterising the event described by that predicate. Before we get to this relation, we first have to introduce the notion of a STATE OF MIND *SoM* more formally.

> $SoM(e)$ is simply a partial function from events e to preordered sets of worlds which represent the informational-evaluative content of the state of mind characterizing e.
> (Silk 2018, p.144)

Crucially, the *SoM(e)* is taken to depend on whether the event is a discourse event or an attitude event and is to encode the informational-evaluative content of an event:

- For concrete discourse events, *SoM(e)* represents the mutually presupposed information and priorities in e, and is given by $(CS_e, \lesssim_{CP_e})$. Where $CS_e = \bigcap CG_e$.
- For concrete attitude events, *SoM(e)* represents the subject's doxastic+affective state in e and is given by, $(\bigcap DOX_e, \lesssim_{CP_e})$.

On this account, the subjunctive is deemed to be a semantic default with the subjunctive feature[5] having no presuppositions whilst the indicative, the semantically marked mood, does. For a given predicate P we check whether the presupposition for the indicative feature [+_ind] holds: $(\bigcap f_P(e), \lesssim_{g_{P(e)}}) \trianglelefteq SoM(e)$.
This just means that the preordered set $(\bigcap f_P(e), \lesssim_{g_{P(e)}})$ has to be a subpreorder of $SoM(e)$. N.B. we call $(\bigcap f_P(e), \lesssim_{g_{P(e)}})$ a modal state (a pair consisting of a body of information and a body of (preordered) priorities). The presupposition says that the modal state determined by the predicate P is live from the perspective of the state of mind characterising the event. The more abstract definition of what it means for a generic modal state $(S, \lesssim)$ to be live from the perspective of another modal state $(S', \lesssim')$ is given as follows (directly from Silk 2018 p.145)):

[5]N.B. the account assumes that mood morphemes of the embedded verb are licensed by mood feature adjoined to the matrix verb.

(43) Let F, F', G, G' be sets of propositions: let S, S' be sets of worlds: and let $\lesssim$, $\lesssim'$ be preorders on worlds.
a. $(S, \lesssim) \trianglelefteq (S', \lesssim')$ iff $(S, \lesssim)$ is a subpreorder of $(S', \lesssim')$
i.e. iff $S \subseteq S' \wedge (\lesssim \cap S^2) \subseteq (\lesssim' \cap S'^2)$ where $X^2 = \{\langle i, j\rangle : i \in X \wedge j \in X\}$
b. $(F, G) \trianglelefteq (F', G')$ iff $F \supseteq F' \wedge G \supseteq G'$

The semantics of the two mood features are given as follows (ibid):
(44) $[\![[+\_ind]]\!]^w = \lambda P \lambda f \lambda g \lambda p \lambda e : (\bigcap f(e), \lesssim_{g(e)}) \trianglelefteq SoM(e).P(f)(g)(p)(e)$
(45) $[\![[+\_sbjv]]\!]^w = \lambda P \lambda f \lambda g \lambda p \lambda e.P(f)(g)(p)(e)$

In the following we go through the analyses of doxastics, bouletics and the emotive factives. In each case, the correct prediction is obtained for French but the wrong prediction is obtained for Italian for every case except 'want'. Finally, we will summarise in a table the French and Italian predictions for other verbs discussed by Silk such as fiction verbs, commissives, directives and modal adjectives.

Analysis and Predictions

Doxastics: BELIEF: Here $f_P(e) = f_{bel}(e)$ i.e. the agent's doxastic modal base that represents their beliefs in event e. The ordering source $g_{bel}(e)$ is treated trivially, i.e. as null, and given that we assume that the preorder $\lesssim_{dox}$ is similarly trivial, we have that $\lesssim_{g_{bel}(e)} = \lesssim_{dox_e} = \lesssim_{\emptyset}$. $f_{bel}(e) = DOX_e$. So the presupposition of [+_ind] is satisfied. So if we assume there to be a principle like Heim 1991's *Maximise Presupposition!* (*MP!*) then the indicative mood is selected.

Desire predicates Both HOPE and WANT are attitude verbs by virtue of describing aspects of attitude events e. In both cases, the $SoM(e)$ represents the agent's overall state of mind as the type of informational-evaluative content of the two types of events is the same. Their different patterns in mood selection come from the relation between $SoM(e)$ and independent differences between the two verbs' semantics. Silk treats diversity conditions as requiring that any non-empty ordering source can non-trivially distinguish among worlds in the modal base with respect to the embedded proposition p.

In formal terms this means that for any $g(e) \neq \emptyset$, there exists $u \in \bigcap f(e)$ s.t. $u \subseteq p$ (i.e. u is a p-world) and some $v \in \bigcap f(e)$ s.t. $v \nsubseteq p$ (i.e. v is a $\neg p$-world) s.t., $u \lesssim_{g(e)} v \vee v \lesssim_{g(e)} u$ (i.e. the preorder from $g(e)$ distinguishes between u and v).

Assuming the diversity condition to be imposed on the modal base of an arbitrary desire predicate ('D'), i.e. on $f_D(e)$, then $\bigcap f_D(e)$ has to include some $\neg p$-worlds. We can then differentiate between two cases: one where $f_D = DOX$ and one in which $\bigcap f_D(e) \supset DOX_e$. It is precisely this difference that Silk 2018 exploits to capture the difference between 'hope' and 'want'.

1. When a desire predicate is such that its modal base represents the subject's beliefs then $f_D = DOX$ and so assuming the diversity condition, 'xDp' implies that $x's$ beliefs are compatible with $\neg p$.

2. When the desire predicate is such that it only represents a (strict) subset of the subject's beliefs then $\bigcap f_D(e) \supset \bigcap DOX_e$. In this case, '$xDp$' does not imply that x takes $\neg p$ to be possible. As then the $\neg p$ worlds in $\bigcap f_D(e)$ that satisfy the diversity condition can be outside of x's doxastic alternatives i.e. such worlds satisfying the diversity condition belong in $\bigcap f_D(e) \setminus \bigcap DOX_e$

Crucially, Silk says that 'hope' is of the first kind of desire predicate and 'want' of the second kind. The first point to make with 'want' is that it takes a non-trivial ordering source (representing the subject's desires) so the diversity condition on modal bases would be violated. Silk 2018 makes this point using an example from Heim along with the French equivalent which remain felicitious even when the agent is certain about whether p will happen.

(5) a. (John hired a babysitter because) he wants to go to the movies tonight.
(Heim 1992, ex. (44), Silk 2018 (48))

b. Jean a embauché une baby-sitter parce qu'il veut que nous allions.SBJV au cinéma.
(Silk 2018, ex. (49))

From this, Silk, following Heim, takes $\bigcap f_{want}(e)$ to be a superset of the subject's doxastic alternatives. I.e. it is taken to represent what the subject believes to be the case independently of how they themselves choose to act. As a result we have that $\bigcap f_{want}(e) \not\subseteq \bigcap DOX_e$ and hence since this means that $(\bigcap f_{want}(e), \lesssim_{g_{want}(e)}) \not\trianglelefteq SoM(e)$, so the relevant presupposition for the indicative is violated and hence the subjunctive-licensing feature $[+\_sbjv]$ has to be used with *vouloir*.
On the other hand, 'hope' has a bouletic ordering source and the diversity condition requires that there be some $\neg p$ worlds in the modal base. $f_{hope} = DOX$ for it is widely assumed that 'hope'-ascriptions require that the subject believes the complement is possible. Based on the infelicity of minimal pairs with Heim's example but swapping out 'want' with 'hope', $f_{hope}(e)$ is treated as representing the subject's beliefs. The ordering source $g_{hope}(e)$ represents the subject's desires ($= DES_e$) and so the presupposition of the indicative-licensing feature is satisfied. I.e. $(\bigcap f_{hope}(e), \lesssim_{g_{hope}(e)}) \trianglelefteq (\bigcap DOX_e, \lesssim_{DES_e})$.

Emotive factives Subjunctive selection comes from their factivity **and** the diversity condition on modal bases. Factivity of *être heureux* requires that the subject believes the embedded proposition p i.e. that $\bigcap DOX_e \subseteq p$. Hence if we take the modal base f_{happy} to be the subject's beliefs then p would be true in every world in the modal base. However, this breaks the diversity condition. The diversity condition has to be ensured as the bouletic ordering source is certainly non-trivial and is also reasonable on the assumption that 'one isn't happy about everything one believes' (Silk 2018, p.152). This means that the modal base $\bigcap f_{happy}(e)$ has to include some $\neg p$ worlds and, since we aren't happy about everything we believe, we also have that $\bigcap f_{happy}(e) \not\subseteq \bigcap DOX_e$ and hence the subjunctive is selected since this means that:

$(\bigcap f_{happy}(e), \lesssim_{g_{happy}(e)}) \not\subseteq SoM(e)$

So the presupposition for the indicative feature is not satisfied and thus we obtain the subjunctive for emotive factives.

Attitude	Mood prediction	Correct for French?	Correct for Italian?
BELIEF	indicative	✓	×
WANT	subjunctive	✓	✓
HOPE	indicative	✓	No, subjunctive is canonical.
Emotive factives	subjunctive	✓	No, mood flexibility unaccounted for.
Fiction verbs	indicative	✓	No, mood shift unaccounted for.
Speech act verbs	indicative	✓	No, *dire* also allows subjunctive.
Directives (e.g. 'to order')	subjunctive	✓	✓
Commissives (e.g. 'to promise')	indicative	✓	No, as both moods are permitted.
Modal adjectives	subjunctive	✓	✓

Table 3.3: French and Italian predictions of Silk 2018

Problems and Evaluation

There are several key technical problems with Silk 2018's account, we list these here and in some cases we sketch their potential solutions:

1. **Negation in French** Firstly, staying in French the account does not predict subjunctive selection by *croire* under negation. The relevant presupposition would still be satisfied so indicative should be selected. However, if we want to maintain a distinction between the intensional subjunctive and the polarity subjunctive, then it could just be said that this problem falls under the remit of the polarity subjunctive.

2. **Emotive factives in Italian**: these exhibit mood flexibility and, as long as mood choice does not make a semantic contribution i.e. as long as the two minimal pairs have the same meaning such optionality cannot be accounted for. If the presupposition is satisfied then, so long as we maintain an adherence to an *MP!*-style maxim, the indicative will always be selected. This need not be the case if they mean different things and relate to the common ground in different ways. However, we have not found any constraints on the distribution which would motivate this.

3. ***credere***: we can't capture this with the current notion of $SoM(e)$ as we just cannot obtain that $\bigcap f_{believe}(e) \not\subseteq \bigcap DOX_e$ but given the observations by Mari and Portner 2021 which we will later in the chapter, we potentially could if we enrich the notion to have an inquisitive component.

4. ***dispiacersi*** 'to regret' is a counterexample for it selects the subjunctive and yet intuitively one cannot regret what one does not believe. i.e. we will **not** get that $\bigcap f_{regret}(e) \nsubseteq \bigcap DOX_e$ as it will always be that $\bigcap f_{regret}(e) \subseteq \bigcap DOX_e$. Note, this is also a counterexample for French as *regretter* also takes the subjunctive in its complements.

Stepping back from the technical issues, a more fundamental objection can be leveraged against Silk 2018's account namely its handwaviness: in that whilst one side (the left-hand side) of the key notion i.e. what it means for one modal state to be live from another, is formal, the other (the right-hand side) is not. Again, we face a degree of adhocness as well as the involvement of metaphysical baggage over what it means for an event to represent a state-of-mind which has arguably pushed to elsewhere the issue of how modal backgrounds are to be derived from predicates.

Moreover, whilst the commitment-based approach does embody the French intuition relatively well and reasonably tracks the French data, it does not really capture the core intuition concerning Italian (nor does it give a satisfying coverage of the data). To turn to an account which does embody the gets far closer to the right intuition for Italian, we proceed to the final family of theories.

3.3 Truth-based approach: Giannakidou and Mari 2021

The guiding principle of the truth-based approach can be glossed as follows:

$\mathbf{P_{TRUTH}}$: A predicate P selects the indicative iff
the embedded clause is true in some designated set of possible worlds.

This tradition largely stems from the early work of Farkas 1992 which does not use premise semantics (Portner and Rubinstein 2020 call the Kratzerian framework 'premise semantics'[6]) but rather similarity semantics, building on the approaches of Stalnaker 1984 and Heim 1992 to conditionals and desiderative and emotive predicates respectively. Farkas 1992 essentially proposes that the mood selection of a given predicate is given by the cardinality of the set of worlds that the predicate introduces within which truth of the complement is entailed: when a singleton is introduced, the indicative is selected; when the set of worlds introduced consists of two or more worlds, the subjunctive is selected. In Farkas 1992's terms, mood selection depends on the nature of the anchor the matrix verb gives rise to – the anchor is the set of world(s) introduced by the matrix verb and we say it is 'extensional' when it is a single world and, 'intensional' when a larger set of worlds is introduced. However, as Portner 2018 (p.95)

[6]N.B. premise and similarity semantics are not tied to comparison-based and truth-based approaches respectively. I.e. premise semantics is not the only way to construe a comparison-based account. As a case in point Portner and Rubinstein 2020 give an alternative presentation in the appendix which is couched in the similarity semantics framework.

notes, for Farkas 1992 to make the correct predictions for French *croire*, her analysis of 'belief' is too simplistic to be able to recover the standard Hintikkan analysis. Another deeper worry that Portner 2018 raises, is that the nature of the anchor for different predicates is not anchored to their lexical semantics; although, the literature on verbal mood largely ignores considerations of what types of clauses can be embedded by a given predicate, such an analysis requires a more systematic approach to the lexical semantics of the embedding verb than that of an adhoc specification of anchors. Finally, although outside the scope of Farkas' desiderata, the account cannot predict indicative selection for predicates taking interrogative complements without having to give up a standard analysis of interrogatives whether in Inquisitive Semantics or in Alternative Semantics. Giannakidou (1997, 1999, 2009, 2011, 2016) has taken up the gauntlet of coming up with a satisfying truth-based approach. We zoom in on Giannakidou's joint work with Mari (i.e. Giannakidou and Mari 2021) and the role they attribute to veridicality in mood selection.

Overview

Giannakidou and Mari 2021's key notion is that of *veridicality* which admits of two varieties: *objective veridicality* and *subjective veridicality*. *Objective veridicality* is not the governor of the indicative, rather *subjective veridicality* is; non-veridicality is the governor of the subjunctive. Veridicality is considered to be a property of functions which take propositions. Giannakidou and Mari define *objective veridicality* and related properties as follows:

(6) **Objective veridicality, non-veridicality and anti-veridicality:**
(i). A propositional function F is veridical iff $Fp \rightarrow p$ is logically valid.
(ii). F is non-veridical iff $Fp \nrightarrow p$
(iii). F is antiveridical iff $Fp \rightarrow \neg p$

In the definitions above Giannakidou and Mari 2021 express *objective veridicality* as pertaining to a propositional function as they are not only interested in the properties of attitude verbs but also of modals. In the scope of our current purposes we can present *objective veridicality* in a less clunky way by considering it as pertaining to properties of embedding predicates. In doing so, we can stay closer to the syntax and create a bridge to the clausal-embedding literature.

Now when we confine consideration of F to that of propositional attitudes, a more natural formulation of *objective veridicality* is that of the notion, familiar within the clausal-embedding literature, of *veridicality w.r.t declaratives*[7]. Following Klochowicz 2022, we can express this using the following notation where V is a clausal-embedding predicate taking two arguments, a subject s and p, a proposition (in the classical, non-inquisitive sense). Then objective veridicality (of declaratives) says that $\ulcorner sVp \urcorner \Rightarrow p$.

[7] We will return to this connection in chapter 4.

Even though 'know' is a factive predicate (and so it presupposes the truth of its complement) it is generally taken to be a veridical predicate as it entails the truth of its complement. This is not the case for 'believe' and 'want'; rather some other property will have to hold of 'believe' but not of 'want' for us to obtain the indicative for 'believe' as seen in all Romance languages bar Italian. This property is that of being *subjectively veridical*. *Subjective veridicality* basically captures a subject's commitment to the complement irrespective of whether the complement is true. Formally, subjective veridicality is essentially entailment in an information state and is defined as follows:

(7) **Subjective veridicality**: (Giannakidou and Mari 2021, p.59)
(i) A function F that takes a proposition p as its argument is veridical with respect to an individual anchor i and an information state $M(i)$ iff Fp entails p in $M(i)$.
(ii) Fp entails p in $M(i)$ iff $\forall w'[w' \in M(i) \rightarrow w' \in w'' \mid p(w'')]$

Where $M(i)$ is an information state relativised to the individual anchor i, the nature of M comes from the lexical semantics of the verb in question. Crucially, since subjective veridicality is just a special kind of entailment, $M(i)$ is homogeneous with respect to the truth value of p. The property we are after for the subjunctive is precisely that of non-entailment of the complement in an information state and is a natural property to consider for it captures what it means for an information state to <u>not</u> settle $?p$. In other words, the information state $M(i)$ contains both p and $\neg p$ worlds.

(8) **Subjective nonveridicality**: (Giannakidou and Mari 2021, p.64)
A function F that takes a proposition p as its argument is subjectively non-veridical with respect to an individual anchor i and an epistemic state $M(i)$ iff Fp does not entail p, i.e., iff $\exists w'[w' \in M(i) \wedge w' \in \{w'' \mid p(w'')\}]$ and $\exists w'''[w''' \in M(i) \wedge w''' \in \{w'''' \mid \neg p(w'''')\}]$

With the notions of *veridicality* and *non-veridicality* in place, Giannakidou and Mari 2021 define the axiom that is key to the licensing conditions they give for the subjunctive and indicative moods:

(9) **Nonveridicality Axiom**:
(i) For ATTITUDE, ATTITUDE obeys the Nonveridicality Axiom iff ATTITUDE p presupposes that the modal base of the anchor i of ATTITUDE is nonveridical, i.e., partitioned into p and $\neg p$ worlds.
(ii) An ATTITUDE that obeys the Nonverdicality Axiom is called nonveridical.

(10) **Licensing conditions**:
Licensing condition for the *subjunctive* mood: The subjunctive is licensed in the complement of a **nonveridical** ATTITUDE.
Licensing condition for the *indicative* mood: The indicative is licensed in the complement of a **veridical** ATTITUDE.

The basic categorisation of predicates with respect to (non)veridicality that Giannakidou and Mari 2021 (p.313) spell out is as follows:

Type of attitude	Objectively veridical	Subjectively veridical	Veridical?
Epistemic attitudes	✓	✓	✓
Solipsistic (doxastic) attitudes	×	✓	✓
Nonveridical attitudes	×	×	×

Table 3.4: (Non)veridicality and attitude types

In what follows, we give an overview of their account of doxastics (as well as other predicates that Giannakidou and Mari treat in a similar fashion to doxastics), bouletics and the emotive factives.

Doxastics, predicates of certainty, fiction verbs and memory verbs

When it comes to the puzzle of belief in Italian, Giannakidou and Mari 2021 argue that the cross-linguistic variation is the result of lexical underspecification[8]. Giannakidou and Mari 2021 argue that belief can be construed, on a stronger construal, as solipsistically or, on a weaker construal, as suppositionally[9]. Solipsistic belief is subjectively veridical and expresses the attitude holder's doxastic commitment to the complement proposition, irrespective of the truth. Crucially, it boils down to regular Hintikkan belief:

(11) $[\![i\, believe_{sol}\, p]\!]^{Dox,i} = 1$ iff $\forall\, w'[w' \in Dox(i) \rightarrow w' \in \{w'' \mid p(w'')\}]$ (p.168)

Suppositional belief, on the other hand, has a "believe but not know" interpretation. This means that it has a non-veridical presupposition in that in order to be defined, the epistemic base has to be non-veridical. When defined, suppositional belief says that agent's doxastic base is homogeneous with respect to the complement (i.e. the agent is doxastically, but not epistemically committed to p).
Formally Giannakidou and Mari 2021 define this as follows:

(12) $[\![i\, believe_{sup}\, p]\!]^{M,Dox,i}$ is defined iff $M(i)$ is non-veridical (i.e. partitioned modal base). If defined, $\forall\, w'[w' \in Dox(i) \rightarrow w' \in \{w'' \mid p(w'')\}]$. (Ibid)

What we see here is that belief in French, which is solipsistic belief, takes one modal base (the doxastic base) whereas belief in Italian, which is suppositional, involves two modal bases (an epistemic and a doxastic base). Crucially, since the difference is

[8]Note in previous work by Mari 2016b, it was regarded to be a case of polysemy.
[9]In the earlier work of Mari 2016b these are called "expressive" and "inquisitive"-belief respectively

brought out in the layers of the presupposition but not in the assertion, whenever the presupposition of belief in Italian is satisfied, Hintikkan belief is recoverable. So belief in French and Italian do not result in a difference in meaning at the level of the assertion. In addition, the idea of solipsistical belief is also put to use for fiction verbs, predicates of certainty and memory verbs whilst the idea of suppositional belief is also put to use for modal adjectives and their subjunctive selection. E.g. for subjunctive-selection of *è probabile* (N.B G&M use French).

Fiction verbs, predicates of certainty, memory verbs

The difference between solipsistic and suppositional belief is generalised to account for fiction verbs, predicates of certainty and memory verbs. In each case, in Italian, the verb at hand can be construed either solipsistically, in which case it simply involves universal quantification over the relevant modal base (i.e. the semantics are given analogously to (11) with Dox replaced by the relevant modal base), or suppositionally, in which case belief and knowledge are contrasted: the presupposition of which says that agent is lacks epistemic commitment whilst the assertion of which amounts to universal quantification over the relevant modal base (i.e. the semantics are given analogously to (12) again with Dox replaced by the relevant modal base). The respective relevant modal bases of these verbs are as follows given in Table 3.5:

Type of attitude	**Modal base and its interpretation**
Fiction verbs	Fic: the set of propositions corresponding to the imagination of the attitude holder
Predicates of certainty	Cer: the set of propositions the attitude holder takes to be certain of i.e. informed by facts and evidential inferences.
Memory verbs	Mem: the set of propositions that are remembered by the attitude holder.

Table 3.5: Attitude types and their modal bases

According to Giannakidou and Mari 2021 all the attitude types above can be construed solipsistically or suppositionally depending on whether or not they have the presupposition that the epistemic modal base is non-veridical. We summarise their account into the following table:

Type of attitude	Is $M_{epistemic}$ non-veridical?	Modal base	Modal base veridical?	Mood
Fiction verbs (e.g. $immaginare_{solipsistic}$)	N/A	Fic	✓	IND
Fiction verbs (e.g. $immaginare_{suppositional}$)	✓	Fic	✓	SUBJ
Predicates of certainty$_{solipsistic}$	N/A	Cert	✓	IND
Predicates of certainty$_{suppositional}$	✓	Cert	✓	SUBJ
Memory verbs$_{solipsistic}$	N/A	Mem	✓	IND
Memory verbs$_{suppositional}$	✓	Mem	✓	SUBJ

Table 3.6: Bouletics and whether or not the presupposition of $M_{epistmeic}$ is non-veridical is a part of their semantics

As far as Italian is concerned, this yields the correct predictions of mood flexibility of *immaginare*, *essere sicuro/convinto/certo* and *ricordare/ricordarsi*. However, as we will see later in the chapter, the mood flexibility of the fiction verb *immaginare* and the predicates of certainty receive an analysis of more explanatory value in Mari and Portner 2021, where they receive a principled explanation similarly to *credere* which does not need to posit lexical underspecification but rather attributes the mood licensing to its discourse function.

Bouletics

In order to provide a unified account of the subjunctive in the complement of particular bouletics and the subjunctive in suppositional doxastics, Giannakidou and Mari 2021 treat bouletics on par with doxastics in so far as they too can admit of two flavors: solipsistic desires and suppositional desires. Bouletic commitment is simply regarded as the counterpart of doxastic commitment. Some verbs can be construed as solipsistic desires. Formally, and analogously to doxastic commitment, *bouletic* commitment simply amounts to homogeneity of the bouletic modal base, Boul, i.e., universal quantification over p worlds in Boul[10]. Bouletics that have only have this component are regarded as solipsistic bouletics, and select indicative (Giannakidou and Mari 2021). We see this play out for HOPE, PERSUADE, and PROMISE which according to the authors can be optionally construed as solipsistic (Ibid). Of course, for French *ésperer* this has to be strengthened as this verb cannot be suppositionally construed on pain of licensing the subjunctive contra to the data. However, there is no operation in their analysis that yields the obligation to construe *ésperer* solipsistically (as we saw, the route taken by Portner and Rubinstein 2020 places an operation which does precisely this within French's grammar).
Turning to Giannakidou and Mari 2021's final analysis of WANT, which is somewhat involved in order to try to take into account the antifactivity of the doxastic base (i.e.

[10]I.e. as per (11) but with Dox swapped out for Boul. (see Giannakidou and Mari 2021, p.206)

all worlds in the doxastic base at the time of utterance t_u are $\neg p$ worlds) as well as conflicting desire reports, they analyse WANT as follows:

(13) $[\![i\, WANT\, p]\!]^{i,Dox,Boul,Ideal,\mathcal{S},t_u}$ is defined iff $\forall w' \in Dox(i) : \neg p$ (antifactivity), and Boul is non-veridical: $\exists w'' \in Boul : \neg p(w'') \wedge \exists w''' \in Boul : p(w''')$
If defined,
$[\![i\, WANT\, p]\!]^{i,Dox,Boul,Ideal,\mathcal{S},t_u} = 1$ iff $\forall\, w'''' \in Ideal_{\mathcal{S}} : p(w'''')$. (p.204)

Firstly, let's try to unpack the assertion. Giannakidou and Mari 2021 do not explicitly specify what $\mathcal{S}$ is anywhere in Giannakidou and Mari 2021. However, in Giannakidou and Mari 2013 it is used as the notation for an ordering source. And in Giannakidou and Mari 2021, $Ideal_{\mathcal{S}}$ is regarded as a function which, given an epistemic modal base relativised to an agent, a time of utterance and the actual world, outputs a subset of this relativised epistemic modal base in which all of the propositions in $\mathcal{S}$ are true. With the involvement of $Ideal$ and $\mathcal{S}$, we end up with not only an unnecessarily roundabout way of obtaining a satisfactory semantics but we also have a proliferation of arguments compared to the account given by the comparison-based theory which uses only a bouletic base and a version of a doxastic base (e.g. DOX^+ in Portner and Rubinstein 2020). Regarding the presuppositions, the doxastic base is homogeneous with respect to $?p$ and settles $?p$ negatively so we have subjective antiveridicality in this presupposition. In the second, we do not have bouletic commitment as the bouletic base contains p and $\neg p$ worlds. Thus, according to Giannakidou and Mari 2021, WANT will select the subjunctive, a correct prediction.

Turning to the other main bouletic verb: HOPE. Unlike WANT, HOPE, according to Giannakidou and Mari 2021, involves bouletic commitment in the assertion and can be construed with or without a presupposition of epistemic uncertainty.

(14) a. Solipsistic HOPE (indicative)
$[\![i\, hope_{sol}\, p]\!]^{Boul,i} = 1$ iff $\forall\, w'[w' \in Boul(i) \rightarrow w' \in \{w'' \mid p(w'')\}]$

b. Suppositional HOPE (subjunctive)
$[\![i\, hope_{sup}\, p]\!]^{M_{epistemic},Boul,i}$ is defined iff $M_{epistemic}(i)$ is non-veridical (i.e. partitioned modal base).
If defined, $\forall\, w'[w' \in Boul(i) \rightarrow w' \in \{w'' \mid p(w'')\}]$
(Glosses of (41) & (42) (pp. 206- 207) but written on par with (11) and (12))

As a result, HOPE is the straightforward bouletic counterpart of BELIEF.

Emotive factives

Recall the Goldilocks problem of the emotive factives in Chapter 2. Giannakidou and Mari 2021 admirably seek to account for the mood flexibility in Italian (i.e. the Goldilocks problem) as well as trying to account for the cross-linguistic variation. How-

ever, sadly, this is precisely where their licensing conditions, as they present them, exhibit shortcomings. This is also the area of their theory which is rather confusing to interpret for initially the authors say that emotive factives have *mixed (non)veridicality*, which is the property held responsible for mood flexibility at large, and which rests upon differentiating the layer of assertion from the layer of presupposition. However, from their treatment of the emotive factives, it becomes apparent that the modal base involved in the assertion and the modal base involved in presupposition need not have differing properties with respect to (non)veridicality for Giannakidou and Mari 2021 take the emotive factives as having two presuppositions: one of which is non-veridical and the other is veridical (see Giannakidou and Mari 2021, pp.276-277). Yet given their licensing conditions in (10) and that the Nonveridicality Axiom (9) refers to only one modal base in the presupposition, then charitably adapting (9) to no longer refer to a unique modal base, we are led to an overgeneration of mood flexibility as attitudes (such as the emotive factives) can simultaneously obey and disobey the Nonveridicality Axiom[11]. As we will see since French emotive factives do not radically differ in their presuppositions to those of Italian, then on the charitable interpretation we will get overgeneration for languages taking the subjunctive only (e.g. French (and Spanish)) and for languages taking the indicative only(e.g. Greek and Balkan languages (Baunaz and Puskás 2022)) as in both cases the charitable interpretation predicts both indicative and subjunctive.

Let's unpack the veridical presupposition first. This presupposition concerns the nature of the doxastic base. Although emotive factives are called "factive", their factivity has been disputed and through consideration of the classic Oedipus example, Giannakidou and Mari 2021 conclude that emotive factives are neither factive nor objectively veridical, rather they only require the subject's belief that p is true, i.e. subjective veridicality, not that p is true. This point is particularly well exemplified with *regret* as in the classic Oedipus example:

(15) Falsely believing that he had inflicted a fatal wound, Oedipus regretted killing the stranger on the road to Thebes.
(ex.(24) in Giannakidou and Mari 2021, p.282, originally from Klein 1980, quoted in Gazdar 1979, p.122)

Hence, the authors conclude that the emotive factives have a veridical doxastic presupposition. So, by virtue of this veridical presupposition, the indicative can be licensed in the complement.
Turning to the non-veridical presupposition now, Giannakidou and Mari 2021 hone in on the fact that emotive factives are gradable (both on their own and as seen in comparative constructions).

(16) a. Davide era molto contento/contentissimo che la squadra inglese femminile

[11]Doing so would require adding something like 'the relevant presupposition' (though of course this would admit of some handwaviness) as 'at least one presupposition' will mean that once an attitude has gone non-veridical, obtaining the indicative is impossible i.e. we would get only subjunctive.

vinse[12] la Finalissima 2023 contro quella brasiliana.
'David was very happy that the England women's team won the Finalissima 2023 against the Brazilian team'

b. Davide è più irritato che io.
'David is more annoyed than I am'

In treating emotive factives as gradable predicates, Giannakidou and Mari 2021 take emotive factives as denoting scales. In the gradability literature, gradable predicates are taken to map individuals to points on a particular scale. Taking a course-grained approach, these predicates have a positive and negative extent with respect to a threshold d. So to follow this literature, Giannakidou and Mari 2021 propose for emotive factives that with respect to d, two equivalence classes are obtained which partition the worlds in the emotive space $\mathcal{E}$: into the part strictly less than d which is where the agent lacks the emotion in question and $\neg p$ is true, and the rest of the space is where the agent has the emotion and p is true. In other words, the first of these equivalence classes is the negative extent of the emotion and the is the positive extent (PE). PE does not cover the whole of the emotive space $\mathcal{E}$; the complement of PE contains $\neg p$ worlds so $\mathcal{E}$ is non-veridical.[13] Giannakidou and Mari 2021 give the semantics of the emotive factives as follows:

(17) $[\![i\, V_{emotive}\, p]\!]^{w,Dox(i),\mathcal{E}}$ is defined iff $Dox(i)$ contains only p worlds (subjective veridicality) and the emotion space $\mathcal{E}$ is nonveridical and contains p and $\neg p$ worlds (emotive nonveridicality)
If defined, $[\![i\, V_{emotive}\, p]\!]^{w,Dox(i),\mathcal{E}} = 1$ iff $\forall w' \in PE_{\mathcal{E}} : p(w')$ where PE is the positive extent of the modal base $\mathcal{E}$ i.e. $PE_{\mathcal{E}} = \{w \mid \forall q \in PEq(w)\}$
(Giannakidou and Mari 2021, (p.289), def. of PE on p.288)

When defined, the definition says that in *all* the worlds that are compatible with the emotion at hand, p is true (Giannakidou and Mari 2021, p.288). Note that negative and positive emotions can be captured by the definition above without any adaption as, to use the example of *fear*, the positive extent of the fear modal base is not the set of worlds in which the agent has positive feelings towards p and where p is true but rather it is the set of worlds in which the agent has the relevant emotion (i.e. fear) and p is true. Another point to note is that although compositionality (at least with respect to negation) does not fall out of their analysis since negation does not yield universal quantification over the negative extent over the emotion but merely yields the existence of a $\neg p$ world in the positive extent. This is not necessarily a problem as it allows a difference in meaning to be maintained between (18a) in which Fiona may be neutral or indifferent and (18b & c) where such an interpretation is unavailable:

[12] We use the *passato remoto* here, which is acceptable in Southern Italian, as it allows us to draw attention to the point presently at hand — that is, gradability rather than mood. In this example, Northern Italian would replace this with the *passato promissimo*, with the auxiliary in either mood.

[13] Note as, G&M themselves highlight, PE basically acts as an ordering source (ordering only with respect to p).

(18) a. It is not the case that Fiona is happy that England won.
b. Fiona is not happy that England won.
c. Fiona is unhappy that England won.

Despite these advantages, the semantics given for the emotive factives is arguably very overcomplicated. Moreover, the two layers of presupposition and assertion, which according to the authors are supposed to be the root of mixed (non)veridicality, do not share the burden of mood licensing, rather it seems to be all in the presuppositions. As discussed at the beginning of this section, it's not clear that adapting the Nonveridicality Axiom to allow for multiple presuppositions offers a route out. On the other hand, it's also not clear that insisting on a division of labour between the presupposition and the assertion offers a way out either. For the cross-linguistic argument regarding the emotive factives is quite different to that of belief. G&M do not claim that a language that takes only the indicative for the emotive factives, such as Greek, lacks the emotive non-veridicality presupposition – in fact, it is difficult to even make sense of the semantics of G&M's entry for the assertion without $\mathcal{E}$ being non-veridical. Moreover, since this presupposition is indispensable, it seems more plausible that languages would attune to different presuppositions and their natures rather than one language attuning to the assertion and the other to a presupposition.[14]

3.4 Belief in Italian and the raisability of questions: Mari and Portner 2021

Last but by no means least in our review of the state-of-the-art approaches to verbal mood, is that of the recent contribution of Mari and Portner 2021. This approach belongs to the comparison-based family of theories and is compatible with the aforediscussed approach of Portner and Rubinstein 2020. Thus in subsequent chapters, when we speak of the comparison-based approach, the theory to which we are referring to, unless otherwise explicitly stated, is the join of the theory of Portner and Rubinstein 2020 and the theory of Mari and Portner 2021. We chose to detail Mari and Portner 2021 separately as their paper illuminates that in Italian the verbal mood licensing of certain attitudes is sensitive to the raisability of the question expressed by the complement (i.e. $?p$), the extendability of which as well as the consideration of the interactions between verbal mood and issue-directed predicates, is the subject of the following chapter.

[14] At least in words though not formally, G&M seem to want to maintain that languages can be sensitive to both levels. For although they do not address why their account does not predict that Greek only takes the indicative, they do discuss the language's two indicative mood complementizers as being sensitive respectively to the verdicality of presupposition (*pu*) and that of assertion (*oti*).

Overview

Recall from the previous chapter that 'to believe' in Italian, *credere* has a strong preference for the subjunctive whilst the indicative, for many speakers, is considered nigh on ungrammatical. Mari and Portner 2021 probe the variation in the distribution more deeply by considering precisely in which contexts the respective moods are licensed. From which, the authors put forward the idea that mood variation with *credere* is both not free nor does it follow a Portuguese pattern i.e. indicative signals higher level of commitment or certainty; subjunctive lower. Instead, using a religious example among others, it is argued that the mood distribution in the complement of *credere* is all about raisability of $?p$ in the common ground. The outcome of this is the analysis that whereas *credere*+SUBJ marks a relation between the content of belief and the discourse context, *credere*+IND is used only to convey the attitude holder's personal mental state.

In a moment, we will recapitulate the key examples that motivate this analysis of *credere* but first we briefly sum up the key move and the relevance of this. From a formal perspective Mari and Portner 2021's key innovation is to allow modal quantification to vary by allowing a language (in this case, Italian) to use the common ground as a modal base (note *not* as an ordering source as might be anticipated from the assumption that 'believe' comes with one modal background; the doxastic base then has a shifted role and acts as the ordering source). This move is not only vital for an account of 'believe' in Italian, but also because the account can be extended to several other Italian predicates which exhibit an analogous pattern. In particular, part of why Italian is so troublesome is that predicates of certainty can also take the subjunctive (and the subjunctive is indeed preferred). Such predicates, as well as reportative speech act verbs and fiction verbs, motivate giving *credere* the attention it deserves because, as highlighted by Mari and Portner 2021, they serve to illustrate that the subjunctive with *credere* cannot be just written off as an idiosyncratic quirk of the lexical semantics of *credere*. To dismiss it would be to take a very superficial view of the subjunctive's use in the complements of Italian propositional attitudes. Rather, essentially, something quite deep happens in Italian which does not occur in French. It is deep in the sense that the mood licensing of the subjunctive in Italian (at least for certain predicates and predicate classes) is fundamentally connected to what propositions the interlocutors of a discourse have already agreed to regard as being true.

	B_1	B_2	**Grammatical for French?**	**Grammatical for Italian?**
'believe'	DOX	-	-	-
'believe' + indicative	$DOX = M$		✓	Only when $?p$ is *not* raisable in CG
'believe' + subjunctive	$DOX = O$	$??{=}M$	$*$	-
	$DOX = O$	$CG = M$	$*$	✓

Table 3.7: Summary of the basic Kratzerian approach of Mari and Portner 2021 for 'believe' in French and Italian

Data

But first let's discuss one of the key examples that Mari and Portner 2021 use to motivate their analysis:

(19) Context: Maria, an observant Catholic, is speaking with Cynthia, an atheist, during their joint visit to Rome. Both accept that Peter was a historical figure but only Maria believes in souls and heaven.

a. Credo che le ossa di San Pietro siano/*sono in Vaticano.
'I believe St. Peter's bones are in the Vatican.'

b. Credo che l'anima di San Pietro è/sia in paradiso.
'I believe St. Peter's soul is in Heaven'

Firstly, it's important to recognise the subtlety of this observation for several native speakers, including myself, did not initially have the indicative as licensed in (19b). However, let's recapitulate the assessment of Mari and Portner 2021 of this data point. Since both speakers agree that San Pietro existed, the issue of where his bones are is raisable in the context, and is presumably the QUD. So the subjunctive is in, the indicative out. If they are unaware of each others' religious beliefs then the speaker can use either mood depending on whether or not they wish to signal that the issue of the whereabouts of San Pietro's soul is raisable. If the speaker uses the indicative, they convey that the interlocutors are committed to resolving $?p$ in incompatible ways.

Another key data point that Mari and Portner 2021 discuss is that although both moods are allowed in future-oriented complements there is a difference in the nature of event that the two moods can describe. The subjunctive can only be used when the truth value of the complement is already settled but for events which are unplanned or unsettled at the time of utterance, the (future) indicative must be used. Furthermore, predicates of taste are an area in which the indicative is allowed and usually preferred unless in the presence of experts (e.g. food critics)[15]. We summarise the mood licensing

[15]Note that whilst Mari and Portner 2021 take contexts in which $?p$ is not raisable to be obligatory indicative, they do stress in footnote 31 that, owning to the prescriptive rule speakers apply to *credere* they do not want to prohibit the subjunctive in such cases

of *credere* in the following diagram:

Licensed moods in Italian	**Raisability status of** $?p$
Obligatory subjunctive	When $?p$ is the QUD in the context
Obligatory indicative	$?p$ is *not* raisable in CG
Both moods possible	Unclear whether $?p$ is raisable in the context

Table 3.8: Mood licensing and raisability of $?p$ according to Mari and Portner 2021

Analysis

In adopting a Kratzerian approach, Mari and Portner's starting point is to treat the indicative and subjunctive as modal operators which differ in their modal force: the indicative being straightforwardly analysed as a simple necessity operator, and the subjunctive as a human necessity operator (i.e. the subjunctive has a non-homogeneity presupposition for the modal base and the truth condition says that the best worlds in the modal base as ordered by the ordering source are p worlds). However, the semantics of the indicative and subjunctive undergo refinement in order to incorporate what it means for a question to be raisable in a context. In the course of these refinements, doxastic states and modal backgrounds are treated as resolution sensitive. This has the effect of turning the subjunctive's non-homogeneity presupposition into recognizability in the modal base.

When it comes to making the notion of raisability precise, a word is first in order about what Mari and Portner 2021 are trying to capture. One case in which they want to block the subjunctive, is in cases of future orientation where the event referred to is a non-planned event taking place at a time in the future from the time of utterance. In such a case, the complement p is regarded as unsettled. When the truth value of the complement p is unsettled, the question of whether p is true or false is not raisable i.e. $?p$ is not raisable. Thus there are certain questions for which, with certain doxastic states or contexts, no answer can be formulated. The key example of this used by Mari and Portner 2021 is that of someone asking on the night that the French National team play a game, 'Will France lose tonight's match?'. This question, at least compared to 'Do you think France will lose tonight?' is rather odd as the speaker's interlocutor, if we assume they are neither an oracle nor a football aficionado, cannot have an answer to the first question only to the second.

Mari and Portner 2021's notion of raisability comes from Lewis's concept of SUBJECT MATTER. Now Mari and Portner 2021 use this because subject matters are partitions and partitions, prior to the advent of Inquisitive Semantics, were regarded to be identifiable with questions. Explicitly, Mari and Portner 2021 say that 'a subject matter is a partition of the set of possible worlds, such that each cell of the partition

is a "maximally specific way things might be with respect to the subject" (Lewis 1988, p.162). Thus, according to partition semantics, a subject matter can be identified with a question.' (Mari and Portner 2021, p.23). To capture which subject matters are permitted in a given context, Mari and Portner 2021 work with the notion of a RESOLUTION SENSITIVE STATE and the authors then follow Yalcin (2018, 2016) in so far as beliefs are modeled to be a resolution sensitive state. In Yalcin's terminology, a RESOLUTION SENSITIVE STATE is a function from partitions to subsets of that partition. A DOXASTIC STATE is then simply a special kind of resolution sensitive state where the domain represents the issues that the agent can recognize and the range represents what the agent actually believes about that issue. However, Mari and Portner 2021 implement Yalcin's idea with a simplified definition of a resolution sensitive state (and consequently also a doxastic state): namely, they take it to be a pair consisting of a partition and a sub-partition of that partition. Rather than as a set of pairs as it would be on Yalcin's definition. Thus the formal definition that Mari and Portner 2021 use is as follows:

Definition (of a **resolution sensitive state**)**.** A **resolution sensitive state** is a pair $\langle P, R\rangle$, where P is a partition of the set of possible worlds W and R is a subset of that partition. ((41a) in Mari and Portner 2021, p.25)

The **common ground** of a context c is also treated as being a resolution sensitive state: namely, $\langle P_{cg}, R_{cg}\rangle$ where P_{cg} represents the issues that can be recognized in the context. It is very important to note that issues are framed in Lewisian terms, i.e. as the possible subject matters, rather than as the questions that the interlocutors have either raised or seek to answer (see discussion on p.27 of Mari and Portner 2021). The subpartition R_{cg} represents the mutually presupposed (possibly partial) answers to those questions. From this, we can define a question as raisable if it conforms to a possible subject matter' (Mari and Portner 2021, p.26). The question that all interlocutors actively seek to answer is the present question under discussion in the context. The QUD is treated separately to the possible subject matters as a part of the context. A context and its QUD are defined formally as follows:
A CONTEXT c is a pair $\langle cg_c, Q_c\rangle$, where:
cg_c is the common ground, a resolution sensitive state, and
Q_c is the QUD, a question recognizable in cg_c (where a question is raisable in a context iff the question is recognizable in the common ground of the context).

With the notions of raisability and context in place, we are in a position to state Mari and Portner 2021's key principle:

(43) A sentence of the form X *believes that* φ_{subj} where φ_{subj} is subjunctive and $[\![\varphi]\!] = p$, presupposes that the question $?p$ is raisable in the context.

Mari and Portner 2021 show that principle (43) is derived from the combination of the non-homogeneity condition on human necessity and the resolution sensitive state-based model of subject matters. Essentially, taking the basic model of Kratzerian

modal backgrounds, and recasting it to incorporate question-sensitivity of resolution sensitive states will mean that the basic non-homogeneity condition of the subjunctive's presupposition will become a recognizability condition. In order to obtain (43), what we basically need is for the doxastic state to have more structure – structure that would allow it to act as ordering source (i.e. to rank relevant worlds not just to pick them out), in order to obtain such a structure we need a notion of what it means for a modal background to be resolution sensitive.

Definition (Resolution sensitive modal background)**.** A **resolution sensitive modal background** is a function F from worlds w to pairs of $\langle P_{F,w}, R_{F,w}\rangle$, where

a. $P_{F,w}$ is a partition of the set of possible worlds W, and
b. $R_{F,w}$ is a set of subsets of $P_{F,w}$ ((44) in Mari and Portner 2021, p.29)

In order to arrive at a new definition of BEST for the subjunctive's truth condition, the next step is to define a relation which compares cells in the partition, the partition identified by the resolution sensitive modal background, rather than individual worlds:

Definition (Ordering of cells w.r.t. a resolution sensitive modal background)**.** For any resolution sensitive modal background $G = \langle P_G, R_G\rangle$, and $A, B \in P_G$:
$A \prec_G B$ iff $\{X \in R_G : B \in X\} \subseteq \{X \in R_G : A \in X\}$ ((45) in Mari and Portner 2021)

Mari and Portner 2021 then use this relation in their definition of a new modal background that is capable of ranking $P_{F,w}$ with respect to $R_{F,w}$. This new modal background is $\textsc{best}(F, G, w)$. Note that the function $\textsc{best}(F, G, w)$ is only defined when the two resolution sensitive modal backgrounds F and G pick out the same partition of W[16].

Definition ($\textsc{best}(F, G, w)$)**.** For any resolution sensitive modal backgrounds F, G and possible world w: BEST is only defined when $\forall x \in P_{F,w}$ s.t. $\exists Y$ s.t. $Y \subseteq P_{G,w} \wedge x = \bigcup Y$. When defined, $\textsc{best}(F, G, w) = \langle P_{F,w}, \{\{A \in \bigcap R_{F,w} : \neg\exists B \in \bigcap R_{F,w}$ s.t. $B \prec_{G,w} A\}\}\rangle$

Note that both the definition of ordering (in (45)) and the truth condition of this definition of $\textsc{best}(F, G, w)$ are analogous to the standard Kratzerian definitions.

In the two new definitions of the key modal operators, Mari and Portner 2021 use two key properties of propositions: namely that of a proposition p being **accessible possibility** and an **accessible information** (N.B. both definitions from Mari and Portner 2021, p.31, footnote 33):

Definition (of **accessible possibility** (resolution sensitive version))**.** A proposition p is an **accessible possibility**, given a resolution sensitive state $S = \langle P, R\rangle$ iff $\exists P' \subseteq P$ s.t. $p = \bigcup P' \wedge \bigcap R \cap P' \neq \emptyset$

[16]This is (75) in Mari and Portner 2021; note that the definedness condition used here is not the final definition endorsed by Mari and Portner (for this see their Appendix) they use the definition in (75) for ease of explication

Here $\bigcap R$ is all the cells that are in every subset of P that is an element of R. A proposition p being an *accessible possibility*, given a resolution sensitive $\langle P, R\rangle$, says that there exists a partition P' where P' is a subset of P s.t. the proposition p is the union of the cells in P' and the set of cells in common to every element of R contains some cell which is a element of P'. I.e. there is overlap between the cells that p comprises of and of intersection of the output of the the modal background. This definition is used in the presupposition for the subjunctive and, in the case of *credere*, the definition requires that both p and $\neg p$ be accessible possibilities in $\bigcap DOX$.

Definition (of **accessible information** (resolution sensitive version))**.** A proposition p is an **accessible information**, given a resolution sensitive state $S = \langle P, R\rangle$ iff $\exists P' \subseteq P$ s.t. $p = \bigcup P' \wedge \bigcap R \subseteq P'$

A proposition p being *accessible information* requires a stronger condition than being an accessible possibility for the second part requires that the cells that comprise p be a superset of the cells in $\bigcap R$. This definition is used in the truth condition of both the indicative and the subjunctive.

Finally we are in a position to give Mari and Portner's final definitions of the modal operators *indic* and *subj* which can now be made resolution sensitive:

(47) **Simple necessity** (resolution sensitive version):
$[\![indic]\!] = [\lambda p \lambda F \lambda w. Ai(F(w), p)]$

(48) **Human necessity** (resolution sensitive version):
$[\![subj]\!] = [\lambda p \lambda G \lambda F \lambda w$:

a. $Aposs(F(w), p) \wedge Aposs(F(w), \neg p)$ (non-homogeneity condition)

b. $\lambda w[Ai(\textsc{best}(F, G, w), p)]$ (truth condition)

As a result applying these to a minimal pair with *credere* as the matrix verb, we obtain:
$[\![G \textit{ believes that } p_{indic}]\!] = \lambda w[Ai(DOX(g, w), p)]$
$[\![G \textit{ believes that } p_{subj}]\!] =$
a. $Aposs(\lambda w.CG, p) \wedge Aposs(\lambda w.CG, \neg p)$
b. $\lambda w[Ai(\textsc{best}(\lambda w.CG, DOX(g), w), p)]$
In the indicative entry DOX acts as the modal base whereas in the subjunctive entry it acts as the ordering source and the common ground acts as the modal base. Let's consider the religious soul example again. Suppose, the two interlocutors know that they have opposing believes, then neither p nor $\neg p$ are accessible possibilities from the CG so the non-homogeneity presupposition of the subjunctive fails. The subjunctive is however licensed when $?p$ is the QUD and when it is unclear whether it is raisable. For in the former case, the non-homogeneity presupposition is evidently satisfied and in the latter case, an interlocutor can take it to be raisable (i.e. both p and $\neg p$ are accessible possibilities in their model of the common ground) and thus they can use

the subjunctive in order to test whether their model of the common ground is indeed correct.

Analysis and predictions beyond *credere*

The idea of a contextually salient modal background such as the common ground as being picked up in certain circumstances in Italian is a wider phenomenon than just applying to *credere*. Mari and Portner 2021 close their paper by working through several other verbs for which use of the common ground as a default can be applied to explaining their mood licensing. Firstly, the authors show that a common ground-orientated use of the subjunctive is also observable with predicates of certainty. For a predicate of certainty, the canonical modal base is $CERT$ a subset of DOX. When $?p$ is not raisable we have $CERT = M$ but when $?p$ is raisable $CERT = O$ and $CG = M$. The analysis is also explored for *dire* 'to say' as well as evidential attitudes like *sentire* (on the 'to hear' interpretation). For *dire*, the attitude contributes the modal background of the reported common ground RPG which can serve as the modal base when combined with the indicative or as the ordering source when combined with the subjunctive (in the latter case the CG serves as the modal base). Finally, Mari and Portner 2021 explore the mood licensing of fiction verbs but these are argued to not be a homogeneous class in that whilst *immaginare* uses rule (39) (i.e. the common ground as default), *sognare* is a case of genuine mood shift with a different semantic interpretation depending on which mood is used (i.e. bouletic when with the subjunctive). The story for *immaginare* is that the attitude gives rise to a modal background of imagination, IMG and when *immaginare* combines with the indicative IMG acts as the modal base but when *immaginare* combines with the subjunctive, the CG acts as the modal base and IMG as the ordering source.

Predictions

We summarise the predictions in the following table:

	B_1	B_2	**Grammatical for Italian?**
'believe'	DOX	-	-
'believe' + IND	$DOX = M$		When raisability of $?p$ is unclear (licensed) or $?p$ is not raisable (selected)
'believe' + SUBJ	$DOX = O$	$CG = M$	✓
predicates of certainty	$CERT \subseteq DOX$	-	-
predicates of certainty + IND	$CERT = \mathrm{M}$	-	✓
predicates of certainty + SUBJ	$CERT = \mathrm{O}$	$CG = \mathrm{M}$	✓(provided $?p$ is raisable in CG)
'say'	RPG	-	-
'say' + IND	$RPG = M$	-	✓
'say' + SUBJ	$RPG = O$	$CG = M$	With evidential function i.e. $?p$ is raisable in CG
immaginare	IMG	-	-
immaginare + IND	$IMG = M$	-	✓
immaginare + SUBJ	$IMG = O$	$CG = M$	✓(provided $?p$ is raisable in CG)

Table 3.9: Summary of grammaticality predictions of Mari and Portner 2021's approach for Italian

Discussion

Despite the fact that the data points are highly subtle, we agree with the broad assessment that the mood licensing of *credere* is deeply connected to the raisability of $?p$ in the common ground. However, we regard the indicative[17] as always grammatical albeit significantly degraded because the use of the subjunctive indicates that $?p$ is unresolved in the common ground and it is pragmatically poor to not mark this when it is unresolved. As a result of it being pragmatically better to mark the unresolvedness of $?p$, in scenarios in which the issue is unresolved the indicative feels ungrammatical but is in fact not.

In support of our position, we supplement the data with two mathematical examples:

(20) Context: a mathematician (without an interest in foundational questions) is asked if they're alright after a dizzy spell. To reassure their interlocutor they say:

[17]It is worth keeping in mind that we are Northern and Northern-Centro speakers and in the North the indicative is, in general, more acceptable in embedded clauses. So we welcome Centro-Sud judgements on the examples of Mari and Portner 2021 and our own.

a. #Beh, credo che uno più uno sia.SUBJ due.
b. Beh, credo che uno più uno è.IND due.
'Well, I believe that one plus one is two'

The dizzy spell is not particularly relevant here - it's just to give a plausible context of utterance for someone to use 'believe' rather than 'know' when it is evident that for them the matter is already settled. On the other hand, there are situations in which the subjunctive is more acceptable, consider the new context in which the axioms of mathematics are explicitly not taken for granted:

(21) Context: the interlocutors are in a mathematical logic classroom going through a derivation in, say, Peano Arithmetic.
a. Credo che uno più uno sia.SUBJ due.
b. Credo che uno più uno è.IND due.
'I believe that one plus one is two.'

In addition, we also not convinced of another two examples of Mari and Portner 2021 which are future-orientated. The examples contrast minimal pairs with the indicative future tense used in the complement and subjunctive present tense in the other. The claim is that only the indicative future can be used when the issue of the complement is unresolved or the event the complement describes is unplanned. The authors consider a scenario in which parents are discussing whether their child, who often loses things, will lose a new scarf. Since the event of losing a scarf is unplanned, the (present) subjunctive is out. We think that these examples should not factor heavily into the ascertaining the licensing conditions for the subjunctive as the indicative and the subjunctive are just not in competition in this example. For Italian, unlike Spanish or Portuguese, has no future subjunctive. Plausibly, conveying the information about when the event is to take place (i.e. using the appropriate tense), takes precedence over marking the mood that ordinarily goes with the predicate. Moreover, if we consider an event in the near future and thus compare a minimal pair for which both parts are in the present tense but with differing moods, then the fact that in this case the subjunctive still sounds fine (if not better) and does not convey the 'plannedness' reading, reveals that it is not the moods which are in competition in the two examples of Mari and Portner 2021 but the tenses.

Our main point of criticism is that since the mood licensing is all about raisability of issues, the phenomenon is well-suited to be approached from the perspective of Inquisitive Semantics and doing so would involve a less convoluted analysis as we do not have to appeal to partitions. Moreover, the new puzzle that Mari and Portner 2021 introduce which we highlight in subsection 3.4.1 requires us to incorporate embedded interrogatives and, as Mari and Portner 2021 acknowledge, this is challenging to do on their partition-based account. Thus, we think a simpler account of the mood licensing of *credere* is available by appealing to what it means for an issue to be resolved which

the framework of Inquisitive Semantics allows us to do and also provides us with a neat account of the key predicate that the new puzzle is about.

Combining P&R (2020) and M&P (2021)

One point that is important to note is that Mari and Portner 2021's account is not applicable to the emotive factives nor to 'want' as these both come with two modal backgrounds by virtue of their lexical semantics so they do not recourse to rule of the common ground acting as a default in order to explain their mood licensing. Rather, they require an approach like Portner and Rubinstein 2020. As alluded to multiple times in this Chapter, the comparison-based approach of Portner and Rubinstein 2020 and Mari and Portner 2021 are combinable. Indeed, only by combining them can we obtain an adequate (if imperfect) coverage of the data as the view in Portner and Rubinstein 2020 only offers a solution to predicates which, given their lexical semantics canonically, take the subjunctive but which in some languages take the indicative and the view of Mari and Portner 2021 only offers a solution to predicates which given their lexical entries would take the indicative but which in some languages take the subjunctive. We will explore this further later in chapter 6 as in that chapter we will take there to be two operations present in Italian: one, which à la Portner and Rubinstein 2020 will allow predicates ordinarily taking two modal backgrounds to combine to a single modal background; and one which à la Mari and Portner 2021 allows us to go from one modal background to two. Only comparison-based accounts which have both of these two operations will give the correct predictions across the key data points of bouletics, emotive factives and doxastics.

3.4.1 A New Puzzle

Another reason why Mari and Portner 2021 is of particular interest to us is that Mari and Portner raise in a footnote that the verbal mood used in embedded interrogative clauses seems to have an analogous effect to as seen with 'belief' i.e. the common ground can be used as a second modal background (qua modal base).
The examples given are:

(22) a. Mi chiedo dov'è la macchina.
b. Mi chiedo dove sia la macchina.
'I am wondering where the car is'
c. Non so dov'è la macchina.
d. Non so dove sia la macchina.
'I don't know where the car is'

This data is the only mention of an inquisitive predicate (i.e. *chiedersi* 'to wonder') in the literature on verbal mood. The further exploration of which is the subject of the next chapter and the rest of the thesis at large.

3.5 Taking stock

As we've seen diving into four accounts from three different families: no single account, or even family, offers full coverage of the Italian data. In presenting the three main families we have focused on how they deal with three key puzzles for Italian:

- Doxastics: Italian's quasi-uniqueness in not only licensing but favouring the subjunctive for *credere*.
- Bouletics: Differentiating *volere* 'to want', a strong subjunctive selector, from *sperare* 'to hope' which licenses both moods (though the subjunctive is preferred).
- Emotive factives: Mood *flexibility* thereof.

Whilst none of the theories presented in this chapter can accommodate all three of these puzzles, there are valuable insights to take from all: firstly, contrasting the intuition behind Silk 2018 and Giannakidou and Mari 2021 as well as their respective predictive power, we see that an approach to subjunctive-licensing in Italian is warranted which is unavailable for the rest of Romance. From Mari and Portner 2021 we see that this is to be in the form of a sensitivity to the raisability of the question embodied by the complement in the common ground. Although Silk 2018 encapsulates the correct intuition for French's mood licensing, it admits of problems even for French and is vastly empirically inadequate for the Italian data. Whilst the account could potentially be enriched to have an inquisitive component in order to stand a chance at capturing the Italian data, we think that the problems the account exhibits for French are sufficient to allow us to put this theory aside. In essence, we would not be starting from the right intuition for Italian. Turning to the remaining two families of accounts, we think that Giannakidou and Mari 2021 are on the right lines of the intuition for Italian but it is clear that the account has problems in so far as its formal implementation is concerned and the semantics of bouletics do not have a particularly clean analysis (recall the theory's clunky entry for WANT). On the other hand, the comparison-theory of Portner and Rubinstein 2020 gives a clean analysis of bouletics and the comparison-based approach work of Mari and Portner 2021 on *credere* involves an implementation of Giannakidou and Mari 2021's intuition successfully. We explore in the following chapter whether the intuition of Giannakidou and Mari 2021 can be fruitfully employed to a restricted part of the distribution which is wider than that of verbs handled in Giannakidou and Mari 2021. Crucial to seeing the breath of the distribution to which Italian's unique sensitivity applies, we have to introduce data hitherto unaddressed in the literature. In doing so, we will now move on to addressing what we take to be an area of research in verbal mood more fundamentally in need of attention which will shed light on the peculiarity of Italian's subjunctive distribution in the Romance family as well as highlighting what is really the intuition behind the Italian subjunctive. We are of course talking about the consideration of inquisitive predicates.

4 Inquisitive predicates and their mood licensing

Inquisitive predicates, in the wider sense of Karttunen 1977[1], are a set of predicates which encompass both issue-directed attitudes (such as 'wonder', 'be curious' and 'investigate') and speech act verbs which only accept interrogative complements[2] (such as 'inquire' and 'ask'). The study of the mood properties of inquisitive predicates is, to date, non-existent in the literature on verbal mood (with the exception of Mari and Portner 2021 who briefly mention in a footnote that 'wonder' in Italian seems to pattern similarly to 'belief' in Italian; however, no formal account accommodating 'wonder' was proposed). However, a full account not only of verbal mood on its own but also of how verbal mood and sentence mood relate to one another and of how the two could be given a uniform treatment all require the verbal mood licensing of interrogative-taking predicates to be addressed (Portner 2018, pp. 236-237).

In this chapter, we will first outline the two key puzzles that motivate this chapter. We then present some preliminaries of the clausal complementation literature in order to frame the new puzzles and discuss related concepts relevant to the clausal selection of complement clauses which mean that connecting key ideas in the clausal complementation literature with that of the verbal mood literature is very natural and the fact that they have not been bridged thus far is surprising. Then we will present the cross-linguistic data in Romance on inquisitive predicates. In the remaining sections of this chapter we will approach this data from two perspectives: the first from that of the sentence mood literature, where we will present the preliminaries of Inquisitive Semantics and discuss what the expected mood patterns of 'wonder' are in three Romance languages (Italian, French and Spanish) given the analysis of 'wonder' offered by Inquisitive Semantics, and the second from that of verbal mood, where we will discuss what (if any) predictions the comparison-based theory and truth-based theory make; where they do not make predictions or where it is unclear if they do or not, we will then sketch proposals to extend such accounts which treat inquisitive predicates (in this we will primarily focus up on the key inquisitive predicate - 'wonder').

[1] N.B. Roelofsen and Uegaki 2018 do not regard rogative speech act predicates as being inquisitive predicates

[2] I.e. rogative speech act verbs

There are two key puzzles that motivate this chapter and which are worth keeping in mind throughout as we move forward. Firstly, the key cross-linguistic puzzle. Recall the French teacher's maxim that the French subjunctive is used to express doubt, uncertainty or lack of commitment. Applying this maxim, we might, quite reasonably think that 'to wonder' in French *se demander* would be followed by the subjunctive. However, this does not bear out in the French data and is in contrast to Italian were the subjunctive is strongly preferred[3]:

(1) **Cross-linguistic puzzle: 'to wonder' in French vs. Italian**

a. André se demande si le train part.IND/*parte.SUBJ de quai numéro 5.
b. Andrea si chiede se il treno parta.SUBJ/parte.IND dal binaro numero 5.
'André/Andrea wonders whether the train leaves from platform 5.'

Secondly, Italian has an intra-linguistic puzzle pertaining to question-embedding predicates. There is a difference in mood licensing between issue-directed attitudes which strongly prefer the subjunctive and interrogative-embedding speech act verbs which take the indicative (provided they are not performing a request). This puzzle is highlighted by Portner 2018[4], who contrasts *chiedere* 'to ask' with its reflexive counterpart *chiedersi* 'to wonder', using the following examples:

(2) **Intra-linguistic puzzle: 'to ask' v.s. 'to wonder' in Italian**

a. Gli avevo chiesto se ci sono.IND corsi d'inglese.
'I asked him whether there are English courses'
b. Mi chiedo se ci siano.SUBJ corsi d'inglese.
'I wonder whether there are English courses'
(ex. (9a) and (9b) on Portner 2018, p.237)

The first step to getting a handle on which types of predicates (with respect to which types of clauses they embed) have been considered in the verbal mood literature, is to discuss the relevant taxonomy from the clausal-embedding literature. We introduce this now in our preliminaries.

4.1 Preliminaries of clausal selection

The literature on verbal mood in Romance has dealt with a variety of predicates which exhibit different properties with respect to clausal selection. However, thus far the

[3]In the case of an Italian speaker applying the doubting maxim to French, we could consider it as an example of negative transfer from L1.

[4]N.B. Portner implicitly takes these patterns as those of mood selection. We describe the pattern in terms of mood licensing since the indicative is not descriptively ruled out for *chiedersi* rather the subjunctive definitely sounds better and feels more natural i.e. subjunctive is strongly preferred over the indicative but the indicative is not ungrammatical.

predicates studied in the verbal mood literature have only been representative of a partial range of the clausal selectional properties of predicates. The means by which we currently wish to classify predicates is by whether a given predicate can embed *declarative* clauses only, whether it can embed *interrogative* clauses only, or whether it can embed clauses of both types. The next three definitions are fundamental to clausal selection and will help us to see the gap in the verbal mood literature.
The oldest of the three terms is 'rogative'; we say that a predicate is *rogative* iff it **only** embeds interrogatives (Asher 1987). The canonical example of a rogative predicate is 'wonder'. The next group of predicates to receive a name was that of the class of predicates which embed both declaratives and interrogatives. Lahiri 2002 introduced the term 'responsive' to the literature to refer to these predicates. The most basic responsive predicate is 'know'. Note that there are various types of interrogative clauses and so the satisfiability condition here is reasonably weak in that for a predicate to be considered *responsive* we do not require it to be able to embed all types of interrogative clauses.[5] Finally, despite the fact that predicates which *only* embed declaratives have received the longest attention in both the philosophical and linguistic literature, the name for them, 'anti-rogative', was the last to be coined (Theiler, Roelofsen, and Aloni 2019). We say that a predicate is *anti-rogative* iff it *only* embeds declaratives. The canonical anti-rogative is 'believe'.

Name	**Declaratives**	**Interrogatives**
Responsive	✓	✓
Anti-rogative	✓	×
Rogative	×	✓

Table 4.1: Classification of clausal-embedding predicates

Assessing the verbal mood literature with respect to the classification of clausal-embedding predicates, we can say that certain responsive predicates and anti-rogative predicates have been studied[6] but rogative predicates have not been.

Now as well as investigating the selectional properties of different predicates, we can also study the semantic properties of predicates. Formal semanticists working in the area of clausal-embedding predicates have sought in recent years to find constraints (i.e. syntactic and semantic properties) which characterise the selectional behaviour of clausal-embedding predicates. This is in part motivated by the fact that, w.r.t clause

[5] 'essere sorpres* is a case in point for whilst it cannot embed polar interrogative it can embed other types of interrogatives.

[6] N.B. by this we do not mean that all responsive predicates are fully dealt with by the verbal mood literature. In particular, there are responsive predicates which do not embed *polar* interrogatives such as 'be surprised'/'essere sorpres*'

type, the selectional behaviour of predicates is by and large stable across languages (Mayr 2019). Later in this chapter we dive into one key semantic property, discussed in the clausal-selection literature which, at least when confined to its declarative version, is precisely that of objective veridicality. This observation only further motivates deeper consideration of the connections between verbal mood and sentence mood and makes it particularly surprising that such predicates have not been studied from the perspective of Giannakidou and Mari 2021.

We adopt the position that in order to ascertain the full picture of the selectional properties of propositional attitudes, the mood selection and licensing patterns of such verbs need to be taken into account. Of particular interest is the question of whether there are cross-linguistic differences which are reflected in verbal mood. Indeed as we will see in the next section of this chapter, the data shows that there are!

4.2 Data across Romance

Our data for Romance comes from two places: firstly, we use the MECORE data (Özyıldız et al. 2023) for Spanish and Catalan as well as to have additional judgements for Italian; secondly, we also use personal judgments of informants for French (as the MECORE data is inconclusive), for Italian, and for Portuguese ('wonder' only).

The following table presents the data seen in the MECORE database for all Romance languages for which there is currently data in the MECORE database. The table is a simplification: first and foremost, because the annotators of the data rarely make explicit whether a mood is ungrammatical – we assume that where a predicate can license both moods, the mood found to be most natural for the annotator for that mood is the one discussed. This means that the table should be read as (only) giving the positive licensing of the displayed mood rather than as providing an explicit denial of ungrammaticality of the complement mood. Secondly, the MECORE study is primarily interested in the selection properties of these predicates. For simplicity we have marked the table with the grammatical moods for the two most basic of interrogative complements – namely, finite polar interrogative clauses and finite alternative interrogative clauses.

	'to wonder'	'to be curious'	'to investigate'	'to inquire'	'to ask'
ITALIAN	SUBJ	variable	#(SUBJ)	IND	variable
FRENCH	future*	future*	future*	future*	future*
SPANISH	IND	SUBJ	IND	IND	IND
CATALAN	IND?	SUBJ?	IND?	IND?	IND?

Table 4.2: Abstracted mood selection of inquisitive predicates from the MECORE database

We asterisk the French MECORE data as the future was used which renders the data uninformative for mood as the indicative and subjunctive are not in competition (as there is no future subjunctive). To be explicit, the example the annotator used was as follows[7]:

(3) 'Martin se demande si Candice fera le cours de syntaxe le mardi'
Annotator translated as: 'Martin wonders whether Candice will teach syntax on Tuesday'

The overall pattern we observe for French (as well as for Spanish, Portuguese and Catalan) is as follows:

(4) a. Maria se demande si Paul va.IND faire le cours de sémantique et philosophie demain
b. *Maria se demande si Paul aille.SUBJ faire le cours de sémantique et philosophie demain
'Maria wonders whether Paul is going to teach Semantics and Philosophy tomorrow'

Specifically, we asked our informant about the following minimal triple (N.B. we asked our Spanish and Portuguese informants for their judgements on the equivalent translations):

(5) a. Marianne se demande si Caroline a.IND une télévision.
b. *Marianne se demande si Caroline ait.SUBJ une télévision.
c. *Marianne se demande si Caroline aurait.COND une télévision.

Here only the indicative was considered grammatical; the subjunctive is by far the worst as (c) can become acceptable when followed by another *si* clause but this would however be a product of the conditional structure not from the embedding verb. In

[7]The English translation is marginally ambiguous with respect to a one-off event in the future or a habitual future. However, the presence of the definite article in the temporal adverbial phrase 'le mardi' means that a more precise gloss of 'Martin wonders whether Candice will teach syntax on Tuesday**s**' would rule out the one-off reading.

isolation (c) is also ungrammatical. We also asked our informant about the following list of verbs substituted into the sentences above and report the licensed mood(s) in the same list:

1. *être curieux* [de savoir] ('to be curious [to know]'): indicative only.
2. *demander* (on both interpretations i.e. both 'to ask' and 'to inquire'): indicative only.
3. *enquêter* [sur] ('to investigate[about/regarding]'): indicative only.

Crucially, for all of these verbs, only the indicative was found to be grammatical (in isolation).
Regarding the Spanish and Catalan data in MECORE, the Spanish annotator paid stricter attention to mood – for example, for the predicate under investigation the minimal pairs of it embedding a finite declarative clause would be given (i.e. an indicative and subjunctive version)[8]; on the other hand, the Catalan annotator only considered the indicative versions for the inquisitive predicates (bar 'tenir curiositat' ('to be curious')). For this reason we marked the Catalan data in the table with a question mark as we are unsure whether it is the only licensed mood or whether it is the preferred mood. Given its linguistic proximity to both French and Spanish and given that these two languages both license the indicative for every inquisitive predicate except from 'to be curious', we think it more likely that Catalan simply exhibits the same pattern as Spanish.

The Spanish data for 'wonder' was also confirmed by an informant. Our (Argentinian) Spanish informant deemed the indicative and, in certain circumstances, the conditional as the only acceptable moods with the subjunctive regarded as ungrammatical. For Portuguese, our informant reported a pattern very similar to Spanish for 'wonder' but with the licensing of the conditional was more constrained. Again, focussing only upon the indicative and the subjunctive, the indicative was the only grammatical mood with the subjunctive deemed completely unacceptable and ungrammatical.

Turning to our language of primary interest, Italian exhibits a particularly discordant pattern. Moreover, Italian is particularly the odd-one out when it comes to 'to wonder'. For although Italian also exhibits the opposite pattern to the rest of the other Romance languages for which we have data when it comes to 'to investigate', *indagare* and *investigare*, as noted both by the annotator and confirmed by ourselves, are in far lower frequency in spoken language compared to English 'to investigate'. For it is only really used in situations with police detectives and academia. The annotator used *indagare* in the questionnaire. Moreover, since in the table we are simplifying to looking at the mood licensing for only finite polar and finite alternative interrogatives, but for both of these clausal types *indagare* was deemed ungrammatical. For this reason we entered the cell in the table as '#(subj)' as for the clausal types for

[8]Curiously, for 'investigar' a finite declarative with the indicative was deemed ungrammatical but the subjunctive version would not be ungrammatical but still somewhat unacceptable (marking: '¿').

which it is grammatical, subjunctive is licensed. In the cases of, *essere curioso* and *chiedere* the mood licensing is variable with respect to the type of clause embedded. With *essere curioso*, infinitival structures are often used, for finite clauses *di sapere* is used whereas for non-finite clauses *essere curioso* can occur on its own. In the examples the MECORE annotator gave for finite polar interrogatives and finite alternative interrogatives, the mood used is ambiguous as the subject of the embedded clause was in the first person plural and this is the only Person for which the verb morphology of the indicative and subjunctive are identical. Using our own judgements we would say that in general, the subjunctive is preferred.
With *chiedere*, the subjunctive has a wholly bouletic interpretation in so far as it is a request or an order, it asks that p be done. The indicative is genuinely epistemic and interrogative. The same distinction is observable in English:

(6) a. Hannah asks that you close the door./Hannah asks you to close the door.
b. Hannah asks who closed the door.

We close this section with another table that summarises our findings (i.e. this table is not limited to the MECORE data but also takes into account the gathered (preliminary) data from our informants):

	'to wonder'	'to be curious'	'to investigate'	'to inquire'	'to ask'
ITALIAN	SUBJ/(IND)	variable	#(SUBJ)	IND	variable
FRENCH	IND	IND	IND	IND	IND
SPANISH	IND	SUBJ	IND	IND	IND
CATALAN	IND?	SUBJ?	IND?	IND?	IND?
PORTUGUESE	IND	-	-	-	-

Table 4.3: Mood licensing of inquisitive predicates

In the following two sections (4.3 and 4.4), we first, in 4.3, explore the data for 'wonder' in relation to how 'wonder' is analysed in the uniform approach of Inquisitive Semantics and two non-uniform decompositional approaches (one from Uegaki 2015, and the other discussed in Uegaki 2023); in 4.4) we then explore how truth-based and comparison-based theories can be extended to make predictions for 'wonder'.

4.3 Preliminaries of Inquisitive Semantics and predictions for 'wonder'

Inquisitive Semantics is a framework which can capture questions and further can capture issue-directed predicates. The key move is to used a raised notion of a proposition: whilst a proposition is traditionally treated as a set of possible worlds, in Inquisitive Semantics a proposition is treated as a non-empty set of sets of possible worlds. In other words, it is a non-empty set of classical propositions. Importantly, this set of classical propositions P, has one other property in addition to being non-empty, it is *downward-closed*. *Downward-closure* can be defined in terms of information states (Ciardelli, Groenendijk, and Roelofsen 2018, p.21), i.e. in terms of whether a given set of possible worlds resolves an issue then any subset of possible worlds thereof also resolves that issue, or in terms of classical propositions (see Theiler 2019, p.22). In addition, the inconsistent information state i.e. the set of possible worlds that contains no worlds, $\emptyset$, is regarded as trivially resolving any issue. Thus, in Inquisitive Semantics, it is an element of any proposition. There are also a couple of notions from Inquisitive Semantics which will be important for us later on in chapter 6: such as what it means for a state to resolve an issue and when an inquisitively construed proposition is (non)inquisitive. We introduce these now to have all the preliminaries of Inquisitive Semantics in one place. We say that an information state, s, resolves an issue, I, just in case, $s \in I$ (Ciardelli, Groenendijk, and Roelofsen 2018, p.17). In other words, an information state s resolves an issue whenever it supports it. For any proposition we can extract the informative content and the inquisitive content. For any proposition P, the informative content of P, $\mathsf{info}(P)$, is defined as the union of the states in P i.e. $\mathsf{info}(P) := \bigcup P$. The notion of the informative content of a proposition are crucial to the definitions of two key properties that we use to differentiate different types of propositions. We say that a proposition P is *informative* iff $\mathsf{info}(P) \neq W$ (Ciardelli, Groenendijk, and Roelofsen 2018, p.23). When a proposition is informative it means that the informative content of the proposition is non-trivial for there are some worlds that are excluded from $info(P)$. A proposition P is *inquisitive* iff $\mathsf{info}(P) \notin P$ (ibid). When a proposition is inquisitive it means that the informative content of the proposition does not resolve the issue underlying P.

We start with the account of 'wonder' from inquisitive epistemic logic IEL, which is the first-order inquisitive logic InqB supplemented with two modal operators K and E which are used respectively to talk about what an agents knows and what issues they are entertaining. In IEL, the attitude of an agent wondering can be represented using these two modalities. Note that in the following, we express the modalities in terms of their truth-conditions rather than their support-conditions which is more typical in Inquisitive Semantics[9]. We use the truth-conditions to be more accessible to

[9]We can go from support-condition to the truth-condition by considering the support-condition at a state which consists of just one world e.g {w}.

a readership not familiar with Inquisitive Semantics:

(7) $W_a\varphi := \neg K_a\varphi \wedge E_a\varphi$ ((22) in Ciardelli, Groenendijk, and Roelofsen 2018, p.156) where the truth-conditions of $K_a\varphi$ are $E_a\varphi$ can be given as follows:
$w \models K_a\varphi \iff \sigma_a(w) \models \varphi$ where $\sigma_a(w)$ is the epistemic state of a at w
$w \models E_a\varphi \iff \forall t \in \Sigma_a(w) : t \models \varphi$ where $\Sigma_a(w)$ is the inquisitive state of a at w. Note that $\sigma_a(w)$ and $\Sigma_a(w)$ are related as follows: $\sigma_a(w) = \bigcup \Sigma_a(w)$.

This gives a rather basic analysis of 'wonder' which has been refined in subsequent work: for example, by using a stronger notion of ignorance that requires not only that the subject's information state cannot be contained in any maximal element (i.e. in any alternative) in $[\![\varphi]\!]$ as per on the weaker notion of ignorance that simply amounts to $\neg K_a\varphi$ (since this condition says that $\forall \alpha \in \textsc{alt}(\varphi)\sigma_a(w) \not\subseteq \alpha$) but also that the subject's information state is compatible with every alternative in $[\![\varphi]\!]$ i.e. we also have that updating the information state with any alternative for φ does not lead us to the inconsistent state. Formally, this second condition is that $\forall \alpha \in \textsc{alt}(\varphi)$, $\sigma_a(w) \cap \alpha \neq \varnothing$ (Roelofsen and Uegaki 2018). Another analysis (Theiler, Roelofsen, and Aloni 2019), opts to swap out knowledge for belief in the above analysis: to require that the subject is not yet certain of P i.e. the subject's current doxastic state (rather) than their epistemic state does not resolve the question.

However, we will use the basic analysis for the moment to illustrate what the mood predictions of 'wonder' are, given this analysis, and how this fares with respect to the cross-linguistic behaviour of 'know' under negation within a subset of the Romance family. It is also worth noting before we proceed in doing this that Ciardelli, Groenendijk, and Roelofsen 2018 do not claim that the modality E is a sufficient formalisation of the natural language predicate *entertain* or any other natural language predicate. Thus, whilst it is certainly interesting to look at whether or not the mood patterns of 'wonder' accords with that of its parts, a negative result would not strictly place Inquisitive Semantics under the burden of proof of explaining away such phenomena – provided that the mood licensing of 'not know' and 'wonder' still accord. As we see in the data, this caveat does not hold (Italian and Spanish are cases in point though for different reasons).

	know	¬ *know*
Italian	IND	SUBJ/(IND)
Portuguese	IND	SUBJ
Spanish	IND	IND/SUBJ
French	IND	IND

Table 4.4: Mood licensing of *know* in positive and negative environments for declarative complements in Italian, Portuguese, Spanish and French.

There are three things to remark upon the table above: firstly, the data presented is only for declaratives. For interrogative complements, French and Spanish allow only the indicative mood in the complement; Italian allows both but with a preference for the subjunctive. Secondly, for declarative complements, Italian can license the indicative but this usually conveys that speaker knows that the complement is true and is talking about someone else's epistemic state:

(8) Non sa che Maria è arrivata (ma so che è arrivata.)
'They (sgl.) don't know that Maria has arrived (but I know that she has.)'

Thirdly, the data for Spanish 'saber' under negation is not a matter of free variation. Minimal pairs differ with respect to a presupposition trigger in that when the verbal mood of the complement is the indicative, a presupposition, that the speaker is committed to the embedded complement p, is triggered but no such trigger occurs with the subjunctive (Borgonovo 2003). The example of this below comes from Montero and Romero 2023:

(9) a. No sabían que Pedro se había.IND ido de viaje. $\rightsquigarrow$ Pedro had gone on a trip.
b. No sabían que Pedro se hubiera.SUBJ ido de viaje. $\not\rightsquigarrow$ Pedro had gone on a trip.
'They didn't know that Pedro had gone on a trip.'

Recall that Spanish *creer* 'to believe' exhibits a polarity subjunctive. Interestingly, the experimental work from Montero and Romero 2023 shows that, contra to previous reports in the literature which claimed that the phenomenon above occurs for both factive and non-factive predicates, this difference in speaker commitment w.r.t. mood only holds of factive predicates. In particular, 'creer' under negation does not have the mood sensitivity that 'saber' does: use of the indicative with 'creer' in a negative environment does *not* trigger the presupposition of the embedded complement.

We now display the cross-linguistic mood patterns of *know* under negation alongside those of *wonder*:

	$\neg$ *know*	*wonder*
Italian	SUBJ/(IND)	SUBJ/(IND)
Portuguese	SUBJ	IND
Spanish	IND/SUBJ	IND
French	IND	IND

Table 4.5: Mood licensing of *know* in negative environments and of *wonder* in Italian, Portuguese, Spanish and French

Equipped with an account of *wonder* from Inquisitive Semantics, we can investigate whether the mood licensing of *wonder* is in accordance with that of its parts. In particular, does the pattern follow only one component part of *wonder*? In addition, since, on the comparison-based account the indicative and subjunctive are modal operators of differing strength, we might ask whether the mood licensing of *wonder* follows that of the weakest mood of its parts? Curiously, as the below table shows this latter idea holds true of Italian and French but not of Spanish and Portuguese.[10]

	¬ *know*	*want to know whether / want to find out*	*wonder*	Weakest modal operator the resulting modal operator for *wonder*?
Italian	SUBJ	IND	SUBJ(IND)	✓, though indicative also permitted.
Portuguese	SUBJ	IND	IND	×
Spanish	IND/SUBJ	IND	IND	×
French	IND	IND	IND	✓

Table 4.6: Compositional account of *wonder*: the mood licensing of *wonder* and its components in Italian, Portuguese, Spanish and French.

The mood licensing of *want to know* reveals an important connection between the syntax-semantics interface: namely, that mood licensing is locality sensitive[11]. When we consider this fact, we might then regard the mood licensing of *want to know* as irrelevant to the mood licensing of *wonder*. In other words, perhaps the mood licensing of *wonder* follows that of the mood licensing of *not know*. Whilst this idea means that indicative licensing of *wonder* in Spanish can now be accounted for, it is curious that it is only the stronger modal operator which is licensed for *wonder*. Moreover, looking at the Portuguese data, it seems that the role of *want to know* cannot be fully discarded. As a result, the above data look worse for Portuguese than for Spanish.
We can consider the table above as performing an internal consistency check on the mood licensing of a Romance language: Italian and French are internally mood-consistent even though their mood licensing patterns bare the starkest differences, whilst Spanish and Portuguese are not internally mood-consistent. That the Spanish and Portuguese mood licensing of *wonder* are not easily reconcilable with a compositional analysis remains an open issue in our work but it is clear that fully understanding *wonder* compositionally requires more attention to be devoted to the mood licensing

[10]Note in this table the data for the second column i.e., *want to know whether/want to find out* is taken from the MECORE database for French, Italian and Spanish; for Portuguese we looked at examples on ContextReverso, finding only indicative in the complement.

[11]As we've seen, *want* is widely considered to be a subjunctive selector but when *know* is placed between *want* and the complement, the complement has to be in the indicative

patterns of Spanish and Portuguese.

Inquisitive Semantics takes a uniform approach to the type of object that predicates embed. However, there are other accounts on the market which do not take a uniform approach. These non-uniform approaches include reductive and inverse reductive approaches which differ with respect to which type of object they regard as basic for responsive predicates. Reductive or proposition-orientated approaches take responsive predicates to semantically select for (classical) propositions and explains their embedding of interrogatives by positing a mechanism to be present in the compositional semantics of the responsive predicate which changes the interrogative complement into a proposition (Uegaki 2023, p.7). On the other hand, inverse reductive or question-orientated approaches take responsive predicates to select for questions (i.e. sets of propositions) and analyses their declarative complements as having a question-like semantics (Uegaki 2023, p.9). Uegaki 2015 is a question-orientated approach which posits a decompositional analysis of *wonder* as *want to know*. In Uegaki 2023, a question-orientated analysis of *wonder* but which follows the analysis from Inquisitive Semantics is compared to a proposition-orientated decompositional analysis of *wonder* as *want to know*. This latter approach of regarding $[\![wonder]\!] = [\![want\ to\ know]\!]$ is, like Uegaki 2015, decompositional, but differs in what type of object is regarded as basic. However, Uegaki 2023 highlights conceptual and empirical problems with the decompositional analysis and we submit the mood mismatch between *wonder* and *want to know* as a further empirical problem, irrespective of whether a reductive or inverse reductive approach is taken. Thus, the challenge posed by understanding the variation of verbal mood licensing among different clause types is independent of which clause type is considered basic and which direction of a type-shifting operation is used. Moreover, though the challenge is most pressing for decompositional non-uniform approaches, the gaunlet of the verbal mood puzzle is laid down for reductive approaches (whether inverse or not) and uniform approaches alike.

In our account in chapter 6 we will largely put to one side the issues that the consideration of verbal mood gives rise to in the clausal embedding literature. We now turn to how accounts of verbal mood could be extended in order to give predictions for rogative predicates. In considering such prospects we will conclude that the prospects for a comparison-based account are vastly more favourable – a conclusion which is critical for us to establish before chapter 6, in which we will present our comparison-based account.

4.4 Predictions from existing accounts of verbal mood (extensions thereof)

In the following section we outline the prospects of extending the two families of approaches that are most favourable to accounting for Italian irrespective of the consideration of inquisitive predicates. By this we mean that we will only consider a truth-based account and a comparison-based account that are possible extensions of the specific accounts that we reviewed in Chapter 3. This decision is not to say that a proponent of a committment-based account would have no means of crafting a plausible story for inquisitive predicates – the idea of the *SoM* having also an inquisitive component, which we touched upon as a potential way for the account to accommodate *credere*, could indeed be such a strategy. However, as discussed in Chapter 3, the commitment-based account faces independent issues.

4.4.1 Truth-based: extending Giannakidou and Mari 2021 to interrogatives

For starters, suppose we cash out the mood licensing condition for an extension of Giannakidou and Mari 2021 as follows:

Definition 1. *A predicate licenses the subjunctive iff it is either non-veridical with respect to either declaratives (N.B by this we mean V is neither objectively or subjectively veridical in Giannakidou and Mari 2021's original terminology*[12]*) or non-veridical with respect to interrogatives.*

Definition 2. *A predicate licenses the indicative iff it is either veridical (objectively or subjectively) w.r.t. declaratives or veridical w.r.t. interrogatives.*

To flesh out the second part of these conditions, we propose using *veridicality w.r.t. interrogatives* as defined in Theiler 2019:

Definition 3. *V is veridical w.r.t. interrogative complements just in case for every individual x, every world w, every exhaustivity-neutral interrogative Q (i.e. just those interrogatives for which the SE, IE and MS readings coincide), and every declarative complement P expressing a complete answer to Q if $V(Q)(x)$ and P are both true in w, then $V(P)(x)$ is true in w as well.*
(Theiler 2019, p.53; gloss of exhaustivity-neutral added).

First, let's look at one reason why this definition is desirable from the perspective of verbal mood. As Theiler 2019 discusses, on Spector and Egré 2015's previous construal of veridicality w.r.t. interrogatives, *know* is not predicted to be veridical. In contrast, on Theiler 2019, *know* is predicted to be veridical and so, under the mood

[12] I.e. being non-veridical w.r.t. declaratives is not the same as being not veridical w.r.t declaratives.

licensing conditions posited above, we will not get subjunctive-licensing in the complement of *sapere* when it occurs in positive environments but only indicative-licensing – a correct prediction. Theiler 2019 contrasts 'know' with 'be certain': 'Be certain' is non-veridical w.r.t. declaratives and, on Theiler 2019, is also non-veridical w.r.t. interrogatives. Now, recall, that *essere certo* unlike its French and Spanish counterparts, not only licenses the subjunctive but prefers it. Per def. 1, subjunctive-licensing will drop out for *essere certo*. However, indicative-licensing will not. So we do not manage to capture its mood flexibility. In addition, to consider predicates of relevance such as 'to care', we have that 'to care' is veridical w.r.t. declaratives but non-veridical w.r.t. interrogatives (Theiler 2019. p.53), in Italian, *importare* can license either mood with a preference for the subjunctive when the verb appears bare but for the indicative when *sapere* directly follows the verb.[13]

Note that the above predicates which motivate Theiler 2019's notion of *veridicality w.r.t. interrogatives* are responsive predicates. We can also apply it to rogative predicates, however, when we apply this notion to rogatives, we trivially obtain non-veridicality. Whilst we will obtain that 'wonder' is non-veridical w.r.t. interrogatives and this is the case for all rogative predicates[14], 'ask' will also drop out to be non-veridical. So, according to our revised licensing conditions, we will obtain subjunctive-only licensing. However, a proponent of Giannakidou and Mari 2021 may object that the non-veridicality w.r.t. interrogatives of rogative predicates is obtained for a different reason to that of 'be certain' - all rogative predicates are non-veridical purely by virtue of the fact that $V(P)(x)$ is ungrammatical. So they may object that $Wonder(P)(x)$ is not truth-conditional. We could try to revise the notion in Theiler 2019 so that non-veridiality of rogatives is not a consequence of the triviality of ungrammaticality. However, the options for doing so are limited: for in order to ensure that Q is exhaustivity-neutral there are only two types of question that Q can be: polar or a wh-interrogative that identifies a property which in any possible world applies to a unique individual (Theiler 2019, p.52). We can revise the entry to allow for rogative predicates (e.g. by requiring that $V(Q')(x)$ be true in w (where Q' is a question related to Q)? The prospects for the polar question do not look good - for what other type of question could we use in P's place? On the other hand, for the wh-interrogatives that can have a single answer, we could use the polar question in place of P.

Suppose the proposed revision then goes as follows: if $V(P)(x)$ results in ungrammaticality (i.e. this acts as a test on whether V is responsive or rogative), then if Q is an wh-interrogative such as 'who won the Chess World Cup last year', we say that V is veridical w.r.t. interrogatives, just in case that if $V(Q)(x)$ and P are both true in w, then $V(Q_P)(x)$ is true in w too (where Q_P denotes the polar question of P). However, this definition whilst yielding the correct mood licensing prediction for

[13] *Importare* is very polarity sensitive in so far as it sounds much better under negation; this somewhat skews the mood licensing question.

[14] On Spector and Egré 2015's original notion, all rogative predicates are, likewise, non-veridical.

French, does not deliver the correct mood prediction for Italian. On this definition: 'to wonder' is predicted to license only the indicative as in Inquisitive Semantics 'who won the FIDE World Blitz Championship 2023' entails 'whether Magnus Carlsen won the FIDE World Blitz Championship 2023' for any information state that resolves the former question also resolves the latter. As a result, since, we have the following inference in Inquisitive Semantics (as well as in most standard accounts of questions), 'to wonder' will license the indicative only:

(10) Anya wonders who won the FIDE World Blitz Championship 2023.
$\Rightarrow_{INQSEM}$ Anya wonders whether Magnus Carlsen won the FIDE World Blitz Championship 2023.

Stepping back from using the above notion of veridicality w.r.t. to interrogatives, any *sensible* account will regard rogative predicates as non-veridical. Moreover, the key take-home point here is that mood licensing and clause-type do not correlate and this is ultimately what carves out the limited scope of the truth-based approach. In addition, to these fundamental theoretical issues (i.e. predicting mood licensing by and large in accordance with clause-type embedding) there are also empirical issues not only in Romance but with the other main language that Giannakidou and Mari 2021 try to account for – Modern Greek. Data presented in Tente 2022 can be viewed in support of this regarding the licensing of rogative predicates *wonder*. In Modern Greek, the preposition $\nu\alpha$ (na) is regarded as Greek's only subjunctive complementizer (Giannakidou and Mari 2021). However, the rogative predicates are seen in Tente 2022 to only embed $\alpha\nu$ (an) translated as 'if' when compared to one of the main indicative complementizer $\acute{o}\tau\iota$ (oti) . So evidently, non-veridicality is not sufficient for $\nu\alpha$ licensing.

4.4.2 Comparison-based: two options for an extension

When it comes to the comparison-based account, we can take a more fine-grained approach with respect to individual rogative predicates. As a result, we do not have to end up with the sort of blanket categorisation yielded by the only plausible ways of extending the truth-based account. Again, for the time being we will focus on the difference between 'to wonder' and 'to ask' and concentrate on the key inquisitive predicate 'to wonder'. There are two strategies that the proponent of the comparison-based theories could implement for these predicates: the *One-to-Two* strategy or the *Two-to-One* strategy.

We have on the one hand the *One-to-Two* approach which assumes that *wonder* comes with one modal background and the grammar of certain languages, such as Italian, can pick up a second modal background (e.g. in a similar fashion to how Mari and Portner 2021 treat *credere*). Whilst on the other hand, we have the *Two-to-One* approach assumes that *wonder* comes with two modal backgrounds and the grammar of certain languages, e.g. French and Spanish, can combine these modal backgrounds

to produce one modal background (e.g. in a similar fashion to Portner and Rubinstein 2020). The main conceptual pros and cons of the two approaches are summarised below:

Pros and Cons of *One-to-Two*:

- PRO: Allows *believe* and *wonder* to be treated in an analogous way: the strategy has the desirable effect that *wonder* and *believe* are counterparts.
- CON: From an Italian perspective, the subjunctive is so intuitive after *chiedersi* that, despite being the odd ones out, it feels that we should not treat its mood licensing as an adhoc quirk. But rather its mood licensing is inline with the semantics of *wonder*.
- CON: Less plausible from a historical perspective (see comment below as PRO for *Two-to-One*).

Pros and Cons of *Two-to-One*:

- PRO: More plausible from a historical perspective: Latin used the subjunctive in embedded questions. The different Romance languages can be situated in a grammaticalization cline at different points in the cline. (Note that although there is debate in the literature as to the order of the main living Romance languages (see Poplack et al. 2018 for discussion[15], Latin is commonly regarded as the least advanced along the path of grammaticalization). With respect to the mood licensing of rogative predicates, Italian more closely resembles Latin than the other Romance languages do. So evolutionarily, it is arguably more plausible that the lexical semantics of inquisitive predicates gave rise to two modal backgrounds and languages have evolved to combine these into one. Rather than Italian being the language that deviated.
- CON: Although *wonder* naturally involves the consideration of alternatives, it does not have an inherently preferential semantics per se; unlike most other subjunctive-licensing predicates.
- CON: Predicting indicative only for *wonder* in Spanish is difficult to achieve whilst maintaining its otherwise fairly extensive but conservative subjunctive.

The historical and evolutionary bearing on which strategy to take requires further research since, as we highlighted, the matter is still subject to debate. In the event that this puzzle gets resolved, the choice between *One-to-Two* or *Two-to-One* may well be obvious (and in favour of the *Two-to-One* approach). However, for the time being, the

[15]In Poplack et al. 2018, the cline previously discussed in the literature (i.e. found in Carlier, De Mulder, and Lamiroy 2012, Lindschouw 2011 and Loengarov 2006) is: Latin > Portuguese > Spanish > Italian > French ; however, Poplack et al. 2018 take a frequency-based approach and suggest Latin > French/Italian > Portuguese > Spanish)

One-to-Two strategy is more promising when it comes to trying to get indicative-only licensing for *wonder* in Spanish without opening the indicative floodgates for other Spanish predicates. In addition, the *One-to-Two* strategy allows us treat 'to believe' as the anti-rogative counterpart of 'to wonder' – a connection which is not nearly as tightly maintained on the *Two-to-One* approach. For these reasons we will implement a *One-to-Two* style of comparison-based account of *wonder* in chapter 6.

From the perspective of Inquisitive Semantics, the most natural modal background for *wonder* is *INQ*. It is however less obvious what the second modal background is to be e.g. is it the *CG* as Mari and Portner 2021 argue for *credere*? (We will return to this idea in Chapter 6). But a bouletic modal background is definitely not an appropriate candidate for whilst *wonder* is often used when a specific outcome is desired, it need not be and this is also the case in Italian:

(11) Mi chiedo se venga.SUBJ, ma non me ne frega.IND comunque sia.
'I wonder whether he's coming, but I don't care either way'

Note also that the situation here for 'to wonder' is quite different for 'to ask' with its request interpretation i.e. with the subjunctive. To explain such a phenomenon, a bouletic background could be used as one of the modal backgrounds (but it could also be analysed as an imperative).

5 Implicational Map of Verbal Mood (in Romance)

In this Chapter, we undertake a typological analysis, which will be instructive for seeing both the differences in the verbal mood systems of different languages in the Romance family as well as the relations between the predicates under consideration. Crucially, we are concerned with visualising the mood licensing inter-dependencies that are observable across the six main Romance languages for the purpose of informing how we are to construct licensing conditions that would yield a wide coverage of the data. In doing so, we will bring together the data on previously discussed predicates in the literature with the new data (presented in Chapter 4) on inquisitive predicates.

We begin this chapter with a negative result – no implicational hierarchy for Romance can be constructed – before moving on to present positive results in the form of two implicational maps in the spirit of Haspelmath 1997 which are derived not analytically but as approximated by the algorithm of Regier, Khetarpal, and Majid 2013.

5.1 Impossibility of an Implicational Hierarchy

Suppose we want to construct an implicational hierarchy that surmises the licensing of only four predicates (*hope*, *want*, *believe*, *wonder*) and one predicate class, the emotive factives. It is not possible to construct a hierarchy for such data as we immediately see that the mood licensing patterns for Romanian and French come into conflict regarding their patterns for *hope* and the emotive factives. Consider the following cross-linguistic data (presented in the table below):

	'want'	'hope'	emotive factives	'believe'	'wonder'
ITALIAN	SUBJ	SUBJ/(IND)	SUBJ/IND	SUBJ/(IND)	SUBJ/IND
PORTUGUESE	SUBJ	IND/SUBJ	SUBJ/IND	IND/SUBJ	IND
CATALAN	SUBJ	SUBJ	SUBJ/IND	IND	IND
SPANISH	SUBJ	SUBJ	SUBJ/(IND)	IND	IND
FRENCH	SUBJ	IND(% SUBJ)	SUBJ	IND	IND
ROMANIAN	SUBJ	IND/SUBJ	IND	IND	?

Table 5.1: Proposed hierarchy no.1

For this hierarchy, French is the offender as: we cannot take the emotive factives to be in place C as then taking 'hope' as verb B we would predict that the subjunctive should be licensed but this is only grammatical for a minority of French speakers. The table above (5.1) demonstrates that the proposed hierarchy
(want < hope < emotive factives < believe < wonder) does not respect the French data. Moreover, the situation cannot be improved by permuting the emotive factives and *hope*, see below:

	'want'	emotive factives	'hope'	'believe'	'wonder'
ITALIAN	SUBJ	SUBJ/IND	SUBJ/(IND)	SUBJ/(IND)	SUBJ/IND
PORTUGUESE	SUBJ	SUBJ/IND	IND/SUBJ	IND/SUBJ	IND
CATALAN	SUBJ	SUBJ/IND	SUBJ	IND	IND
SPANISH	SUBJ	SUBJ	SUBJ/(IND)	IND	IND
FRENCH	SUBJ	SUBJ	IND(% SUBJ)	IND	IND
ROMANIAN	SUBJ	IND	IND/SUBJ	IND	?

Table 5.2: Proposed hierarchy no.2

In this hierarchy the offender is Romanian as it licenses the subjunctive for 'hope' but the subjunctive is ungrammatical for Romanian emotive factives contra as would be predicted if the Proposed hierarchy no.2 were the case. The other thing to note (highlighted in yellow in the table) is that the predictions for 'hope' do not nicely cascade as we would like them to because the indicative is licensed for Portuguese but *only* the subjunctive is licensed for Catalan.

Evidently, no other permutations make sense to consider as 'want' is generally regarded as unanimously licensing (or even more strongly, selects) the subjunctive and both 'believe' and 'wonder' pattern similarly – being highly rare licensors of the subjunctive perhaps even unique to Italian. So as long as we want to be able to account for both the cross-linguistic variation of 'hope' and that of the emotive factives, no implicational hierarchy of verbal mood is constructable. The key finding here is that the data cannot be neatly surmised by a linear order. We have to work with an order which is not total. Thus we have to move away from an implicational hierarchy and

look to constructing an implicational map. In doing so, we closely follow the work of Haspelmath on indefinites.

5.2 An Implicational Map or Two

Semantic maps are traditionally discrete graphs which represent a presumed universal structure that underlies observed cross-linguistic semantic variation with respect to a given phenomenon. They have been created for the typological study of various grammatical phenomena (for an extensive list see Georgakopoulos and Polis 2022, p.2); to explain the basic ideas behind their construction we briefly discuss Haspelmath's implicational map for indefinites. Haspelmath constructed a semantic map for indefinites in which the nodes of the graph are various different types of indefinites and the edges signify relationships between the different types of indefinites. The construction of such a map proceeds in accordance with two principles: the *connectivity hypothesis* and the *economy principle*. The *connectivity hypothesis* imposes a continuity condition for it says that any linguistic form for the grammatical phenomenon at hand has to be a connected subgraph (Georgakopoulos and Polis 2022, p.2). In respect of Haspelmath's semantic map for indefinites, this means that no language which uses the same indefinite for, say, a specific unknown and for a question uses only a different indefinite for specific unknowns and irrealis nonspecific indefinites. The *economy principle* ensures that the minimum number of edges is used for it states that an edge connecting two nodes is only added when there is no other meanings by which the nodes would already be indirectly connected. With respect to Haspelmath's semantic map for indefinites, this means that there is no edge directly connecting direct negation and free choice for either in a language there is no indefinite used in both contexts (Italian exemplifies this as *nessuno* can be used for indefinites of direct negation, indirect negation and questions while indefinites with the suffix *-unque* are used for comparatives and free choice indefinites) or in a language there is an indefinite which can be used for both free choice and direct negation but does so by a path via indirect negation and comparatives (English exemplifies this for the indefinite *any* is an indefinite used for all four of these uses).

In addition to these two principles of construction, is a more pragmatic principle which is to favour two-dimensional representations, consequently, we desire that the graph be planar (see Georgakopoulos and Polis 2018, p.14)). This can typically be achieved by limiting the number of nodes used in the first place. This means that we face decisions regarding which nodes to include as the more nodes included the less likely it is that we will be able to preserve planarity.

It is possible to construct semantic maps manually through inspection of the data but given that semantic maps are usually grounded in typological research and aim to posit universal relationships, ideally they are constructed from very large-scale cross-linguistic datasets which can render construction challenging when approached manually. Note that whilst implicational maps make predictions about which languages

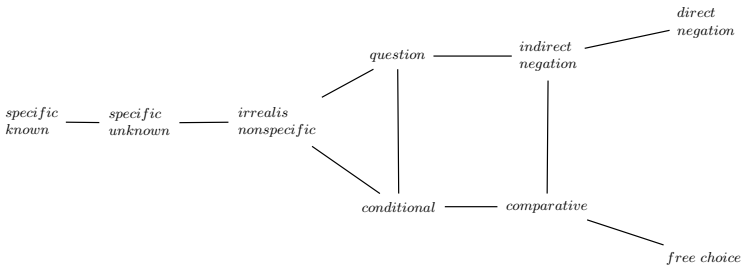


Figure 5.1: Haspelmath's Implication Map for Indefinites

do and do not exist, they are falsifiable and should phenomenon which the map explicitly predicts to not exist be attested to when investigating a new language, the maps are to be revised accordingly (Georgakopoulos and Polis 2022, p.16). A more systematic approach which should make the process of revision easier and more systematic is to approach the problem computationally by algorithmically constructing the graph. However, the construction problem as laid out by the two construction principles is equivalent to the *travelling salesman problem* which is a known NP-hard problem (Croft and Poole 2008, p.7). This news of computational intractability, however, is not as bad as it appears at first glance as Regier, Khetarpal, and Majid 2013 show the construction problem to be equivalent to that of the problem of inferring a social network from outbreaks of disease within a population – a problem for which "an efficient algorithm exists which approximates the optimal solution nearly as well as is theoretically possible" (Regier, Khetarpal, and Majid 2013, p.91).

In approaching the construction of an implicational map for uses of the subjunctive and indicative, we used the algorithm of Regier, Khetarpal, and Majid 2013. However, in the interests of having a planar and aesthetically pleasing map, we had to exclude some nodes that we originally planned to include (*to doubt* is an example of this: Figure 5.2 and Figure 5.3 include *doubt* but are not planar; Figure 5.6 (our simplified map) does not include *doubt* but is planar). We include *want* and *hope* as the cross-linguistic and intra-linguistic variation between these two bouletics is a key problem in the mood literature. We include the epistemic *know* and the doxastic *believe* as well as the non-doxastic *wonder* in order to see the relationships between these w.r.t. mood and in particular to investigate whether *wonder* is the counterpart of *believe*. We include the emotive factives for as we have seen in the Goldilocks problem they pose quite a challenge for licensing conditions. In addition, we include a *not + verb* node which serves as an imperfect proxy of polarity subjunctive effects and a node inspired by Haspelmath for the antecedent of conditionals (the data for this considers conditionals like 'If I were rich, I'd go to New Zealand' see our Appendix for details on the cross-linguistic variation in the antecedents of conditionals. Note that for this

node and this node only, we only used data for three languages: French, Italian and Spanish).
As far as possible we have tried to avoid including nodes which exhibit a genuine mood shift depending on whether they are followed by the indicative or the subjunctive. Hence we did not include fiction verbs and *to ask*. Bar the antecedents of conditionals and *wonder*, we generally tried to only include nodes for which we had data for all six main Romance languages: this excluded verbs of denial, modal adjectives, permissives and interdictives, and predicates of consciousness.

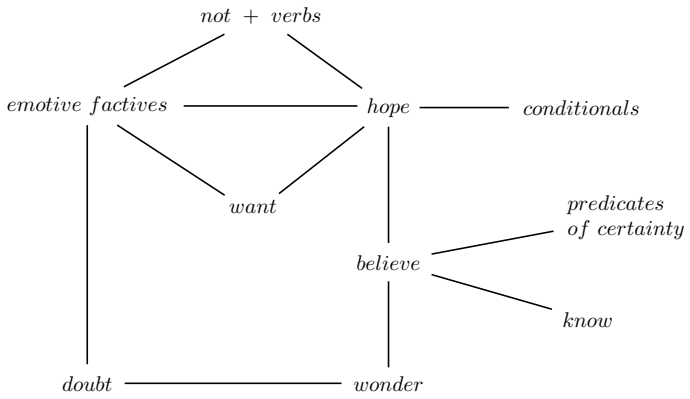


Figure 5.2: Implicational Map for Verbal Mood with a node for the antecedents of conditionals

In the following map, we consider verbs only in order to focus upon mood licensing in embedded contexts which is the primary subject of this thesis. Thus, Figure 5.3 is as Figure 5.2 but with the *conditionals* node excluded.

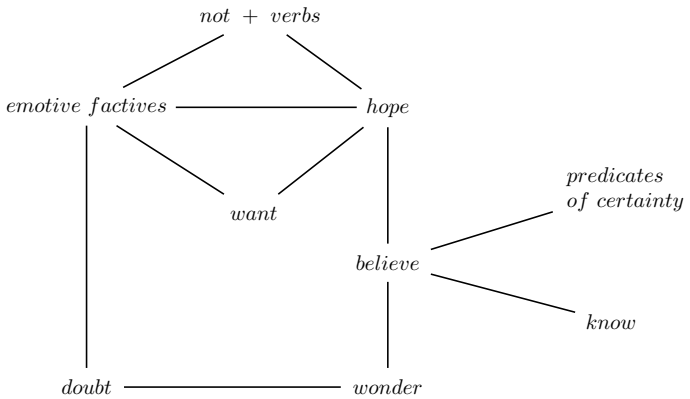


Figure 5.3: Implicational Map for Verbal Mood

The subgraphs that this implicational map gives rise to for Italian, French and Spanish are given below:

Constraint name	Subgraph for Italian	Subgraph for French	Subgraph for Spanish
SUBJ	$\{know\}^C$	$\{know, wonder, believe,$ predicates of certainty, $hope\}^C$	$\{know, wonder, believe,$ predicates of certainty $\}^C$
IND	$\{not + verb\}^C$	$\{know, wonder, believe,$ predicates of certainty, $hope\}$	$\{know, wonder, believe,$ predicates of certainty$\}$

Table 5.3: Subgraphs for Italian, French and Spanish

Note that whilst our implicational map (i.e. Figure 5.3), was built without data for *wonder* in Romanian, since we know that *believe* in Romanian takes only the indicative, the implicational map predicts that Romanian will take only the indicative for to *wonder*. We invite empirical research to confirm or falsify this claim. One nice aspect of the map is that *hope*, *believe* and *know* are linearly connected; this is desirable as they are all representational attitudes. A further nicety of our implicational map is that emotive factives, *want* and *hope* are connected (via triangulation) which is consistent with the intuition that they all have a preference-based semantics. In addition, predicates of certainty can be added consistently with the data as a node to *believe* which means that other than *hope*, the predicates directly connected to *believe* in the implicational map are positioned at different grades of epistemic (un)certainty for we have: *wonder*, *predicates of certainty*, and *know*.

Finally, it is worth remarking on the non-uniqueness of the generated graph. The algorithm is sensitive to the order in which the data is put into the input file. When trying to find an aesthetic graph for a larger set of nodes we did play around with this but similarly were unable to find a planar aesthetically pleasing graph. The reproducibility of our graph is likely to be susceptible to small changes should the data be input in a different order.

5.3 Epistemics, doxastics and *wonder*

In the previous graphs we did not take a particularly fine-grained approach to the data for the *not + verb* node. The polarity subjunctive is by no means uniform across Romance – in particular, and most pertinently for our interests, with respect to epistemics and doxastics. For example, the indicative is licensed under *not+know* in Italian and Spanish but not in French (we saw this in Chapter 4) but all three of the main Romance languages license and prefer the subjunctive for *not+believe*. In this final section of the chapter we take a more finely-grained approach to this node but we

restrict our typological study to the Big Three (French, Italian and Spanish) and zoom in on epistemics and doxastics and *wonder*. The data for this is as follows:

Language	Constraint name	V1	V2	V3	V4	V5	V6	V7	V8	V9
		'know'	'wonder'	'believe'	'not know'	'not believe'	'not wonder'	'doubt'	'not doubt'	not + verb
		responsive	rogative	anti-rog	responsive	responsive?	rogative	responsive	rogative	N/A
ITALIAN	SUBJ	0	1	1	1	1	1	1	1	1
SPANISH	SUBJ	0	0	0	1	1	0	1	1	1
FRENCH	SUBJ	0	0	0	0	1	0	1	1	1
ITALIAN	IND	1	1	1	1	0	1	0	1	0
SPANISH	IND	1	1	1	1	0	1	0	0	0
FRENCH	IND	1	1	1	1	0	1	0	1	0

Table 5.4: Mood licensing pattern of epistemics, doxastics and *wonder* in Italian, Spanish and French with their clausal-embedding status

This gave rise to the following implicational mini-graph:

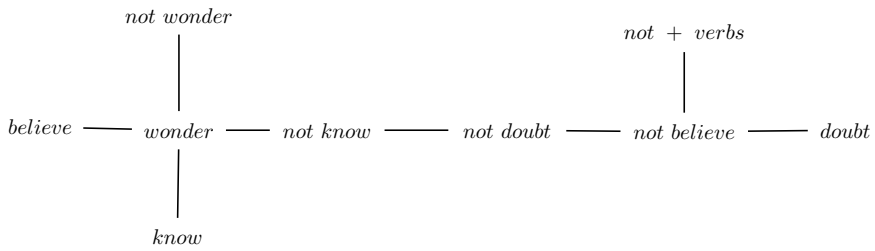


Figure 5.4: Implicational map of epistemics, doxastics and *wonder* in French, Italian and Spanish

In order to ensure that the map would extend to Portuguese we have to permute *wonder* and *believe* as otherwise the subgraph for the Portuguese subjunctive would break connectedness. Hence we manually adapted the graph to the following:

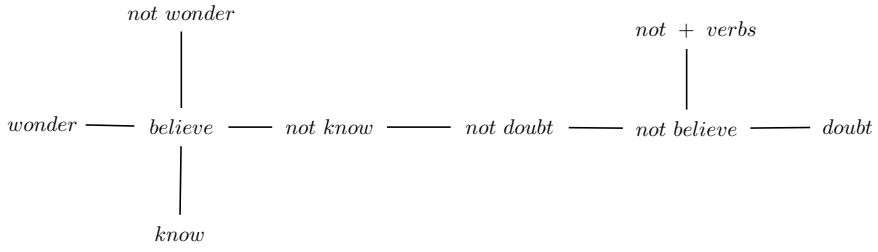


Figure 5.5: Adapted Implicational map of epistemics, doxastics and *wonder* in French, Italian and Spanish

Finally, whilst it makes little sense to construct an implicational map w.r.t. different clause types (given the variety of interrogative clauses), it is clear from the relative positions of *wonder* and *believe* in both the implicational map that handles the most commonly discussed predicates in the verbal mood literature and the implicational map that zooms in on doxastics, epistemics and *wonder*, that the mood data supports the idea that they are closely semantically related. Furthermore, their proximity in these maps, serves to indicate that the mood of an embedded clause is not determined by the clause type embedded. As discussed in 4.4, this fact significantly stunts the prospects for the truth-based account of giving a sufficiently empirically adequate account of the variety, w.r.t. mood licensing, found among rogative predicates. The time has come to turn to our own comparison-based account.

5.4 Simple Implicational Map

The simplified implicational map that we will work with for the following chapter is given as follows:

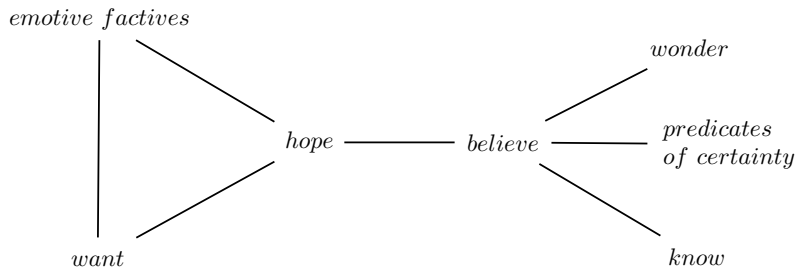


Figure 5.6: Simplified Implicational Map

The subgraphs of this graph for Italian, French and Spanish are given below:

Constraint name	Subgraph for Italian	Subgraph for French	Subgraph for Spanish
SUBJ	$\{know\}^C$	{emotive factives, *want*}	{emotive factives, *want*, *hope*}
IND	ALL	{emotive factives, *want* }^{C}	{ emotive factives, *want, hope*}^{C}

Table 5.5: Subgraphs for Italian, French and Spanish

6 Our account: Raisability, Inquisitive Semantics and Mood Licensing

In this Chapter, we put forward an account for the Italian mood distribution which is the first uniform analysis of the Italian subjunctive and whose primary contribution is the extension to embedded interrogatives which thereby allows us to predict the mood licensing of rogative predicates. The account is couched in the tradition of the comparison-based account and takes its inspiration from the guiding intuition of Mari and Portner 2021 in so far as the subjunctive is modelled as human necessity and has a non-homogeneity presupposition which means that whenever the issue of the complement is raisable the subjunctive will be licensed. At the end of Chapter 4, we discussed and compared two styles of approaches to accounting for inquisitive predicates - namely, a *Two-to-One* approach and a *One-to-Two* approach. Note that we are adopting a *One-to-Two* style of approach to inquisitive predicates and will primarily concentrate of 'believe' and 'wonder'.

We will treat the indicative as simple necessity and treat the subjunctive as human necessity with a non-homogeneity presupposition. Thus, for the subjunctive, we begin at the starting point of Mari and Portner 2021 rather than Portner and Rubinstein 2020[1]. Our starting point for the subjunctive (this is the same as Mari and Portner 2021 initial (36) but, in the spirit of Portner and Rubinstein 2020 using situations rather than worlds as one of the arguments) is as follows where σ is a situation:

Definition (Subjunctive (initial))**.**
$[\![subj]\!] = [\lambda p \lambda g \lambda f \lambda \sigma :$
a. $\bigcap f(\sigma) \cap p \neq \emptyset \wedge \bigcap f(\sigma) \setminus p \neq \emptyset)$ (non-homogeneity condition)
b. $BEST(f, g, \sigma) \subseteq p]$ (truth condition)

In aiming for a cross-linguistic account, we will take there to be type-shifting operations (SIMPLIFICATION and DUPLIFICATION) which may or may not be present in a given Romance language's grammar which allow us to change the number of arguments

[1]As previously seen in Chapter 3, Portner and Rubinstein 2020 treat the subjunctive as local necessity. The reasons for using this yet weaker type of necessity are to preserve the monotonicity of *want*. However, whether *want* is indeed to be treated as (upward) monotonic rather than non-monotonic is a point of heated debate in the literature so we adopt an economic approach.

that a predicate or more properly speaking the event type that the predicate ordinarily gives rise to by performing an operation on the modal background(s): UNIFICATION and DUPLIFICATION respectively. Spanish will lack both operations, French will have only SIMPLIFICATION and Italian will have both.

The DUPLIFICATION operation which will be present in Italian's grammar will alter, under certain circumstances, $content(\sigma)$ to be an ordered pair of modal backgrounds rather than one modal background. In the classical setting and in the extension of Portner and Rubinstein 2020 which we presented in Chapter 3, the thematic roles of the two moods in Italian were given as follows:

Definition (**Thematic roles** ((Chp. 3 extension of Portner and Rubinstein 2020))**.**
$[\![[\theta_{ind(IT)}]]\!] = \lambda p \lambda \sigma[sn(p, spl(content(\sigma)), \sigma)]$
$[\![[\theta_{subj(IT)}]]\!] = \lambda p \lambda \sigma[ln(p, content(\sigma), \sigma)]$

We will leave the indicative as previously stated modulo a raised notion of *sn* and with inquisitive propositions. The entry for the subjunctive will undergo more refinement. From now on we will take the initial entry for the Italian subjunctive to be as follows:

Definition (Thematic role for the Italian subjunctive (initial))**.**
$[\![[\theta_{subj(IT)}]]\!] = \lambda p \lambda \sigma[hn(p, dupl(content(\sigma)), \sigma)]$

This will be revised in two ways: with the raised (i.e. inquisitive) notion of a proposition and with a raised notion of *hn*. We will define DUPLIFICATION and redefine SIMPLIFICATION later on in this chapter as in order to do so we first have to raise the modal backgrounds. In the next, section we discuss the treatment of propositional attitudes in Inquisitive Semantics and discuss why, in approaching analysing verbal mood, certain deviations from their standard treatments in Inquisitive Semantics are motivated for simplicity. Despite this, our account is still very much in the spirit of Inquisitive Semantics as it adopts their treatment of questions.

Propositional Attitudes in Inquisitive Semantics

In Inquisitive Semantics, our key predicates have the following lexical entries[2]:
$[\![wonder]\!] = \lambda P \lambda x DOX_x^w \notin P \wedge INQ_x^w \subseteq P$
$[\![believe]\!] = \lambda P \lambda x DOX_x^w \in P$
$[\![hope]\!] = \lambda P \lambda x BUL_x^w \in P \wedge BEST(BUL_x^w, DOX_x^w) \in P$
In the above, P is the meaning of the complement and the complement can theoretically be an interrogative or a declarative but we will treat the meaning of the complement in either case as being of type $\langle\langle s,t\rangle, t\rangle$.

[2]Note that we are taking a very simplistic view of 'believe' here. For a more sophisticated entry which accommodates the predicate's neg-raisability see Theiler, Roelofsen, and Aloni 2019. Note also that our entry for 'believe' is in fact that of 'be certain' in Theiler, Roelofsen, and Aloni 2019

The difference between *hope* and *want* has received relatively little attention in the Inquisitive Semantics literature, the two have been analysed together as non-veridical preferential predicates in Uegaki and Sudo 2019 which contrasts these to veridical preferential predicates but only a semantics for *hope* is given; the definition we give above is simplistic in so far as it does not track the non-veridical/veridical difference between preferential predicates. We'll assume that the analysis of *want* is similar to *hope* but with the type of variations on the bouletic and doxastic backgrounds that we have seen in Portner and Rubinstein 2020. Given these analyses, adhering closely to Inquisitive Semantics, we would view our main key predicates come with their modal background(s) as follows:

$believe \longrightarrow DOX$
$wonder \longrightarrow INQ$
$want \longrightarrow BUL, DOX^{*/+}$
$hope \longrightarrow BUL^{c}, DOX$

Note that DOX_x^w is a set of worlds whereas INQ_x^w is a set of states and the two are related as the former is defined as the union of the latter i.e. $DOX_x^w = \bigcup INQ_x^w$. Where does this leave us with respect to the nature of modal backgrounds? Recall that we ordinarily take modal backgrounds to be functions from situations to sets of classical propositions. In order, to account for *wonder* we will have to introduce a raised notion of modal backgrounds i.e. functions from situations to sets of inquisitive propositions. Now although fully sticking to Inquisitive Semantics would require us have a two-sorted approach to modal backgrounds, we will not adopt this approach as it gives us four cases to contend with – three of which are exemplified by predicates that are of importance to us. In the following table we illustrate the four cases (in the table 'normal f' means treating f as a classical modal background and 'raised f' means treating g as an inquisitive modal background and likewise for the two versions of g.

Normal f	Normal g	Raised f	Raised g	Predicate
✓: $f = DOX^{*/+}$	✓: $g = BOUL$	×	×	*want*
×	✓: $g = DOX$	✓: $f = CG$	×	*believe*
×	×	✓ : $f = INQ_a$	✓ : $g = INQ_a$	*wonder*
✓	×	×	✓	?

Table 6.1: Cases on a two-sorted approach to modal backgrounds

Now whilst from the table above we could handle 'want' in a completely classical way i.e. with a normal f and g this is not the case for 'believe' and 'wonder' and even though we could stick as close as possible to the traditional approach to modal backgrounds and only deviate from this by using raised modal backgrounds for certain

predicates, the fact that we have, in principle, four cases to contend with, means that it is far simpler to adopt a uniform approach to modal backgrounds and raise all modal backgrounds. We will treat all modal backgrounds as functions from situations to set of inquisitive propositions and this will greatly simplify our raised versions of simple and local necessity.

Definition (Modal background (inquisitive version))**.** A modal background f is a function from situations to sets of inquisitive propositions. For a given situation σ, $f(\sigma)$ is thus a set of inquisitive propositions.

Note that it can be that all the propositions in P are non-inquisitive. The idea is simply that the propositions in $f(\sigma)$ are construed inquisitively but the definition itself places no constraints on the nature of those propositions w.r.t. inquisitivity.

When discussing predicates it will be helpful to use lowercase to refer to a modal background inquisitive construed in order to separate them from the objects used in the classical setting (the latter are typically given in uppercase). Thus we will start by saying that our key predicates come with the following inquisitively construed modal backgrounds:
$believe \longrightarrow dox$
$wonder \longrightarrow inq$
$want \longrightarrow bul, dox^{*/+}$
$hope \longrightarrow bul^{c}, dox$

6.1 Indicative: simplification revisited

Recall that the entry for the Italian indicative will have the type-shifting operation of *simplification*. This means that predicates which ordinarily come with two modal backgrounds can be unified to one modal background when they are consistent. To obtain a sensible definition of UNIFICATION, we raise the original definition by Portner and Rubinstein 2020 as follows:

Definition (UNIFICATION of raised modal backgrounds)**.**
If M is a pair of raised modal backgrounds $\langle g, f\rangle$ and
$\forall\sigma[\sigma \in domain(f) \rightarrow (\sigma \in domain(g) \wedge \bigcap(g(\sigma) \cup f(\sigma)) \neq \{\emptyset\})]$:
$Unify(M) = [\lambda\sigma : \sigma \in domain(f).g(s) \cup f(s)]$
Otherwise: $unify(M)$ is undefined

In the above definition we define the intersection of a modal background as follows: $\bigcap f(\sigma) = \{s \mid \forall P \in f(\sigma) : s \in P\}$. (We will make us of this definition of intersection several times throughout this chapter.) Our definition is only slightly different to the original definition in Portner and Rubinstein 2020. Due to the downward closure of propositions in Inquisitive Semantics, $\bigcap(g(\sigma) \cup f(\sigma))$ will always be non-empty as the inconsistent state supports all propositions in $g(\sigma) \cup f(\sigma)$. Thus, the definition by

Portner and Rubinstein 2020 had to be altered to requiring that the intersection of the union have some consistent state. We will say that $g(\sigma)$ and $f(\sigma)$ are inconsistent whenever the only state that supports their union is the inconsistent state (i.e. $\bigcap(g(\sigma) \cup f(\sigma)) = \{\emptyset\}$). As a result of our adaptation to the condition on UNIFICATION, the $f(\sigma)$ and $g(\sigma)$ which were inconsistent in the classical setting are still regarded as inconsistent. For an example, let $f(\sigma) = \{p, q\}$ and $g(\sigma) = \{\neg p, q\}$ then $g(\sigma) \cup f(\sigma) = \{p, q, \neg p\}$ and $\bigcap(g(\sigma) \cup f(\sigma)) = \{\emptyset\}$ so with this $f(\sigma)$ and $g(\sigma)$, $unify(M)$ will be undefined so SIMPLIFICATION will retain the two modal backgrounds, as in the classical setting.

The definition of SIMPLIFICATION is as in the classical setting. The only difference is that here M is an ordered pair of raised modal backgrounds.

Definition (SIMPLIFICATION)**.** For any sequence of modal backgrounds M:
a. If $unify(M)$ is defined: $spl(M) = unify(M)$
b. Otherwise: $spl(M) = M$

6.2 Indicative: raising simple necessity

$sn(P, f, \sigma)$ is only defined when P is inquisitively construed, f is a single modal background, σ is a content-bearing situation, and $f(\sigma)$ is defined (i.e. is of type $\langle\langle s, t\rangle, t\rangle$.

Definition (**Raised** *sn*)**.** $sn(P, f, \sigma) = 1$ iff $\bigcap f(\sigma) \subseteq P$

(Again, here intersection is defined as: $\bigcap f(\sigma) = \{s \mid \forall P \in f(\sigma) : s \in P\}$.) Using this raised notion of *sn* together with our new definitions of the UNIFICATION operation on modal backgrounds and the type-shifting operation *simplification*, we are now in a position to state the updated version of the thematic role of the indicative:

Definition (Thematic role of the Italian indicative)**.**
$[\![[\theta_{ind(IT)}]]\!] = \lambda P \lambda \sigma[sn(P, spl(content(\sigma)), \sigma)]$

6.3 Subjunctive: duplification revisited

Turning back to the subjunctive now. We need to define, the DUPLIFICATION operation, the raised version of *hn* and also adapt the non-homogeneity presupposition in a way that makes sense when inquisitive propositions are genuinely inquisitive. Whilst we can simply raise the non-homogeneity for anti-rogative predicates like 'believe', it is crucial that it is changed for rogative predicates like 'wonder'. First, DUPLIFICATION. We can think of DUPLIFICATION as follows, where M is a sequence of modal backgrounds (inquisitively construed) which may be of length 1 or 2 (note that when it is of length 2, the first element is the ordering source, the second the modal base i.e. we have $\langle g, f\rangle$):

$$DUPLIFICATION(M) = \begin{cases} (M), & \text{if } |M|{=}2 \\ (M, Y) \text{ where } Y \text{ is contextually provided} & \text{otherwise.} \end{cases}$$

Note that when M undergoes DUPLIFICATION with non-trivial output, the original modal background (which for languages that lack DUPLIFICATION will be the modal base), becomes, in Italian, the modal background that acts as the ordering source. In Italian, the contextually salient modal background will be the one that is relevant to ascertaining the relevant set of states.

6.4 Subjunctive: raising human necessity

We now have to raise the definition of human necessity so that modal backgrounds have their propositions construed inquisitively.

First of all we need to think about how states should be ordered with respect to a set of inquisitive predicates (bearing in mind of course that (some of) the propositions themselves may lack inquisitive content). Whilst it is quite intuitive from the perspective of Inquisitive Semantics (in particular in view of the inquisitive state of agent a at world w is construed $\Sigma_a(w)$) to regard the best states as those in which all of the agent's issues are resolved, this is not what we are after in practice. Rather, we are after the states which most adhere to the norm given by the ordering source; this means that for issues that are resolved in g, we are after the states which resolve those issues and do so with the same polarity as in g but for the issues that are not resolved in g we want these issues to remain open in the best states i.e. in which these issues remain unresolved and inquisitivity is preserved.

The ordering of states is defined as per Kratzer's definition of ordering of worlds except now the set of propositions A, which acts as the ordering source, is regarded as a set of inquisitive propositions (these propositions themselves may or may have inquisitive content but they are all construed inquisitively) and we order states rather than worlds.

Definition (Ordering of states)**.** For all states s and $t \in \mathcal{P}(W)$,
$s \leqslant_A t$ iff $\{P\colon\ P \in A \text{ and } t \in P\ \} \subseteq \{P\colon\ P \in A \text{ and } s \in P\}$.

With our notion of ordering in place, there are two steps remaining to be taken to get to human necessity: (1) defining a set of relevant states and (2) the definition of *Best* which is crucial to the truth condition of human necessity.

The most sensible way of defining a set of relevant states is just to take the intersection of the propositions. Such an approach is commonplace in modelling updates of contexts by propositions in Inquisitive Semantics. The scenario we have here is analogous to updating a context with a proposition for in Inquisitive Semantics a context is, on par with a proposition, also regarded as a non-empty downward closed set of information states. Thus we can identify a particular proposition with a given context and so forming the relevant set of states from a given set of inquisitive propositions

is analogous to perform a context update which is done by taking the intersection (as defined earlier).

Definition ($Best_{\bigcap}(g, f, \sigma)$)**.**
$Best_{\bigcap}(g, f, \sigma) = \{s : s \in \bigcap f(\sigma) \wedge \neg\exists s'[s' \in \bigcap f(\sigma) \wedge s' <_{g(\sigma)} s]\}$

Using this definition we will straightforwardly have the truth condition as the analogously familiar condition that $Best_{\bigcap}(g, f, \sigma) \subseteq P$.
The last step will be to reconfigure the non-homogeneity presupposition of the subjunctive.

Subjunctive: non-homogeneity presupposition

Let's consider as an initial entry for the non-homogeneity presupposition, the result by simply raising the classical definition, we have:

Definition (**Non-homogeneity presupposition (initial)**)**.**
$\bigcap f(\sigma) \cap P \neq \emptyset$ and $\bigcap f(\sigma) \setminus P \neq \emptyset$.

Whilst this still works when P is non-inquisitive, the second conjunct in particular becomes a problem when P is inquisitive. Suppose $P = ?p$ and $f'(\sigma) = \{?p\}$, then $\bigcap f'(\sigma) = \{\{11, 10\}, \{01, 00\}\}^{\downarrow}$. Whilst the first conjunct of the non-homogeneity presupposition is fine (as $\bigcap f'(\sigma) \cap ?p = ?p \neq \emptyset$), the second is not as $\bigcap f'(\sigma) \setminus ?p = \emptyset$. In this case, the non-homogeneity presupposition fails, but $f'(\sigma)$ could have easily been $inq(\sigma)$ were the agent is wondering about one issue $?p$ so in order to predict the subjunctive as licensed for *chiedersi* we have to change the second conjunct to $\bigcap f(\sigma) \setminus P \neq \{\emptyset\}$. We also change the first conjunct analogously as $\bigcap f(\sigma) \cap P \neq \emptyset$ does not say anything meaningful as this will be satisfied by any $f(\sigma)$ and any P (inquisitive or non-inquisitive) by virtue of the fact that the inconsistent state $\emptyset$ will always be both an element of $\bigcap f(\sigma)$ and an element of P. Thus, in order, for this conjunct to say anything meaningful we want that the intersection of $\bigcap f(\sigma)$ and P contain a consistent state i.e. $\bigcap f(\sigma) \cap P \neq \{\emptyset\}$.

Definition (**Non-homogeneity presupposition (final)**)**.**
$\bigcap f(\sigma) \cap P \neq \{\emptyset\}$ and $\bigcap f(\sigma) \setminus P \neq \{\emptyset\}$.

Our final non-homogeneity presupposition says that adding P to $\bigcap f(\sigma)$ should not lead us to only the inconsistent state and nor should taking P away from $\bigcap f(\sigma)$ lead us to only the inconsistent state.

6.5 In action: *credere* and *chiedersi*

We turn now to several examples with *credere*, *chiedersi* and *volere* ('to want').

credere + SUBJ

First let's look at *credere* + SUBJ. We start with a believing situation, or alternatively we say that the lexical entry for *credere* comes with the modal background *dox* (i.e. the inquisitively construed doxastic modal background) applied to the situation. We take this function and apply DUPLIFICATION, in so doing the common ground is picked up as being contextually salient and the inquisitive version of this, *cg*, becomes the modal background that acts as the modal base. For we start with $M = dox$, so by $dupl(M) = dupl(dox) = \langle dox, cg \rangle$. (Again, reminder that the ordering source is given first). For the sake of a simple example, suppose we are in a scenario in which when *dox* and *cg* are applied to σ we obtain $dox(\sigma) = \{p, q\}$ and $cg(\sigma) = \{?p, q\}$. Suppose that $p = \{11, 10\}^{\downarrow} = \{\{11, 10\}, \{11\}, \{10\}, \emptyset\}$ and $q = \{11, 01\}^{\downarrow} = \{\{11, 01\}, \{11\}, \{01\}, \emptyset\}$. Then, since in general, $\bigcap f(\sigma) = \{s \mid \forall P \in f(\sigma) : s \in P\}$, then $\bigcap cg(\sigma) = \{\{11\}, \{01\}, \emptyset\}$. Now since, $dox(\sigma) = \{p, q\}$ then of the states in $\bigcap cg(\sigma)$ s.t. $s \neq \emptyset$ we have that $\{11\} <_{dox(\sigma)} \{01\}$. So $Best(g, f, \sigma) = \{\{11\}, \emptyset\}$ then we just have to check that $Best(g, f, \sigma) \subseteq p$ which is the case as $Best(g, f, \sigma) = Best(dox, cg, \sigma) = \{\{11\}, \emptyset\} \subset \{\{11, 10\}, \{11\}, \{10\}, \emptyset\}$.

credere + IND

Suppose we have $dox(\sigma)$ as before (i.e. $dox(\sigma) = \{p, q\}$) but we do not apply DUPLIFICATION, then we just have to check that simple necessity does hold i.e. that $\bigcap dox(\sigma) \subseteq p$. This holds as $dox(\sigma) = \{\{11\}, \emptyset\} \subset \{\{11, 10\}, \{11\}, \{10\}, \emptyset\} = p$.

Whilst in principle, this should mean that the indicative should be always grammatical in Italian, adoption of the pragmatic principle of *Maximise Presupposition!* (Heim 1991) means that the subjunctive is still preferred and pragmatically since the common ground is almost always relevant (except in cases of disagreement such as in the religious example or in matters of taste), and so DUPLIFICATION will in the majority of cases be applied. Basically, in Italian the subjunctive acts as a test of the raisability of the question in the common ground. Thus whilst we do not predict, contra to Mari and Portner 2021, that the subjunctive is obligatory when $?p$ is the QUD we can still explain why the subjunctive is considered the preferred mood in this scenario for a question having been explicitly raised means that its raisability is taken for granted. Also, that the subjunctive is the preferred mood in the QUD scenario rather than the selected mood arguably actually respects the empirical data better for Northern speakers consider the indicative to be grammatical albeit dispreferred.[3]

[3] In general, what is particularly difficult to entangle in mood judgements specifically is that of subtracting a speaker's prescriptive judgement (since the subjunctive is more prestigious and associated with a higher register) from their descriptive judgement.

Note that if we take the disagreement scenario at face-value, and we include neither p, $\neg p$ nor $?p$ in the common ground but leave the issue unspecified then, we don't actually break the non-homogeneity presupposition. In an example such as the religious disagreement concerning the issue of the whereabouts of San Pietro's soul, something of a trick is available. We just have to represent the disagreement on that issue in how we model the common ground. In this scenario suppose the agents agree on one issue (q) that is irrelevant to the issue on which they have inconsistent beliefs: $cg(\sigma) = \{q, \emptyset\}$ then $\bigcap cg(\sigma) = \{\emptyset\}$ This won't work with the non-homogeneity presupposition as raised for non-inquisitive complements but if we generalise the non-homogeneity presupposition for inquisitive complements we could block it.

chiedersi + SUBJ

We start with $inq_{cg}(\sigma)$ and apply DUPLIFICATION which, as the common ground is contextually salient, means we pick up cg. As a result, cg becomes the modal base and $inq_{cg}(\sigma)$ has a shifted role, becoming the ordering source. Whilst cg consists of propositions inquisitively construed, some propositions will have inquisitive content and others will not. As an example, suppose that $cg(\sigma) = \{?p, q\}$ and $inq_{cg}(\sigma) = \{?p\}$. We have to check the non-homogeneity presupposition first:

$\bigcap cg(\sigma) \cap ?p \neq \{\emptyset\}$ and $\bigcap cg(\sigma) \backslash ?p \neq \{\emptyset\}$.

First conjunct is satisfied as $\{\{11\}, \{01\}, \emptyset\} \cap ?p = \{\{11\}, \{01\}\} \neq \{\emptyset\}$ and the second conjunct is trivially satisfied: $\{\{11\}, \{01\}, \emptyset\} \backslash ?p = \emptyset \neq \{\emptyset\}$. So the non-homogeneity presupposition holds. Now the semantic content is as follows:

$Best(inq_{cg}, cg, \sigma) = \{s : s \in \bigcap cg(\sigma) \wedge \neg \exists s'[s' \in \bigcap cg(\sigma) \wedge s' <_{inq_{cg}(\sigma)} s]\}$. In our example, $Best(inq_{cg}, cg, \sigma) = \{\{11\}, \{01\}, \emptyset\} = \bigcap cg(\sigma)$ (as we'll see this means the truth-condition is identical to what it will be in case with the indicative).

chiedersi + IND

We start with a wondering situation, or alternatively we say that the lexical entry, which comes with the single modal background, $inq_{cg}(\sigma)$, since we do not apply DUPLIFICATION we see whether the indicative is licensed in the complement of *chiedersi*, we just have to check the truth condition for the indicative, namely that $\bigcap inq(\sigma) \subseteq ?p$. We will specify that $inq(\sigma)$ consists only of inquisitive propositions which are genuinely inquisitive i.e. for all P in $inq(\sigma)$, $info(P) \in P$. Note that the meaning of *wonder* means that we have to perform a further check that $\bigcap inq_{cg}(\sigma) \neq \{\emptyset\}$. As whilst the meaning of the indicative is such that it will be licensed even when $f(\sigma) = \emptyset$ and so $\bigcap f(\sigma) = \{\emptyset\}$, (this is because $\{\emptyset\}$ is subset of any proposition construed inquisitively), when $inq(\sigma)$ is empty we do not say that the agent wonders $?p$ as they have, albeit trivially, resolved every issue. Thus when $\bigcap inq_{cg}(\sigma) \neq \{\emptyset\}$ we will say that *chiedersi* + IND, is infelicitous, not because of the meaning of the indicative but because of the meaning of *wonder*. As an example for a not completely trivial scenario, suppose two issues are unresolved, then $inq_{cg} = \{?p, ?q\}$, so:

$\bigcap inq_{cg} = \{\{11\},\{01\},\{10\},\{00\},\emptyset\} \subset P = \{\{11,10\},\{01,00\}\}^{\downarrow}$. Thus, the indicative is licensed.

volere + SUBJ

Like Heim 1992 and von Fintel 1999, we'll assume that satisfying non-homogeneity is part of the meaning of 'want'. However, to stay as close as possible to the analyses of 'want' in Portner and Rubinstein 2020 and Mari and Portner 2021, we'll use dox^+ (the inquisitive counterpart of DOX^+ from Portner and Rubinstein 2020). Hence we ensure, by virtue of the meaning of 'want' that: $\bigcap dox^+(s) \cap P \neq \{\emptyset\} \wedge \bigcap dox^+(s) \setminus P \neq \{\emptyset\}$. A wanting situation s comes with $\langle bul, dox^+\rangle$. With the non-homogeneity presupposition satisfied, we look at the truth condition for the subjunctive. $Best(bul, dox^+, \sigma) = \{s : s \in \bigcap dox^+(\sigma) \wedge \neg\exists s'[s' \in \bigcap dox^+(\sigma) \wedge s' <_{bul(\sigma)} s]\}$. Suppose $dox^+(\sigma) = \{q\}$ then p is compatible with dox^+ as is $\neg p$ and suppose that $bul(\sigma) = \{p, q\}$. Then $\bigcap dox^+(\sigma) = \{\{11,01\},\{11\},\{01\},\emptyset\}$ and $Best(bul, dox^+, \sigma) = \{\{11\},\emptyset\} \subset p$. So, *volere* licenses the subjunctive.
Note that in the specific example given here, $\bigcap(bul(\sigma) \cup dox^+(\sigma)) = \{\{11\},\emptyset\} \neq \{\emptyset\}$. However, in general the backgrounds *bul* and dox^+ cannot be unified as it is not the case that for every situation σ they are consistent. Rather, it is possible that the beliefs and desires associated with a wanting situation are inconsistent. For an example of this, consider $bul(\sigma') = bul(\sigma)$ as given above but now let $dox^+(\sigma') = \{\neg p\}$ then $bul(\sigma') \cup dox^+(\sigma') = \{p, \neg p, q\}$ so $\bigcap(bul(\sigma) \cup dox^+(\sigma)) = \{\emptyset\}$. Hence, since unification does not take place, the indicative is not licensed and so we predict subjunctive and subjunctive only for *volere*. (Note that as we'll assume that *sperare* 'to hope' has the modal backgrounds $\langle bul^c, dox\rangle$ but these will be consistent for any situation so unification can be applied. Thus, we will have that *sperare* licenses both the subjunctive and the indicative).

Discussion

In presenting a theory which yields predictions of mood optionality for *chiedersi*, we have opted to present the simplest way in which this can be done. In an alternative formulation of our theory, we posited a raisability constraint on DUPLIFICATION, which ensured that DUPLIFICATION could only take place when the candidate modal background did not resolve the issue, and we jettisoned the non-homogeneity presupposition from the meaning of the subjunctive. Whilst this alternative is rather more clumsy (for example, DUPLIFICATION depends not only on M but also on P), it is worth noting that there are two advantages over our simplified account. First of all, the simplified account, which sees non-homogeneity as part of the subjunctive's meaning, does not in general predict the subjunctive for the Italian emotive factives. Note that the emotive factives already come with two modal backgrounds so to explain their mood optionality we do not appeal to DUPLIFICATION. However, the decision to in-

clude non-homogeneity as part of the subjunctive's meaning means that we yield the wrong prediction for the emotive factives. For even though it may be that in certain situations, the doxastic base indeed respects non-homogeneity and so the subjunctive can be licensed, as the example below reminds us, the subjunctive is still licensed by emotive factives even when the doxastic base blatantly violates non-homogeneity. Our simplified theory would predict only the indicative in this scenario.

(1) Sono contenta che Sinner sia.SUBJ il numero 2 del mondo e so che lo è.
'I'm happy that Sinner is the world number 2 and I know that he is'

The alternative could yield the correct (i.e. subjunctive and indicative) licensing predictions by positing that non-homogeneity is not part of the meaning of the subjunctive but is instead part of the meaning of predicates like 'want' but not of the emotive factives and is also a constraint on DUPLIFICATION.

Secondly, the alternative does not make DUPLIFICATION a free-for-all. From a cognitive perspective DUPLIFICATION is unlikely to be of low cognitive load: at lowest cost it means computing the issues actually raised in the conversation but at highest cost it involves modelling the raisability of issues taking into consideration one's interlocutors.

On the other hand, although we have primarily concentrated on *wonder* as our main inquisitive predicate of interest, the fact that Italian issue-directed predicates generally license the subjunctive whilst the speech act rogatives are canonically indicative licensing suggests that raisability does not belong in DUPLIFICATION and, presumably, since the common ground is already the only contextually salient modal background for speech act rogatives, picking up of a second copy of the common ground is redundant.

With all of these points in mind, it is safest to regard the precise division of labour between DUPLIFICATION and the non-homogeneity as an open issue. Hence, why we have just concentrated on presenting the simplest formal implementation of DUPLIFICATION.

Finally, although Portner and Rubinstein 2020's move from using human necessity to local necessity for the subjunctive is arguably too quick (for we could retain human necessity and simply say that there are two situations at play in the examples which break monotonicity), a sensible definition of raised local necessity in our setting can be given as follows:

Definition (Local necessity). $ln(P, \langle g, f\rangle, \sigma) = 1$ iff there is a **non-inconsistent** state $s \in \bigcap f(\sigma)$ s.t. for all $t \in \bigcap f(\sigma)$, if $s \leqslant_{g(\sigma)} t$, then $t \in P$.

We leave exploration of this, as well as the debate between human v.s. local necessity for further work.

Conclusions and future work

In our account presented in this chapter, we put forward the first account in the verbal mood literature which gives predictions for predicates that can embed interrogatives. In doing so, we have focused on predicting the mood licensing of the Italian rogative predicate *chiedersi* 'to wonder' in order to predict its mood licensing and have addressed a relatively new puzzle that Italian poses.

Whilst our account in chapter 6 does not solve all of the puzzles posed by the distribution of the Italian subjunctive, we have in the course of this thesis contributed to the three traditional puzzles posed by the Italian subjunctive, recapitulated here from chapter 2:

- Belief in Italian: strong preference for the subjunctive with the indicative perceived as ungrammatical in the majority of scenarios
- Bouletics: 'want' regarded as a subjunctive selector v.s. 'hope' which is mood optional
- Emotive factives: mood optionality

Our theory in chapter 6 addressed the first puzzle. In chapter 3, we extended Portner and Rubinstein 2020's account and our extension addressed the final two puzzles as it yielded the correct heterogeneous predictions for the bouletics and mood optionality for the emotive factives. We have also handled the second in our theory in chapter 6 and have, in our discussion thereof, suggested ways in which the third could be handled. In chapter 6 we concentrated primarily on our new discovery that 'to wonder', like 'to believe', can take the subjunctive in Italian but not in other Romance languages and we propose an account of their licensing – the first account in the literature to handle this phenomenon.

We have sought to illustrate that whilst the Italian subjunctive is a quaestio vexata, fruitful advancement can be taken by considering inquisitive predicates. A full account of the Italian subjunctive will have to take into account tense considerations (as highlighted by Portner and Rubinstein 2020) and subject obviation effects as well as looking beyond its distribution in complement clauses and thus considering its use in root clauses, in the presence of modal adverbs and adjectives, as well as in the presence of concessives and free choice indefinites, and last but not least in the antecedents of conditionals.

A

Appendix: Verbal Mood in Italian beyond complement clauses

A.1 Verbal Mood elsewhere in Italian

In this appendix we give brief overviews of other areas in which mood variation also occurs. The only (partial) section here that is within the scope of our aims is that of modal adjectives. The purpose of giving a whistle-stop tour of the subjunctive's distribution in Italian at times with comparison to French and Spanish is to demonstrate the sheer vastness of its distribution. We do not aim at accounting for the full distribution, only the distribution restricted to that of propositional attitudes. In this vein, this appendix serves as a reference point and as a menu for future work.

A.1.1 Verbal Mood in Root clauses

Although the indicative is the canonical mood of root clauses whether declarative or interrogative, the subjunctive is found in some root clauses. Such as in certain exclamatives of an optative flavour (see e.g. example (2) in Chapter 1.)

A.1.2 Verbal Mood in non-root questions

Rocci 2007 discusses the use of the subjunctive in questions but which always follow the complementizer *che*. These may occur in the absence of a predicate e.g. in the following example (ex (1) in Rocci 2007, p.129) in which the context is such that Giovanni's car is visibly not in the parking lot.

(1) [La macchina di Giovanni non è nel parcheggio]
Che sia.SUBJ andato a casa?
'Has he possibly gone home?'

Other examples include questions that include a modal adjective (as in (2a) ((6) in Rocci 2007), see also next section) and questions which use *credere* (as in (2b) ((15) in Rocci 2007)) or *pensare* as an embedding predicate.

(2) a. Credi che Giovanni sia andato a casa?
'Do you think John has gone home?'
b. È probabile che sia andato a casa?
'It is it probable that he has gone home?'

A.1.3 Verbal Mood with Modal Adjectives, Impersonal Expressions and Adverbs

With respect to modal adjectives and impersonal expressions, Italian is not of distinct interest as French and Spanish require the subjunctive after these constructions. Modal adjectives in Italian such as, *È necessario, è (im)possibile*, take, in common with their French and Spanish counterparts, the subjunctive:

(3) a. È necessario che gli studenti verifichino.SUBJ/*verificano.IND ogni caso.
b. C'est nécessaire que les étudiantes vérifient chaque cas.[1]
c. Es necessario que los estudiantes verifiquen.SUBJ/verifican.IND cada caso.
'It is necessary that the students check each case.'

Relatedly, we also have impersonal expressions of judgement which take the subjunctive. These include but are not limited to: *è importante (che), è probabile (che), è bello, è utile, è interessante, è logico, bisogna, importa, basta (che)*

(4) a. Bisogna che faccia la valigia almeno il giorno prima della partenza.
'It is necessary/it's essential that you pack your suitcase at least the day before leaving'
b. Basta che tu trovi un controesempio.
'It suffices that you find a counterexample'

In this area, Italian is only really of interest when it comes to the adverb *magari* which exhibits a difference in meaning when it is used with the indicative v.s. with the subjunctive.

(5) [Context: the hearer's cat was last seen several days ago.]
a. Magari il tuo gatto è scappato.
b. Magari il tuo gatto abbia scappato.
'Maybe/probably your cat has run away'

(5a) the speaker merely conveys the possibility that the hearer's cat has run away whereas (5b) conveys this but also that the speaker hopes that the cat has run away. I.e. (5a) is wholly epistemic, whereas (5b) is bouletic. *Magari* is of interest in its own right and we will not major upon it here but simply point the reader to D'Antuono

[1]Note: owning to the difference in the richness of verbal morphology of French compared to Italian and Spanish, the use of *vérifier* as the embedded verb is suboptimal for demonstrating French's use of the subjunctive only in this environment as the French 3rd forms are identical in the two moods.

2020 for extended discussion of the adverb.

A.1.4 Verbal Mood and Free Choice Indefinites

The subjunctive is required when followed by a number of free choice indefinites such as *chiunque, qualunque, qualsiasi (cosa), dovunque, ovunque.*[2] For example, with *dovunque*:

(6) a. Puoi dormire dovunque ci sia un posto nella stalla.
b. *Puoi dormire dovunque c'è un posto nella stalla.
'You can sleep wheverever there is a place in the cowshed.'

A.1.5 Verbal Mood and Concessives

An area in which mood selection crops up but whose cross-linguistics distributions have received comparatively little attention – to that of the complements of propositional attitudes and of hypothetical clauses – is that of phrases following concessives. Concessives 'something which is conceded but not detracted from what is said'
Italian examples include but are not limited to: *sebbene/benché*, ('although'),*malgrado* ('despite'), *nonostante* ('even though').

Quer 1998 and Quer 2001 handle concessives. Quer 2001 arguing on the basis of data from Spanish and Catalan contends that subjunctive concessives (i.e. concessives which select the subjunctive) belong to the category of concessive conditionals rather than to simply the category of concessives.

A.1.6 Verbal Mood and Conditionals

Conditionals in their own right are a further area that has been studied in relation to mood variation. As well as being a further area in which Italian verbal mood selection is at least distinctive to French is its role in conditional statements. For in Italian, the subjunctive enjoys a far wider distribution in conditionals compared to in French. We give a brief exposition of the Italian distribution and discuss the historical development. In French, if the condition is unlikely but in the present then the indicative *l'imparfait* is used in the protasis of the conditional[3]. E.g.

(7) Si j'étais riche, j'irais en Nouvelle-Zélande.
If I were.IMP.IND rich, I go.COND to New Zealand.
'If I were rich, I would go to New Zealand.'

[2]For extended discussion and treatment of the first three along with *qualsivoglia* see Degano and Aloni 2022.

[3]Note that the subjunctive has been used in older French in the antecedent of a variety of hypothetical constructions, see Wagner 1939.

This is not possible in 'proper, controlled' *sorvegliato* Italian, but rather for a proper translation of (4), the *congiuntivo imperfetto* (imperfect subjunctive) has to be used:

(8) Se fossi ricca, andrei in Nuova Zelanda.
If I were.IMP.SUBJ rich, I go.COND to New Zealand.
'If I were rich, I would go to New Zealand.'

As an historical aside, however, it was not always that case that Italian used the subjunctive in such cases; as Dessì Schmid 2010 comments, in Old Italian, *l'imperfetto* was used in conditionals. Dessì Schmidt highlights use of *imperfetto* in Old Italian in both the protasis and apodosis of counterfactual conditional sentences (*periodi ipotetici dell'irrealtà*). I.e. *imperfetto* has a hypothetical reading in such cases and here it admits of what Dessì Schmid calls examples of 'hypothetic imperfect'. Again, this historical fact of the indicative imperfect being used prior to the subjunctive imperfect, lends some evidence counter to the suggestion of the subjunctive as a semantic default as per Schlenker 2005). The examples that Dessì Schmidt presents are from Sabatini 1985 (p.167) with the first example from the 16^{th} century (from Machiavelli's *Istorie fiorentine*) and the second from the 19^{th} century (from Manzoni's *I promessi sposi*):

(10) Braccio cercò di ottenere il regno di Napoli e se non era [*imp.*] rotto e morto all'Aquila, gli riusciva [*imp.*].
'Braccio tried to gain dominion over Naples, and if he had not failed and died in Aquila, he would have succeeded.'

(11) Se Lucia non faceva [*imp.*] quel segno, la risposta sarebbe probabilmente stata diversa.
'If Lucia had not made this sign, probably the answer would have been another.'

The following tense-mood pairings of antecedent (protasi) and consequent (apodosi) are possible in contemporary Italian with the following interpretations. For hypotheticals in the future that are regarded as real or possible, the future tense[4] is used in both the antecedent and the consequent.

(9) Se il tempo farà brutto (quando sarò a Madrid), passerò tutta la vacanza nei musei.
'If the weather will be bad when I will be Madrid, I will spend all my holiday in the museums.'

For real hypotheticals with events happening in the present that are either true, certain or very probable, the present indicative is used in both the antecedent and the consequent.

(10) Se il tempo fa bello, vado alla spiaggia.
'If the weather is nice, I'll go to the beach.'

[4]Indicative mood as this is the only mood that has a future tense in Italian

For hypotheticals with events happening in the present that are possible, i.e. that could take place but may not do so, the subjunctive imperfect is used in the antecedent and the present conditional in the consequent.

(11) Se (tu) ti allenassi forte, vinceresti il torneo.
'If you train hard, you would win the tournament.'

The same structure is used for hypotheticals with events happening in the present that are impossible (whether they actually are (as in (a)) or are just perceived to be so by the speaker (as in (b) due to physical difficulty):

(12) a. Se fossi Fido, avrei una coda.
'If I were Fido, I would have a tail'
b. Se (tu) giocassi a tennis al Polo Nord, lo troveresti difficile.
'If you played tennis at the North Pole, you would find it difficult.'

Hypotheticals whose antecedent are in the past are regarded as impossible (as the past cannot be changed). For these antecedents the *congiuntivo trapassato* (pluperfect subjunctive i.e imperfect subjunctive followed by the past participle) is used. The tense of the consequent depends on whether it is also in the past (as in (a)) or in the present (as in (b)):

(13) a. Se (tu) avessi giocato ieri, avresti vinto la partita.
'If you had played yesterday, you would have won the match'
b. Se (tu) avessi giocato ieri, saresti la campionessa.
'If you had played yesterday, you would be the champion'

Spanish, like Italian, has constructions which pattern like (9), (10), (11) and (12). So, with the exceptions of (9) and (10) which are either future or present orientated, the imperfect subjunctive and the pluperfect subjunctive are used in the antecedent of a number of hypothetical constructions in Spanish. However, the two languages do not have an identical mood distribution in conditionals, as curiously, Spanish allows pluperfect subjunctive also in the consequent[5]. The following is my own example of this type of construction:

(14) Si hubieran sabido que Berlín es el personaje más interesante en La casa de papel, le hubieran dado un rol activo en el segundo atraco.
'If they'd known/realised that Berlín is the most interesting character in La casa de papel, they would have given him an active role in the second heist'

[5]This construction is seemingly not prescriptively dispreferred as it is also widely presented in resources for learning Spanish as a foreign language.

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