

Evidentiality, Learning Events, and Spatiotemporal Distance: The View from Bulgarian

Todor Koev

University of Düsseldorf

Abstract

The grammatical category of evidentiality is traditionally conceived as marking the “information source” for the claim described by the sentence (see e.g. Anderson 1986; Willett 1988; Aikhenvald 2004). This paper defends the view that evidentiality need not be a semantic primitive but can rather be pragmatically derived from the spatiotemporal distance between the event described by the sentence and the “learning event”, i.e. the event of the speaker acquiring the relevant evidence for her claim. While the empirical focus is on the Bulgarian evidential *-l*, this work adds to similar proposals about evidential markers in typologically unrelated languages (see Nikolaeva 1999; Fleck 2007; Speas 2010; Kalsang et al. 2013; Lee 2013). The view of evidentiality as a spatiotemporal distance undermines the claim that evidential sentences in Bulgarian have modal force (pace Izvorski 1997; Smirnova 2013) and correctly predicts that speakers are typically committed to the core proposition described by evidential sentences. The paper also discusses the not-at-issue discourse status and projection behavior of the evidential implication, suggesting that evidential meanings belong to the broader class of “conventional implicatures”, in the sense of Potts (2005). The formal proposal, couched in an update semantics, successfully captures not only the meaning of the evidential marker but also the discourse properties of evidential sentences in Bulgarian.

1 Introduction

Inflected verbs in Bulgarian can occur in either of the two forms shown below.

- (1) Ivan celuna Maria.
Ivan kiss Maria
“Ivan kissed Maria.”
- (2) Ivan celuna-**I** Maria.
Ivan kiss-**EV** Maria
“Ivan kissed Maria, as I heard/inferred.”

While the unmarked form in (1) is largely compatible with a direct or indirect evidential source, it typically often gives rise to the implication that the speaker witnessed the described event, here

the event of Ivan kissing Maria.¹ The rough intuition about (2) is that the speaker distances herself from the described event, thus implying that she has indirect, i.e. hearsay or inferential evidence for it. The intuition of distancing is due to the presence of the verbal suffix *-l*, which I gloss as EV (for “evidential”).

The evidential form is historically related to the present perfect morphology in Bulgarian. The form in (2) differs from the present perfect sentence in (3) only by the fact that the latter contains an auxiliary.

- (3) Ivan e celuna-l Maria.
Ivan be.3SG kiss-EV Maria
“Ivan has kissed Maria.”

Although the evidential paradigm and the present perfect paradigm overlap to a large extent, the interpretations of the two forms differ (see e.g. Izvorski 1997; Smirnova 2013). In this paper, I will focus on evidential forms as in (2), which are morphologically distinct from the respective present perfect sentences.

The main question that this paper addresses is the following: What is the meaning of the Bulgarian indirect evidential marker and how can the intuition that the speaker distances herself from the described event be explained? The received view in the literature is that evidential morphemes mark the “information source” for the claim described by the sentence (see e.g. Anderson 1986; Willett 1988; Aikhenvald 2004). This paper defends an alternative view according to which evidentiality is not (or need not be) a semantic primitive but can rather be a derived notion. I argue that indirect evidential markers can encode the spatiotemporal distance between the event described by the sentence and the “learning event”, i.e. the event of the speaker acquiring the relevant evidence for her claim. While the empirical focus is on Bulgarian, this work adds to previous proposals about evidentiality in typologically unrelated languages which aim to derive the intuition of secondary information from the relationship between times/events/situations (see Nikolaeva 1999; Fleck 2007; Speas 2010; Koev 2011; Kalsang et al. 2013; Lee 2013; Smirnova 2013). The view of evidentiality as a spatiotemporal distance undermines the claim that evidential sentences in Bulgarian have modal force (see Izvorski 1997; Smirnova 2013) and correctly predicts that speakers are typically committed to the core proposition of the sentence. The paper also discusses the not-at-issue discourse status and projection behavior of the evidential implication, suggesting that this implication belongs to the broader class of “conventional implicatures”, in the sense of Potts (2005). The formal proposal, couched in an update semantics, successfully captures not only the meaning of the evidential marker but also the discourse properties of evidential sentences in Bulgarian.

The paper is structured as follows. In Section 2, I show that viewing indirect evidentiality as reporting non-witnessed events does not quite fit the meaning of the Bulgarian evidential. In Section 3, I critically examine the claim that Bulgarian evidential sentences encode a purely temporal relation between the described event and the event of acquiring the stated information (see Koev 2011; Lee 2013; Smirnova 2013). I demonstrate that the full range of data cannot be accounted for without also specifying the spatial location of these two events. Section 4 offers a sketch of the main proposal, according to which the Bulgarian evidential requires that the described event and

¹Given the meaning restrictions on evidentially-marked sentences discussed in the paper, this implication could be analyzed as a pragmatic inference. Since the implication is cancelable, evidential and non-evidential sentences in Bulgarian are not in complementary distribution.

the learning event are temporally or spatially disjoint. In Section 5, I argue that the core proposition described by evidential sentences is entailed in its unmodified form (modulo cases of perspective shift), and in Section 6 I discuss the discourse status and projection properties of the evidential implication. Section 7 presents the formal account and Section 8 is the conclusion.

2 The traditional account: non-witnessed events

Evidentiality is traditionally defined as a grammatical category that encodes the “source of information” for the claim made by the sentence. The main distinction is between direct vs. indirect information source, where indirect source subsumes the two major types of reportative and inferential sources (see Anderson 1986; Willett 1988; Aikhenvald 2004).

The Bulgarian evidential marker is compatible with both a reportative and inferential information source.² This marker is then best characterized as encoding *indirect* evidence. The rough intuition about Bulgarian evidential sentences is that they encode the information that the speaker did not witness the described event (see e.g. Izvorski 1997; Sauerland & Schenner 2007). For example, the core meaning of (4a) can be rendered as in (4b), which states that there is a raining event which the speaker did not witness.³

- (4) a. Valja-I-o.
rain-EV-NEUT
“It rained, as I heard/inferred.”
b. $\exists e(\text{rain}(e) \wedge \neg \text{witness}(\text{speaker}, e))$

I will refer to this simple view of indirect evidentiality as the “traditional account”.

In a similar vein, Faller (2004) analyzes the Cuzco Quechua suffix *-sqa* as a “non-experienced past” marker. That is, *-sqa* is a past tense marker which locates the described event outside the speaker’s perceptual field and thus gives rise to an indirect evidential interpretation. According to Faller’s analysis, the sentence in (5a) receives the (slightly adapted) interpretation in (5b).

- (5) a. Para-sha-sqa.
rain-PROG-NX.PST
 p = “It was raining.”
EV = “The speaker was told/infers that p .” (Faller 2004: 46)
b. $\exists e(\text{rain}(e) \wedge \tau(e) < t_{UT} \wedge \langle \tau(e), \lambda(e) \rangle \notin \mathbf{P}\text{-trace}(\text{speaker}))$

Above, t_{UT} is the utterance time, $\tau(e)$ and $\lambda(e)$ are the time and the location of the event e (respectively), and $\mathbf{P}\text{-trace}(\text{speaker})$ is the speaker’s perceptual field, defined as $\{\langle t, l \rangle \mid t \subseteq \tau(\text{speaker}) \wedge \text{perceive}(\text{speaker}, t, l)\}$. Thus, in addition to locating the described event prior to the utterance time, (5b) also states that the spatiotemporal location of the described event was not part of the speaker’s perceptual field. It is this latter meaning component that triggers the intuition of a secondary information source in (5a).

²It seems though that the use of evidential forms in inferential contexts is somewhat more restricted than their use in reportative contexts. It is possible that this contrast is due to a dialectal variation.

³Evidential sentences as in (4) can imply the existence of a present or past raining event. I defer marking and discussing tense in evidential sentences to Section 3.

Faller’s analysis of the Cuzco Quechua marker *-sqa*, briefly sketched above, can be regarded as a way of making formally precise the main idea behind the traditional account of evidentiality.⁴ Recall that according to the traditional account, indirect evidentials semantically encode the information that the speaker did not witness the described event. This is exactly what Faller’s account does too. In fact, (4b) and (5b) are structurally similar, the main differences being that the latter has a temporal component and also substitutes the condition $\neg witness(speaker, e)$ with the more elaborate condition $\langle \tau(e), \lambda(e) \rangle \notin \mathbf{P}\text{-trace}(speaker)$.

While the traditional account comes close to capturing the core meaning of the Bulgarian evidential, it appears not precise enough when we look at a broader range of data. A challenge for the traditional account comes from what I call “late realization” scenarios, i.e. scenarios in which the speaker has direct evidence for the described event but the realization that she does comes at a later time.⁵ Importantly, late realization scenarios are compatible with indirect evidentials, despite the fact that the speaker has direct perceptual evidence of the described event. The following example from Bulgarian illustrates one such scenario.

- (6) *One of Nixon’s aides vividly recalls walking into the Oval Office and seeing the President erase some tapes. She later learns about the Watergate scandal from the media and makes sense of what she had seen. When asked what happened on that day, she says:*

Kogato vljazo-x, Niksûn trie-še njakav-i zapis-i. Toj zaličava-l ulik-i-te.
 when enter-PAST Nixon erase-PAST some-PL tape-PL he remove-EV clue-PL-DEF

“When I walked in, I saw Nixon erase some tapes. He was covering up the clues, as I learned later.”

In this example, the speaker witnesses Nixon cover up the clues and thus has direct evidence for the event described by the second sentence. In spite of that, the use of the evidential in that sentence is possible (in fact, preferred). This is unexpected under the traditional account, which incorrectly predicts that an evidential sentence in this context is ruled out.

It is important to convince ourselves that the second sentence in (6) receives a truly *evidential* interpretation rather than being an instance of a mirative use. The grammatical category of mirativity adopts indirect evidential morphology and marks information that is “new or surprising to the speaker” (DeLancey 1997: 33). Since mirative uses are compatible with both direct and indirect evidence contexts (see DeLancey 1997; 2001; Peterson 2010; Rett & Murray 2013), the presence of an indirect evidential marker per se does not imply an indirect information source. Bulgarian evidential sentences are compatible with mirative uses, including in direct evidence contexts, as the following example demonstrates.

- (7) *Upon hearing Ivan rip a Jimmy Hendrix solo:*

Ivan bi-l straxoten muzikant!
 Ivan be-EV amazing musician

“Ivan is (such) an amazing musician!”

⁴Faller actually rejects the idea that *-sqa* is a genuine evidential due to the fact that this marker does not *directly* encode information source. However, it is not immediately clear whether what is traditionally called an “evidential” encodes information source or rather only gives rise to inferences *about* information source.

⁵Aikhenvald (2004: §3.8, §5.1) refers to such scenarios as “deferred realization”.

I will not try to offer an account of the Bulgarian evidential that also captures its mirative uses. Such an account is not easy to come up with, since it would need to reconcile the distancing effect of evidential uses with the compatibility of mirative uses with a direct information source. To the best of my knowledge, Smirnova (2013) is the only attempt at a comprehensive analysis. However, as discussed in Section 3.3 below, this analysis fails to rule out the use of evidential sentences with direct sources in certain cases.

There are two pieces of evidence against the view that the second sentence in (6) is an instance of a mirative use. First, the speaker of (6) need not be surprised that Nixon was covering up the clues, as she could have learned about the Watergate scandal a long time before delivering the utterance. For example, her utterance cannot be paraphrased as “I’m really surprised that he was covering up the clues.” Second, mirative sentences in Bulgarian are conventionally marked by exclamatory intonation, as (7) suggests. Yet, the second sentence in (6) need not carry such intonation. The indirect evidential morphology in late realization cases then must receive a genuinely evidential interpretation.

It is important to also demonstrate that late realization scenarios involve a *direct* rather than indirect information source. This is because one might try to defend the traditional account by claiming that in (6), the aide infers from what she had seen that Nixon was covering up the clues. If so, the aide would only have indirect, i.e. inferential evidence for her claim, and thus the use of the evidential in the second sentence in (6) would be warranted under the traditional view of evidentiality as marking evidence type.

I argue that the type of evidence involved in late realization scenarios is in fact direct. In (6), it is hard to imagine what more direct evidence for Nixon covering up the clues would be than seeing Nixon delete the suspicious tapes. Philosophically speaking, it may seem reasonable to assume that all evidence is indirect in some sense, e.g. because even direct perceptual evidence involves the extra step of realizing what one has perceived. However, it is difficult to find support for this view in the Bulgarian evidential system. For example, the speaker cannot see the rain and utter the evidentially-marked sentence *Navûn valjalo* “It is raining outside, as I inferred” to describe it. This holds true even if the speaker is a professional philosopher who truly believes that all knowledge is reliably inferred from perception.

There is also empirical evidence that late realization scenarios involve direct evidence. Consider the following two variations of the example in (6). Imagine first that the aide realizes that Nixon is covering up the clues while watching him erase the tapes. As shown in (8a), in this context an evidential sentence is not felicitous. This would be surprising, if the evidence involved was indeed secondary. In contrast, if the aide observes the very same event of Nixon erasing the tapes and realizes at a later point that the President was covering up the clues (say, without additional input from the media), an evidential sentence is quite felicitous, as illustrated in (8b).

- (8) a. *One of Nixon’s aides walks into the Oval Office and sees him erase some tapes. She immediately realizes that Nixon is covering up clues. When asked what happened on that day, she says:*

Kogato vljazo-x, Niksûn trie-še njakav-i zapis-i. #Toj zaličava-l
 when enter-PAST Nixon erase-PAST some-PL tape-PL he remove-EV
 ulik-i-te.
 clue-PL-DEF

- b. *One of Nixon's aides walks into the Oval Office and sees him erase some tapes. Later on, she recalls the entire episode and realizes that Nixon was covering up clues. When asked what happened on that day, she says:*

Kogato vljazo-x, Niksûn trie-še njakav-i zapis-i. Toj zaličava-I ulik-i-te.
 when enter-PAST Nixon erase-PAST some-PL tape-PL he remove-EV clue-PL-DEF

Since these two examples involve the same type of evidence (in both cases, the aide observes Nixon erase some tapes), the divergence in judgment in (8a)-(8b) is puzzling. It is then clear that evidence type is not necessarily a good predictor for the distribution of the Bulgarian evidential. What rather seems to matter is whether the realization comes at the actual event or after the event.

An anonymous reviewer points out that the two examples in (8) would not involve the same type of evidence if one factors in the linguistic description of events. Indeed, if events are identified not just by what is perceived but also by how it is conceptualized in the mind of the perceiver, then the traditional view could be salvaged. In particular, in (8a) the aide may perceive the event as a clue-covering event whereas in (8b) she perceives it as a tape-erasing event. This implies that the aide has direct evidence for the evidentially-marked sentence in (8a) but she only has indirect evidence for that sentence in (8b), which would explain the contrast in judgment. Unfortunately, this line of reasoning has the unwelcome consequence that according to the aide we are dealing here with two separate events, since her linguistic descriptions vary. If that were so, it would be puzzling how the aide could come to the realization that the two events are actually the same event.

We see that the traditional account of indirect evidentiality as marking non-witnessed events falls short. Late realization scenarios demonstrate that the information encoded by the indirect evidential is *propositional*, not eventive. The Bulgarian evidentiality system is sensitive to when the proposition expressed by the sentence was learned by the speaker, not to whether or not the speaker witnessed the described event. The semantic consequences of the distinction between witnessing an event vs. becoming aware of a proposition have long been recognized in the literature on perception reports. For example, Barwise (1981) draws attention to the contrast in (9)-(10), noting that the former sentence does not entail the latter sentence.

(9) Dick saw Rosemary remove the crucial part of the Watergate tape.

(10) Dick saw that Rosemary removed the crucial part of the Watergate tape.

(both examples from Barwise 1981: 373–374)

Assuming that bare infinitival complements refer to events while finite complements refer to propositions, Barwise's observation can be explained as follows. The complement in (9) refers to an event and is thus compatible with a late realization scenario, i.e. a scenario in which Dick realizes what Rosemary's actions amounted to at a later point.⁶ This is not true about the complement in (10), which refers to a proposition and requires Dick's online realization of what he had seen.

Before closing the section, I remark on the particular form in which the traditional account was presented. I have stated the traditional account in a negative way, i.e. by requiring that the speaker did *not* perceive the described event. One might wonder if the traditional account falls prey to the same objections if it is instead expressed in a positive way, e.g. by requiring that the speaker has *indirect evidence* for the described event. However, in late realization scenarios the speaker

⁶But see Asher & Bonevac (1985), who claim that naked infinitives in perception reports are extensional only with respect to designators but are intensional with respect to VPs.

also has direct evidence and it is known that in such “double-source” contexts the use of indirect evidential markers is infelicitous (see Faller 2012 for a Gricean explanation). Thus, the objections raised above do not turn on the particular way the traditional account has been explicated.

In this section, I presented the traditional view that indirect evidentials mark non-witnessed events. I pointed out that this view fails to recognize the fact that the content flagged by the Bulgarian evidential is propositional rather than eventive, and that the time of learning plays a crucial role. In the next section, I discuss an alternative account of evidentiality that incorporates those insights.

3 The temporal account: temporally displaced learning

In the previous section, I hinted at the presence of learning events in the Bulgarian evidential system. The argument came from late realization scenarios, in which the speaker witnesses what her utterance describes but does not realize it until later. The fact that evidential sentences are felicitous in such scenarios points at the intriguing possibility that the intuition of indirect information source is derived from the temporal relationship between the described event and the learning event. More specifically, when the two events are temporally disjoint, the addressee can infer that the presented information was obtained from a secondary source. This is precisely the idea behind temporal accounts of evidentiality, to which I now turn.

3.1 Background assumptions

The standard Reichenbachian temporal ontology has three main ingredients: an “event time” (ET) or the time during which the described eventuality holds, a “reference time” (RT) or the time to which the claim of the sentence is limited, and a “speech time” (ST) or the time of utterance (see Reichenbach 1947; Kamp & Reyle 1993; Klein 1994; a.o.). While the category of tense locates the reference time relative to the speech time, the relation between the reference time and the event time is determined by aspect. For example, a past tense locates the reference time prior to the speech time and a perfective aspect requires that the event time is included in the reference time. We arrive at the following temporal picture.

$$(11) \text{ Classical temporal ontology: } ET \xleftrightarrow{\text{Aspect}} RT \xleftrightarrow{\text{Tense}} ST$$

The proponents of the temporal account make two adjustments to this picture for evidential sentences (see Lee 2013; Smirnova 2013; see also Koev 2011): they introduce a “learning time” (LT) or the time at which the speaker learns the described proposition, and they assume that tense in evidential sentences is anchored to the learning time rather than the speech time. The temporal relation between the learning time and the speech time is determined by the evidential itself, which requires that the learning time precedes or overlaps with the speech time. Since the learning time is ordered with respect to the speech time and the reference time is anchored to the learning time, evidential sentences bear two tenses in them.⁷ The enriched temporal ontology for sentences with evidentials is as shown below.

$$(12) \text{ Evidential temporal ontology: } ET \xleftrightarrow{\text{Aspect}} RT \xleftrightarrow{\text{Tense}} LT \xleftrightarrow{\text{Evidential}} ST$$

⁷This is similar to the phenomenon of “double tense” in Matses (see Fleck 2007; Munro et al. 2012).

Since aspect will not play a prominent role in the following discussion, I will largely ignore the import of the reference time and make the simplifying assumption that tense links the event time directly to the learning time. The following simplified temporal ontology is as much as we need for the purposes of this paper.

$$(13) \text{ Evidential temporal ontology (simplified): } ET \xleftrightarrow{\text{Tense}} LT \xleftrightarrow{\text{Evidential}} ST$$

The main insight of the temporal account is that the intuition of indirectness in evidential sentences can be derived from the location of the learning time with respect to the event time. For example, a past tense evidential sentence specifies that the event time precedes the learning time, from which it can be inferred that the speaker acquired the evidence for her claim from a secondary source. The temporal account is thus quite a radical departure from the traditional view that evidentiality encodes information source. In aiming to derive evidential implications from temporal information alone, it reduces evidentiality to temporality.⁸

3.2 Temporal reference of evidential sentences in Bulgarian

In order to assess the merits of the temporal account, we first need to discuss the interaction of tense and evidentiality. Evidential sentences in Bulgarian do not display temporal morphology very clearly and in order not to prejudge the issue, in the examples so far no temporal markings have been included. It is now time to carefully examine the temporal reference of evidential sentences.

A starting observation is that simple evidential forms in Bulgarian are ambiguous between a past and a present temporal interpretation. For example, the evidential form in (14) can describe either a past or an ongoing event, as demonstrated by the different possibilities for temporal locating adverbials.⁹

- (14) Včera / V moment-a v Sofia valja-I-o.
 yesterday / in moment-DEF in Sofia rain-EV-NEUT
 “Yesterday it rained in Sofia, as I heard/inferred.”
 “Right now it is raining in Sofia, as I heard/inferred.”

Simple evidential sentences cannot be used to refer to the future, however, as (15) shows. One exception are cases in which planned events are being reported, as in (16). It seems though that the possibility of reporting planned events in present tense sentences is independently attested across languages (cf. for example the English *The train departs tomorrow morning*), so such examples do not call the data in (15) into question.

- (15) #Utre v Sofia valja-I-o.
 tomorrow in Sofia rain-EV-NEUT

⁸This is true of Koev (2011) but not quite true of e.g. Smirnova (2013), who follows Izvorski (1997) in assuming that evidential markers in Bulgarian also introduce modality. However, in this section I am primarily interested in how far the temporal picture can get us in explaining the intuition of indirectness in evidential sentences. The claim that the Bulgarian evidential involves modality will be taken up in Section 5.

⁹I will often translate the evidential contribution in terms of hearing or inferring rather than in terms of learning. This raises the question of why speakers interpret learning events as associated with one of those two sources and not from, say, dreams or visions. I suspect this question has less to do with semantics proper and is more about the way secondary information is reliably obtained.

- (16) Utre toj bi-I v Sofia.
tomorrow he be-EV in Sofia

“It is planned that he will be in Sofia tomorrow, as I heard/inferred.”

In order to refer to the future, Bulgarian evidential sentences need to contain the future auxiliary *šte* “will”, as in (17).

- (17) Utre v Sofia štja-I-o da vali.
tomorrow in Sofia will-EV-NEUT to rain

“Tomorrow it will rain in Sofia, as I heard.”

The fact that simple evidential sentences in Bulgarian can generally only receive non-future temporal interpretations is reminiscent of the paradigm found in “tenseless languages”, i.e. languages without overt temporal morphology (see Lin 2006; Matthewson 2006; Tonhauser 2011). For example, Matthewson shows that a similar pattern holds for St’át’imcets: simple sentences in this language can be interpreted as either past or present but not as future, as seen from (18). In order to obtain a future interpretation, an overt marker (such as the second position clitic *kelh* “WOLL”) is needed (19).

- (18) a. k’ác-an’-lhkan i-nátcw-as
dry-DIR-1SG.SUBJ when.PAST-one.day.away-3CONJ
“I dried it yesterday.”

- b. táyt-kan lhkúnsa
hungry-1SG.SUBJ now
“I am hungry now.”

- c. *sáy’séz’-lhkan naticw / zánucwem
play-1SG.SUBJ one.day.away / next.year
“I will play tomorrow / next year.” [attempted] (Matthewson 2006: 677)

- (19) sáy’séz’-lhkán kelh
play-1SG.SUBJ WOLL

“I will play.” (Matthewson 2006: 678)

The parallel between the evidential paradigm in Bulgarian and the paradigm found in tenseless languages brings up the question of whether evidential sentences in Bulgarian are marked for tense at all. I will assume that they indeed are, whether overtly or covertly. In doing so, I broadly follow Matthewson (2006), who posits a single null non-future tense for St’át’imcets to explain the pattern in (18)-(19). Slightly modifying Matthewson’s idea, I will posit for Bulgarian a null past tense and a null present tense, in view of the fact that a portmanteau non-future tense is not found elsewhere in the language.¹⁰ The assumption that evidential sentences in Bulgarian are marked for tense is plausible because of the following considerations.

First, a language-internal argument: Since Bulgarian is generally a tensed language in which verbs are typically overtly marked for tense, it would be difficult to claim that a given subset of

¹⁰Since the present tense is often not morphologically manifested in Bulgarian, the main innovation here is the introduction of a null past tense.

the grammar, i.e. the one involving the evidential paradigm, is tenseless. This would make for a more complex grammar and one that imposes heavier a burden on the language learner. Also, we have already seen in (17) that evidential sentences *can* be marked for tense. If in future evidential sentences the marker *šte* “will” is analyzed as a tense morpheme, then at least certain evidential sentences are overtly marked for tense.¹¹ In addition, Smirnova (2013) argues that evidential participles in Bulgarian can occasionally exhibit morphological distinctions between past and present. A few examples are listed below.

ROOT-PRES-EV	ROOT-PAST-EV	translation
<i>piš-e-l</i>	<i>pis-a-l</i>	“write”
<i>svir-e-l</i>	<i>svir-i-l</i>	“play (an instrument)”
<i>pe-e-l</i>	<i>p-ja-l</i>	“sing”

Table 1: Temporal distinctions in evidential participles in Bulgarian

There are indeed alternative analyses that aim to derive the non-future interpretation of simple sentences in tenseless languages without relying on covert temporal morphemes. Here, I briefly discuss two such analyses and note that none of these seems to be a good fit for the Bulgarian data.

According to Lin (2006), the temporal interpretation of simple sentences in Chinese is determined by their default aspect: roughly, imperfective aspect implies a present tense interpretation while perfective aspect implies a past tense interpretation. Lin’s account is not “tenseless” in the semantic sense, though, as it stipulates that temporal meanings (i.e. temporal relations between the reference time and the evaluation time) are part of the lexical semantics of various aspectual markers. As such, this analysis does not present a truly tenseless alternative to the covert tense analysis assumed above. This analysis is also not empirically appropriate for Bulgarian: while perfective evidential sentences cannot receive a present tense interpretation, imperfective sentences are ambiguous between a past and a present tense interpretation (recall (14)). Thus is unexpected, if temporal reference in evidential sentences was determined by aspect only. In turn, Tonhauser (2011) develops a truly tenseless analysis for the tenseless language Paraguayan Guaran. The main idea behind this analysis is that tenseless languages can introduce past reference times but generally do not introduce *future* reference times. Since temporal reference is achieved through anaphora to previously introduced reference times, main clauses in those languages generally cannot refer to the future. It is difficult to see though how Tonhauser’s explanation can be extended to Bulgarian, since in this language sentences seem to be able to introduce future reference times. For example, the first sentence in (20a) must introduce a future reference time since a future time is anaphorically retrieved in the second sentence: both sentences talk about the same future time period, i.e. the day that follows the day of the utterance. Even so, a simple evidential sentence cannot pick out a future reference time, as (20b) demonstrates.

- (20) a. *Utre Ivan štja-I da xodi do Sofia. Štja-I da poseti baba si.*
 tomorrow Ivan will-EV to go to Sofia will-EV to visit grandma POSS
 “Ivan will go to Sofia. He will visit his grandma.” (evidential information omitted)

¹¹One might suggest that it is the lack of a future tense in simple evidential sentences that pragmatically implies a non-future interpretation. However, Bulgarian does have overt past tenses and thus the lack of overt tense marking in evidential sentences could at best implicate a present tense reference.

- b. Utre Ivan štja-I da xodi do Sofia. #Poseti-I baba si.
 tomorrow Ivan will-EV to go to Sofia visit-EV grandma POSS

The unavailability of the future reference in (20b) then cannot be blamed on the absence of a future reference time in previous discourse. More likely, (20b) fails because the second sentence is covertly marked for a past or a present tense and thus cannot refer to a future moment.

To conclude, it is reasonable to assume that Bulgarian evidential sentences are marked for tense. From now on, I will mark simple evidential sentences for null tense by the null morphemes \emptyset_{PAST} and \emptyset_{PRES} , depending on linguistic context. For example, (14) above is as in (21a) or (21b).

- (21) a. Včera v Sofia valja- \emptyset_{PAST} -I-o.
 yesterday in Sofia rain-PAST-EV-NEUT
 “Yesterday it rained in Sofia, as I heard/inferred.”
 b. V moment-a v Sofia valja- \emptyset_{PRES} -I-o.
 in moment-DEF in Sofia rain-PRES-EV-NEUT
 “Right now it is raining in Sofia, as I heard/inferred.”

Given this background, I will present the temporal account of evidentiality in the next section. I will focus on the particular version of it defended in Lee (2013) and Smirnova (2013), and will only briefly mention Koev (2011).

3.3 The temporal account and its limitations

As already mentioned in Section 3.1, the temporal account makes two important modifications to the classical Reichenbachian temporal ontology. The first modification is the assumption that evidential markers introduce a learning time that precedes or overlaps with the speech time. The main evidence for this assumption comes from the fact that evidential claims cannot be based on future learning events, as the following example demonstrates.¹²

- (22) *You suspect that Maria is writing a book, but you have no evidence. Next week you have a meeting with Maria’s sister, a good friend of yours. You plan to ask her whether Maria is writing a book. Today, when someone asks you what Maria does, you say:*

#Maria piš-e-I-a / štja-I-a da piše kniga.
 Maria write-PRES-EV-FEM / will-EV-FEM to write book

Intended: “Maria is writing a book, I will hear.” (Smirnova 2013: 500)

An anonymous reviewer suggest that such examples might be blocked because the speaker is lacking the grounds for making the claim, not because the claim is based on a future learning event. Indeed, in the context of (22) uttering the English sentence *Maria is writing a book* might not be felicitous either because the speaker is not certain in her claim. While in most cases the grounds and the evidence for a claim are identical, the two could also differ. This is because evidential claims in Bulgarian need to be based on *observable* evidence (see e.g. Izvorski 1997; Smirnova 2013) while the grounds for making an assertion need not be (say, the asserted content could be

¹²For uniformity of presentation, I occasionally regloss borrowed Bulgarian examples.

deduced). In (23), the speaker has sufficient grounds to assert that Ivan will get drunk, hence the non-evidential sentence in (23a) is felicitous. Even so, the evidential counterpart in (23b) is ruled out because the claim is based on anticipated acquisition of evidence.

(23) *Tomorrow is Ivan’s birthday and he always gets drunk on that day. You are planning to attend Ivan’s birthday party.*

- a. Utre Ivan šte se napie.
tomorrow Ivan will REFL get.drunk
“Tomorrow Ivan will get drunk.”
- b. #Utre Ivan štja-I da se napie.
tomorrow Ivan will-EV to REFL get.drunk

These examples demonstrate that evidential claims cannot be based on future evidence even when the speaker has sufficient grounds for making an assertion.

The second modification of the Reichenbachian temporal ontology is that in evidential sentences tense is not absolute, or anchored to the speech time, but rather *relative*. Tense is relative when it is anchored to the local evaluation time, which could be the utterance time or any time provided by the immediate syntactic environment (see Ogihara 1996; Abusch 1997; Gennari 2003). In evidential sentences, tense encodes a relation between the event time and the learning time, not between the event time and the local evaluation time. In order to see how this assumption is motivated, note that when the event time precedes the learning time, as in (24), a sentence without overt temporal marking (here, assumed to contain a null past morpheme) is possible and a sentence containing a future auxiliary is excluded. In contrast, when the event time follows the learning time, as in (25), the reverse state of affairs obtains. This is so even though in both sentences the event time precedes the speech time, as indicated by the use of the indexical temporal adverbial *včera* “yesterday”, which is anchored to the speech time.¹³

(24) *You learned earlier today that it had rained yesterday in Paris.*

Včera v Pariž valja-Ø_{PAST}-I-o / #štja-I-o da vali.
yesterday in Paris rain-PAST-EV-NEUT / will-EV-NEUT to rain

“Yesterday it rained in Paris, as I heard.”

Temporal structure: ET < LT < ST

(25) *The day before yesterday you watched the weather forecast and learned that it was going to rain yesterday in Paris.*

Včera v Pariž #valja-Ø_{PAST}-I-o / štja-I-o da vali.
yesterday in Paris rain-PAST-EV-NEUT / will-EV-NEUT to rain

“Yesterday it was going to rain in Paris, as I learned.”

Temporal structure: LT < ET < ST

¹³See Smirnova (2013) for additional evidence that tense in evidential sentences in Bulgarian anchors the event time to the learning time.

An anonymous reviewer notices that sentences containing the future auxiliary are sometimes compatible with the reverse temporal structure from the one predicted by the temporal account. (26) below contrasts with (25) in that the learning time follows the event time.

- (26) Mojat mûž včera štja-Ø_{PAST}-I da si otkusne prûst-a.
 my husband yesterday will-PAST-EV to REFL tear.off finger-DEF
 “My husband almost tore off his finger yesterday, as he told me.”
Temporal structure: ET < LT < ST

However, this last sentence also differs in meaning: it describes an unrealized event (as visible from its translation) and thus receives a counterfactual interpretation. This suggests that the unexpected temporal order in this sentence might be due to its counterfactual meaning. It is then possible that this additional interpretation arises because of the presence of a covert past tense on the future auxiliary, as indicated in (26).¹⁴ Apparently, when a past tense morpheme is present, the Bulgarian future auxiliary can acquire a non-temporal meaning. Indeed, a counterfactual reading is also attested when a past tense morpheme is overtly present: if in (26) *štjal* is substituted by the non-evidential marker *šte-še* “will-PAST”, the counterfactual reading is preserved. Thus, if past tense morphemes can introduce counterfactuality, the additional reading observed in (26) becomes less puzzling.

Given the two adjustments to the Reichenbachian temporal ontology, we are left with the following three options for temporal relations in evidential sentences.

	Tense	EV
Past sentences	ET < LT	LT ≤ ST
Present sentences	ET = LT	LT ≤ ST
Future sentences	LT < ET	LT ≤ ST

Table 2: Temporal relations in evidential sentences

The main claim of the temporal account is as follows. The intuition of indirectness in evidential sentences arises from the temporal relation between the event time and the learning time. In past or future tense evidential sentences, the two times are necessarily disjoint (ET < LT or LT < ET, respectively), and this triggers the implication of an indirect information source. A direct information source is only possible when the learning time overlaps with the event time (LT = ET), which occurs in present tense evidential sentences. According to this view, information source is not semantically encoded but is rather *pragmatically implied* from the temporal structure of the sentence. Evidentiality is a by-product of temporality.

The temporal account can easily account for the initially puzzling fact that evidential sentences are felicitous in late realization scenarios. This is because in such scenarios the event time precedes the learning time and thus the use of (past tense) evidential sentences is predicted to be possible. In this respect, the temporal account has a clear advantage over the traditional account, which cannot easily accommodate late realization scenarios, as already discussed in Section 2.

However, there are problems. The temporal account works well in past and future tense sentences yet it makes no predictions about information source in *present* tense evidential sentences.

¹⁴See Iatridou (2000) for an explanation of the robust crosslinguistic generalization that past tense morphemes can contribute counterfactuality.

In such sentences the learning time overlaps with the event time and a direct information source is in principle possible. This prediction is problematic in view of the fact that present tense evidential sentences are generally not compatible with a direct information source. In (27), for example, the learning time overlaps with an ongoing event and the sentence is marked by the present tense. In spite of that, this sentence cannot be used in the direct evidence context specified below.¹⁵

(27) *You go on the porch and see the rain.*

#V moment-a navûn valja-Ø_{PRES}-I-o.
in moment-DEF outside rain-PRES-EV-NEUT

“It is raining outside right now.” (attempted)

Temporal structure: ET = LT = ST

The same problem arises in sentences about the past. In (28), the learning time overlaps with a past event time and the sentence is marked by the present tense. Still, this sentence is ruled out in the context given, apparently due to the direct nature of the available evidence.

(28) *You attended a party last night. Today, you tell your friend what happened there.*

#Na parti-to snošti Martin svir-e-I na kitara.
at party-DEF last.night Martin play-PRES-EV on guitar

“At the party last night Martin played the guitar.” (attempted)

Temporal structure: ET = LT < ST

One might ask whether it is not possible to regard the implication of indirect evidence associated with the evidential sentences as pragmatically derived. For example, what about the idea that the Bulgarian evidential marker introduces a learning time, and this fact *by itself* implicates an indirect information source? However, this pragmatic story is not crosslinguistically plausible for the following reason. While Bulgarian evidential sentences typically require an indirect information source, other languages whose evidential systems have been analyzed along similar lines differ in interesting but important ways. Similarly to Bulgarian, Korean sentences marked by the evidential *-te* require an indirect information source in past or future tense sentences (29a)-(29b). However, unlike in Bulgarian, present tense evidential sentences in Korean are only compatible with a *direct* evidential source (29c) (see Chung 2007; Lim 2010; Lee 2013).

(29) a. *Yenghi saw yesterday that the ground was wet. Now, she says:*

Pi-ka o-ass-te-la.
rain-NOM fall-PAST-TE-DECL

“[I inferred (from the acquired sensory evidence) that] it had rained.”

b. *Yenghi saw the overcast sky yesterday. Now, she says:*

Pi-ka o-kyess-te-la.
rain-NOM fall-FUT-TE-DECL

¹⁵The sentence becomes felicitous if it is marked by exclamatory intonation and the speaker intends to express surprise (a mirative use).

“[I inferred (from the acquired sensory evidence) that] it would rain.”

- c. *Yenghi saw it raining yesterday. Now, she says:*

Pi-ka o-Ø-te-la.
rain-NOM fall-PRES-TE-DECL

“[I made a sensory observation that] it was raining.” (Lee 2013: 2)

Whatever pragmatic explanation is invoked to explain why present tense evidential sentences in Bulgarian require indirect evidence, it is expected to hold across languages with similar evidential systems. But it is unlikely that this explanation would extend to present tense evidential sentences in Korean, which happen to require direct contexts. In Section 4, I will demonstrate that the proposal I make for Bulgarian can be minimally modified to capture the Korean data.

We see that the temporal account makes no specific predictions about evidence type in present tense sentences. It does not explain why present tense evidential sentences in Bulgarian are restricted to indirect contexts and how the contrast to the Korean data arises. What seems to be missing is the possibility to refer to the *spatial* location, not only the temporal location of the learning event. Making reference to both the temporal and spatial location of the learning event could integrate the insights of both the temporal account (by introducing a learning event that serves as anchor for tenses in evidential sentences) and the traditional account (by encoding the spatiotemporal distance between the learning event and the described event).

3.4 Summary

I have argued that while the temporal account is an improvement over the traditional account by e.g. accounting for late realization scenarios, it makes no specific predictions about information source in present tense evidential sentences. I have suggested that paying attention to the location, in addition to the timing of the learning event, may solve the main challenge for the temporal account.

In closing, I would like to make two additional remarks. The first is that it might be unfair to criticize the temporal account on grounds of missing predictions about evidence type in present tense sentences. This is because Lee (2013) and Smirnova (2013) adopt Izvorski’s (1997) claim that the core proposition of evidential sentences carries modal force and as such might not be compatible with direct evidence.¹⁶ Since I will argue in Section 5 against a modal view of the Bulgarian evidential, I will not further investigate how modality could be integrated into the temporal account in order to overcome its main weakness.

Relatedly, one might wonder whether other versions of the temporal account fall prey to the same objections. Koev (2011), for example, treats the Bulgarian evidential as a secondary past tense marker which requires that (roughly) the event time precedes the learning time. This version of the temporal account can explain the infelicity of (27)-(28): the presence of the evidential in these examples requires that the event time and the learning time are disjoint. However, if the evidential marker is simply a past tense anchored to the learning time, it is less clear why it can occur in sentences about ongoing events or sentences about the future, in which the event time does not precede the learning time. This version of the temporal account cannot explain the whole range of the data either, at least not without introducing further complications.

¹⁶This could explain the Bulgarian data but it seems to go against the Korean data in (29c).

4 The proposal in brief: evidentiality as a spatiotemporal distance

This section presents a brief sketch of my own proposal for the meaning of the Bulgarian evidential. It builds on the temporal accounts of Lee (2013) and Smirnova (2013) but modifies these along the lines of Faller (2004) by incorporating a spatial component. The full-blown proposal has a few more parts to it, due to the special semantic/pragmatic status of the evidential implication, discussed in Section 6. It is formalized in Section 7.

I borrow from the temporal account the idea that tense in evidential sentences is relative and anchors the event time not to the speech time but rather to the learning time, i.e. the time at which the speaker acquires the relevant evidence. Thus, in past tense sentences the described event precedes the learning event, in present tense sentences it is cotemporal with it, and in future tense sentences it follows it. At the same time, I follow the traditional account in assuming that the evidential marker encodes some notion of a *spatiotemporal distance* between the learning event and the described event. Putting those two ideas together, I view the Bulgarian evidential marker as introducing a non-future learning event and stating that this event is spatiotemporally distant from the described event. We arrive at the following spatiotemporal restrictions in evidential sentences, where DE/LE/SE abbreviate the described event/learning event/speech event and Δ abbreviates the relation of a spatiotemporal distance.¹⁷

	Tense	EV
Past sentences	DE < LE	LE \leq SE, LE Δ DE
Present sentences	LE = DE	LE \leq SE, LE Δ DE
Future sentences	LE < DE	LE \leq SE, LE Δ DE

Table 3: Spatiotemporal relations in evidential sentences

The relation of a spatiotemporal distance that holds between two events is interpreted in Bulgarian as follows.

(30) *Spatiotemporal distance (Bulgarian)*

$e_1\Delta e_2$ if and only if the time of e_1 is disjoint from the time of e_2 or the location of e_1 is disjoint from the location of e_2 .

The utterer of a Bulgarian evidential sentence could have learned the described proposition at the location of the described event but at a different time, at the time of the event but at a different location, or at both a different time and different location. This accounts for the rough intuition that Bulgarian evidential sentences convey indirect evidence. The only option that is ruled out is that the learning event and the described event occur at the same time and location. This is why the utterances in (27)-(28) above are infelicitous: in them, the learning event and the described event coincide in both temporal and spatial dimensions.

Since such examples involve a direct source, one might wonder whether the use of an evidential sentence is still excluded if the presented information is obtained at the time and location of the action but from a secondary source. One such case are “blindfolding scenarios” as in (31), which

¹⁷The symbol Δ is reminiscent of the capital Greek letter delta and is meant as a mnemonic for “distance”.

are predicted to not be compatible with evidential sentences. And indeed, evidential sentences cannot be naturally used in such scenarios.

- (31) *You are at a party where a strange game is played. Part of the game requires that each guest is blindfolded for a short while during which time a narrator describes to them what is going on. It's your turn now and your eyes have been covered. The narrator tells you that Ivan stripped off his clothes and started dancing. On the next day, you say:*

?Včera Ivan tancuva- \emptyset _{PRES}-I gol.
yesterday Ivan dance-PRES-EV naked

“Yesterday Ivan danced naked, as I learned at a different time or location.” (attempted)

Notice that blindfolding scenarios are, in some sense, the mirror image of late realization scenarios. In late realization scenarios, the speaker witnesses the described event but the use of an evidential sentence is possible. In blindfolding scenarios, the speaker only has indirect evidence but the use of an evidential sentence is not natural. While the current proposal can easily explain this pattern by considering the spatiotemporal location of the learning event, the exact reverse pattern is predicted under the traditional view of indirect evidentiality as marking non-witnessed events. Thus, blindfolding scenarios provide additional evidence against the traditional view of evidentiality.¹⁸

Since the spatiotemporal account does not directly encode “evidence type”, it preserves the main tenet of the temporal account, which is to derive evidential implications from the relationship between the learning event and the described event. As already discussed, spatiotemporal proximity vs. distance between the described and the learning events does not directly translate into the presence of direct vs. indirect evidence (respectively): in late realization scenarios the speaker can use an evidential sentence and but has direct evidence while in blindfolding scenarios the speaker cannot naturally use an evidential sentence even though she has indirect evidence. The terms “direct” vs. “indirect” evidence are at best convenient descriptions of the actual meaning of the Bulgarian evidential, which encodes the relative distance between the learning event and the described event. This is the sense in which these terms will be used in the rest of the paper. The spatiotemporal account does not lead us to expect that the distribution of the Bulgarian evidential is sensitive to information source. However, as an anonymous reviewer points out, it is well-known that the Bulgarian evidential cannot express inferences based on reasoning alone (see Izvorski 1997; Smirnova 2013). Interestingly, this is possible for indirect evidential markers in other languages, e.g. *k’a* in St’át’imcets (see Matthewson et al. 2007). Why would that be? I suggest that this contrast has to do with the speaker’s degree of certainty towards the core proposition and the type of evidential marker we are dealing with. The Bulgarian indirect evidential has a non-modal semantics and as such it is not compatible with a lowered degree of certainty towards the core proposition, which would typically arise if external evidence is lacking.¹⁹ In contrast, Matthewson et al. (2007) argue that *k’a* is an epistemic modal and as such it is expected to be compatible with a lowered degree of

¹⁸An anonymous reviewer notices that (31) is felicitous if the sentence is modified by *dokato bjax sús zavûrzani očî* “while I was blindfolded”. The same reviewer suggests that this judgment would follow from the spatiotemporal account if one assumes that adding this modifier removes, in some abstract sense, the learning event from the spatial location of the described event. Another reviewer claims that (31) also improves if the narrator is allowed to occasionally provide incorrect information. However, an informant comments that if incorrect information is allowed, the speaker would not have sufficient grounds for asserting the sentence.

¹⁹See Section 5 for a careful discussion of the strength of the core proposition in evidential sentences.

certainty towards the core proposition. Thus, while the spatiotemporal account imposes no explicit restrictions on information source, it might indirectly exclude sources that do not provide sufficient grounds for making an assertion.

I conclude this section with a remark about the way the notion of spatiotemporal distance was defined. Given the disjunctive nature of (30), one might wonder whether a simpler statement of the spatiotemporal distance requirement is not possible. For example, one might instead require that the learning *situation* is not part of the described situation and thus forego talking about spatial or temporal dimensions of events.²⁰ While using situations might work for Bulgarian and would lead to a theoretically simpler account, it will not do justice to the larger crosslinguistic picture, which necessitates reference to the temporal and spatial dimensions of the learning and the described event. Recall from Section 3.3 that evidential sentences in Korean impose similar restrictions as in Bulgarian, except in present tense sentences, which require direct evidence. This means that in Korean, the relation of spatiotemporal distance is spelled out differently. In this language, LE Δ DE requires that when the times of LE and DE coincide, their locations coincide too, and otherwise there are no spatial restrictions on the two events. The former case explains why present tense evidential sentences in Korean require a direct information source: in this case the learning event and the described event share the same time and location. The latter case accounts for the intuition that past or future tense evidential sentences in Korean imply an indirect information source: this is because the learning event is temporally disjoint from the described event. Evidential systems in other languages may yet spell out the notion of a spatiotemporal distance differently. We see that this notion not only accounts for the meaning of the Bulgarian evidential but also provides the flexibility needed to capture attested variation, thus recommending the spatiotemporal analysis for its crosslinguistic relevance.

5 The strength of the scope proposition

The discussion has so far focused on the *meaning* of the Bulgarian evidential marker. However, evidential sentences are fairly complex in that they express two different propositions: a main proposition associated with the non-evidential part of the sentence, and a secondary proposition carrying the evidential information. This brings up the question of the semantic/pragmatic status of those propositions and the way they interact with each other. In this section, I argue that the speaker is typically committed to the main proposition. The discourse status and projection properties of the secondary proposition are the topic of Section 6.

5.1 Evidentiality and modality

The sentence below expresses two propositions. The core meaning of the sentence is that Ivan kissed Maria and the secondary implication is that the speaker learned that at a different time or location.²¹

²⁰This is indeed the main idea behind the accounts in Nikolaeva (1999), Speas (2010), and Kalsang et al. (2013).

²¹In this and the following section, I will mark covert past or present tense in evidential sentences only when relevant. Also, I will often take the freedom of translating and describing evidential sentences in the more traditional terms of evidence type if this helps the intuitive understanding.

- (32) Ivan celuna-I Maria.
Ivan kiss-EV Maria

“Ivan kissed Maria, as I learned at a different time or location.”

Scope proposition: $p =$ Ivan kissed Maria.

Evidential proposition: The speaker learned p at a different time or location.

I call this latter proposition the *evidential proposition* (typically rendered by a parenthetical expression in the English translation) and refer to the former as the *scope proposition* (since, intuitively, it is in the scope of the evidential marker).²²

While there is a general consensus in the literature that the utterer of an evidential sentence is fully committed to the evidential proposition, there is virtually no consensus about the degree to which the speaker is committed to the scope proposition. Evidential markers across languages have been claimed to imply no degree of commitment to the scope proposition (e.g. in sentences marked with the reportative evidential *-si* in Cuzco Quechua; see Faller 2002), some level of commitment (see Mathewson et al. 2007 for the claim that the inferential evidential *k'a* in St'át'imcets allows for varying degrees of strength of the scope proposition), or full commitment (see e.g. Garrett 2001, according to whom Tibetan speakers are fully committed to the scope of the indirect evidential *-red*). The alleged weakening effect of evidential markers on the scope proposition is often explained by the claim that evidentials are modal markers. In a seminal paper, Izvorski (1997) analyzed the Bulgarian evidential marker as (roughly) an epistemic modal with a universal force, thus rendering a sentence of the form $EV(p)$ similar in meaning to $must(p)$.²³ Izvorski's analysis is challenged in Sauerland & Schenner (2007) and Koev (2011), who argue that Bulgarian evidential sentences flat-out entail their non-evidential component. The two opposing views are schematically represented below.

- (33) a. *Modal view:* $\llbracket EV(p) \rrbracket = \langle \mathbf{must}(\llbracket p \rrbracket), \mathbf{has.ind.evid.for}(sp, \llbracket p \rrbracket) \rangle$
 b. *Non-modal view:* $\llbracket EV(p) \rrbracket = \langle \llbracket p \rrbracket, \mathbf{has.ind.evid.for}(sp, \llbracket p \rrbracket) \rangle$

As can be seen, the modal and the non-modal view differ only with respect to the scope proposition. On both views, the evidential implication is that the speaker has indirect evidence for the scope proposition (this can be explicated differently on different accounts). However, according to the modal view the scope proposition has modal force while according to the non-modal view it is entailed in an unmodified form. The same divergence of opinion exists about languages other than Bulgarian and often modal vs. non-modal accounts are proposed for the very same evidential marker.²⁴ Apparently, when it comes to how strong the scope proposition is, opinions differ and thus a careful reexamination of the data is needed. Although I will focus on the Bulgarian data, the discussion has implications for evidential markers in other languages, where similar arguments can be or have been put forward.

²²I borrow the term “scope proposition” from Murray (2010; 2014).

²³See Mathewson et al. (2007), McCready & Ogata (2007), Faller (2011), and Lee (2013) for modal accounts of evidential markers in St'át'imcets, Japanese, Cuzco Quechua, and Korean (respectively).

²⁴Lee (2013), for example, analyzes the Korean evidential *-te* as introducing a modal component while Chung (2007), Lim (2010), Lim & Lee (2012) give the same marker an extensional analysis. Also, Faller (2002) claims that the Quechua evidential *-si* is a modally-neutral illocutionary modifier while Faller (2011) offers a modal account for the same marker.

I will side with the non-modal view and argue that Bulgarian evidential sentences commit their utterer to the plain scope proposition. I will proceed in a roundabout way, i.e. by demonstrating that the alleged arguments in favor of the alleged modal nature of the Bulgarian evidential do not stand up to closer scrutiny. This does not mean that the speaker’s commitment to the scope proposition can *never* be weakened, though. What I will try to show is that when such weakening occurs, it does not turn on the presence of the evidential marker but is rather due to pragmatic factors.

5.2 Reexamining the case for modality

In this section, I discuss three arguments that have been put forward in support of the view that Bulgarian evidential sentences have modal force. These involve intuitions about the strength of the scope proposition, the possibility that the speaker disbelieves the scope proposition, and modal subordination effects. I argue that none of these arguments is conclusive. What is more, I will show that the data often argues against a modal account of the Bulgarian evidential.

The first and most basic argument for the modal account involves intuitions about plain evidential sentences. Although in most contexts the utterer of (34) would be understood as signaling commitment to the proposition that Todor has red hair, informants remark that the presence of the evidential marker may have a weakening effect on that commitment (see also Izvorski 1997).

- (34) Todor ima-**I** červen-a kosa.
 Todor have-**EV** red-FEM hair
 “Todor has red hair, as I learned at a different time or location.”

However, it is not clear whether informants are attending to semantic or pragmatic cues when reporting such intuitions. If the latter, one would expect that the weakening effect is lost when the evidential sentence is syntactically embedded. Sauerland & Schenner (2007) already point out that when embedded under an attitude verb, the alleged weakening effect of the Bulgarian evidential disappears. For example, the embedding verb in (35) takes as its complement the plain proposition that Todor has red hair, not the modal proposition that Todor has red hair in some further restricted set of worlds. The sentence would be translated into English as in (35a) and not as in (35b).²⁵

- (35) Maria kaza- \emptyset _{PAST}, če Todor ima-**I** červen-a kosa.
 Maria say-PAST that Todor have-**EV** red-FEM hair
 a. ✓ “Maria said that Todor has red hair.”
 b. ✗ “Maria said that Todor must have red hair.” (Sauerland & Schenner 2007)

We see that while intuitions about the strength of the scope proposition differ in main clauses, this variability is absent in embedded environments. This finding suggests that the source of the potential weakening effect is due to the way (unembedded) evidential sentences are used in discourse. Later in this section, I will provide further evidence for this suggestion.

²⁵Sauerland & Schenner’s argument only goes through if the Bulgarian evidential qua epistemic modal contributes to the truth-conditional content of the sentence. The assumption that epistemic modals contribute to the truth conditions is fairly uncontroversial in the semantics literature (see e.g. Papafragou 2006; Anand & Hacquard 2013). Notice also that this argument does not require that English *must* has the exact same meaning as the modal meaning assumed for the Bulgarian evidential. The general point is simply that – notwithstanding the predictions of the modal view – the embedded clause does not contain an additional layer of modality.

A second and related point concerns the fact that speakers can weaken and sometimes even deny their commitment to the scope proposition (cf. Izvorski 1997; Smirnova 2013). Here again, it is critical to establish that a weakened commitment to the scope proposition is indeed contingent on the presence of the evidential marker and not due to external factors. A Bulgarian speaker can employ various strategies to weaken the scope proposition of, say, (36), including embedding the sentence under an attitude predicate (37), using the dubitative mood, which marks both the auxiliary and the main verb with the evidential morpheme (38), or adding the modal adverbial like *už* “allegedly, supposedly” (39).

- (36) Ivan stana-**I** milioner.
Ivan become-**EV** millionaire
“Ivan became a millionaire.”
- (37) Ivan kaza- \emptyset _{PAST}, *če* stana-**I** milioner.
Ivan say-PAST that become-**EV** millionaire
“Ivan said that he (=Ivan) became a millionaire.”
- (38) Ivan bi-**I** stana-**I** milioner.
Ivan be-**EV** become-**EV** millionaire
“Allegedly, Ivan became a millionaire.”
- (39) Ivan **už** stana-**I** milioner.
Ivan **allegedly** become-**EV** millionaire
“Allegedly, Ivan became a millionaire.”

Due to the presence of additional grammatical complexity, none of these examples provides an argument for a weakened scope proposition in evidential sentences. These examples then do not advance nor do they disprove the view that the Bulgarian evidential weakens the scope proposition.

A potentially better piece of evidence for the alleged weakening effect of the Bulgarian evidential involves grammatically unmodified evidential sentences used in contexts in which the speaker disbelieves the scope proposition. In (40), the speaker is fully aware that her friend’s utterance is absurd but can nevertheless report it with a plain evidential sentence.

- (40) *You just came from a psychiatric clinic, where you visited your friend Eli. Eli was hospitalized because of severe hallucinations and other psychological problems. When your friend inquires about the things Eli told you, you say:*

Izvûnzemn-i-te í predloži-**I**-i rabota v kosmičesk-a laboratorija.
alien-PL-DEF her offer-**EV**-3PL job in space-FEM laboratory

“Aliens offered her a job in a space lab, I heard.” (Smirnova 2013: 482, slightly modified)

However, examples in which the speaker completely disbelieves the evidential scope are not good evidence for the presence of modality either. This is because modal sentences imply at least *some* degree of commitment to the prejacent or else the utterance is infelicitous, cf. e.g. *#It must/might be raining but it isn’t*. This might be the reason why in order to explain such non-committing uses of evidential sentences, Smirnova (2013) invokes a secondary perspective. The basic idea is that

in reportative contexts the modal base with respect to which the evidential scope is interpreted is not that of the speaker but rather that of the original reporter. According to this analysis, the speaker of (40) is committed to the proposition that Eli said that she was offered a job in a space lab, not the proposition that Eli was offered a job in a space lab. Smirnova’s analysis is undesirable for at least two reasons, though. First, it predicts that in reportative contexts *Navûn valjalo* ‘EV(it is raining outside)’ is roughly equivalent to *Njakož kaza, če navûn vali* ‘Someone said that it is raining outside’. This is because the core proposition is attributed to a modal base that is not that of the speaker. But this is problematic, since in most cases the first sentence would while the second sentence would not commit the speaker to the proposition that it is raining outside. Second, the crucial feature of Smirnova’s analysis is the availability of a secondary perspective, not the presence of modal force. Thus, if an additional perspective can be provided without also introducing modality into the sentence, a non-modal perspective-based account should be preferred on grounds of simplicity.

The important question is whether such non-committing uses of evidential sentences turn on the semantic import of the evidential morpheme or rather they can also arise in sentences without evidentials, including in languages that lack grammatical evidential marking. Indeed, similar data have already been discussed in the literature on appositives (see Amaral et al. 2007; Harris & Potts 2009; Koev 2013). While appositives are typically speaker-oriented (see e.g. Potts 2005), their semantic content can in certain cases be attributed to another agent. In (41), it is not the speaker but rather Joan who believes that the Feds are listening to her every word. Crucially, such non-committing readings extend to independent clauses, as demonstrated in (42).

- (41) Poor Joan seems to have grown crazier than ever. She now claims that her apartment was bugged by the Feds, [who are listening to her every word]_{Joan}. (Harris & Potts 2009)
- (42) Poor Joan seems to have grown crazier than ever. She now claims that her apartment was bugged by the Feds. [They are listening to her every word]_{Joan}.

From the availability of (42) one would certainly not conclude that English speakers are not committed to the proposition expressed by plain declarative sentences. Rather, one would seek to explain such examples as arising from a particular discourse set-up. Koev (2013), for example, analyzes such data as a case of a *perspective shift* to the speaker of a secondary speech context, here the context of Joan’s claiming that the Feds are listening to her every word. Since non-committing uses of evidential sentences arise in similar environments, they should be regarded in the same light. The example in (40) makes salient a previous speech context and thus the content expressed by the sentence can be attributed to its agent, i.e. Eli. Since perspective shift of full sentences can also arise in English, a language without grammaticalized evidentiality marking, the shifted reading in (40) need not depend on the evidential morpheme. At the same time, it is possible that the presence of the evidential morpheme facilitates such shift, especially in view of the fact that it reinforces the hearsay source. These ideas are used in Section 7.2 to develop an alternative, non-modal analysis of such data in terms of perspective shift.

One prediction of the perspective shift analysis is that non-committing evidential uses primarily arise in *reportative* environments. This is so because shifted sentences require that a secondary speech context is saliently present in previous discourse. Indeed, evidential sentences in inferential environments are infelicitous if the speaker disbelieves the scope proposition, as (43) shows (see also Lim & Lee 2012; Smirnova 2013).

- (43) *You spot your friend Dima walking three dogs on the street. You know these are not her dogs. Later you say:*

#Dima ima-I-a tri kuče-ta.
Dima have-EV-FEM three dog-DEF.PL

“One might think Dima owns three dogs.” (intended)

An anonymous reviewer cites the following related example with a non-committing use. In it, the speaker produces an evidential sentence to repeat a previous utterance and then goes on to voice her doubts.

- (44) Popita-x gi koga e pristigna-l. Pristigna-l po obed, ama ne mi se vjarva.
ask-PAST them when be.3SG arrive-EV arrive-EV at noon but not me REFL believe
“I asked them when he arrived. They said he arrived at noon, but I doubt it.”

This example is easy to explain if we assume that the evidential clause in the second sentence is shifted and thus can be doubted by the speaker. Again, parallel data can be found in languages like English.

- (45) *Upon hearing a politician boast that he did a lot of good things for his country.*
You did a lot of good things for the country. Sure. / Yeah, right.

Utterances that follow this pattern are important because they are sometimes presented as evidence for the non-committing nature of sentences with reportative evidentials in various languages (see Faller 2002; Murray 2010; 2014). For example, Faller (2002) states that the reportative evidential *-si* in Cuzco Quechua is modally neutral and does not require that the speaker believes or considers the scope proposition a possibility. She illustrates her claim with the sentence in (46), which refers to a previous claim and is structurally similar to the Bulgarian example in (44).

- (46) Pay-kuna-s ñoqa-man-qa qulqi-ta muntu-ntin-pi saqiy-wa-n, mana-má riki
(s)he-PL-si I-illa-TOP money-ACC lot-INCL-LOC leave-1O-3 not-SURP right
riku-sqa-yki ni un sol-ta centavo-ta-pis saqi-sha-wa-n-chu.
see-PP-2 not one Sol-ACC cent-ACC-ADD leave-PROG-1O-3-NEG
“They left me a lot of money, but, as you have seen, they didn’t leave me one sol, not one cent.”
EV: “It is said / They said that they left me a lot of money.” (Faller 2002: 191)

It then remains to be seen whether such non-committing uses of evidential sentences in other languages can too be explained not in terms of the semantics of the given evidential marker but rather as due to a perspective shift.

The third and final argument for the modal account comes from modal subordination. Modal subordination is a phenomenon whereby a clause that is not in the syntactic scope of a preceding modal operator is interpreted as if it were (see Karttunen 1976; Roberts 1989; Frank 1996; Geurts 1999; Stone 1999; Asher & Pogodalla 2010; Brasoveanu 2010). One reflex of modal subordination is that modally subordinated clauses support anaphora back to an indefinite introduced in the scope of a modal operator. In (47), the anaphoric link between *a wolf* and *it* can be established if the appropriate mood is used in the second sentence so that it is subordinated to the possibility modal *might* found in the first sentence.

(47) A^x wolf might walk into the house. It_x would / #will eat you first.

Izvorski (1997) and Smirnova (2013) argue that evidential sentences in Bulgarian trigger modal subordination effects and that this follows from the modal flavor of the evidential marker.²⁶ For example, the anaphoric link in (48) cannot be established, apparently due to the fact that the second sentence is not marked by an evidential and thus cannot be modally subordinated to the first sentence.

(48) *You just came home and discovered that your house has been broken into. Besides your laptop, a tray of baklava is missing. There are baklava crumbs all over the floor. You inferred that the thief [was hungry and] ate the baklava. Later you tell Maria:*

Vkûšti vlezna-I kradecⁱ. #Toj_i be-še gladen.
in.house enter-EV thief he be-PAST hungry

Intended: “A thief broke into the house, as I inferred. He was hungry.” (Smirnova 2013: 506, slightly modified)

However, (48) might be bad for independent reasons, e.g. because the entire discourse is inferred while only the first sentence is flagged with an evidential. The existence of infelicitous examples involving anaphora between an evidential and a non-evidential sentence does not establish that such anaphora is in principle impossible. In fact, there are good instances of anaphora across evidential sentences, as in (49)-(50). In those examples, the speaker has direct evidence for the proposition expressed by the second sentence and the issue with (48) does not arise.

(49) *You arrive home and find a cake on the table. You infer that your roommate Ivan made it. Later you say:*

Ivan napravi-I torta^x. pro_x be-še ostaven-a na masa-ta v kuxnja-ta.
Ivan make-EV cake pro be-PAST left-FEM on table-DEF in kitchen-DEF

“Ivan made a cake. It was left on the kitchen table.”

(50) *Ivan introduced to you his new girlfriend at the party last night.*

Ivan ima-I nov-a prijatel-ka^x. pro be-še s neja_x na parti-to.
Ivan have-EV new-FEM friend-FEM pro be-PAST with her at party-DEF

“Ivan has a new girlfriend. He was with her at the party.”

These data suggest that modal subordination does not provide strong evidence for the claim that the Bulgarian evidential is a modal operator. The formal account developed in Section 7 thus drops the claim that the scope proposition of evidential sentences has modal force.

²⁶See also McCready & Ogata (2007) and Lee (2013) for apparent modal subordination effects triggered by evidential markers in Japanese and Korean.

5.3 Conclusion

In this section, we found that the evidence for the claim that the Bulgarian evidential is an epistemic modal and has a weakening effect on the scope proposition is inconclusive. This is in line with the extensional view defended in this paper, according to which the Bulgarian evidential marks the spatiotemporal distance between the learning event and the described event. Needless to say, the question of whether the Bulgarian evidential system introduces modality is far from settled. What I have demonstrated, though, is that one can explain the same set of data without invoking modality.

The above discussion raises the more general question of the relationship between epistemic modality and evidentiality. I agree with de Haan (1999), Fitneva (2001), Faller (2002), and von Fintel & Gillies (2010) that epistemic modality and evidentiality are two related but distinct grammatical categories. Epistemic modality expresses the *degree of certainty* towards a proposition and modals typically weaken the scope proposition (see e.g. Karttunen 1972; Kratzer 1991; but see von Fintel & Gillies 2010). It is then expected that epistemic modals naturally trigger indirect evidence inferences: since the speaker made a modal, i.e. weaker statement, she could only have indirect evidence for her claim. Evidentiality, on the other hand, implies *information source* and as such does not require a lowered degree of certainty. For example, the utterer of $EV(p)$ could simply be asserting p while also signaling that she acquired the relevant information at a different time or location, thus implying that she has indirect evidence for p . The fact that the scope proposition is not weakened could be explained in terms of information packaging: if the evidential implication is secondary, then what is asserted is the unmodified scope proposition. This is exactly what I will argue in the next section.

6 The evidential proposition

In the previous section, we discussed the scope proposition and its strength. In this section, I focus on the semantic/pragmatic properties of the evidential implication, showing that it is informative not at issue content that projects past entailment-canceling operators.

6.1 Discourse status

Although Bulgarian evidential sentences express two propositions, only the proposition described by the non-evidential part of the sentence (the scope proposition) is *at issue* or the main point of the utterance. The evidential proposition is not at issue or encodes information that is secondary to what the utterance is primarily about. The distinction between at-issue vs. not-at-issue content has lately received a considerable amount of attention in the semantics literature and has been discussed in relation to various empirical phenomena, including presupposition, apposition, and evidentiality (see Potts 2005; Murray 2010; 2014; Simons et al. 2010; AnderBois et al. 2013; Koev 2013).

One standard test for diagnosing at-issueness relies on the fact that only at-issue content can be felicitously targeted by direct responses (see Strawson 1950; Shanon 1976; Lyons 1977; Karttunen & Peters 1979; Chierchia & McConnell-Ginet 2000; Faller 2002; Papafragou 2006; Amaral et al. 2007; von Fintel & Gillies 2007; Matthewson et al. 2007; Murray 2010; 2014; Tonhauser 2012; AnderBois et al. 2013; Koev 2013; Syrett & Koev 2014). To illustrate, the speaker of (51) utters

an evidential sentence and the addressee can directly challenge the scope proposition but not the evidential proposition.

- (51) A: Ivan kupi-I nov-a kola.
Ivan buy-EV new-FEM car
Scope proposition: “Ivan bought a new car.”
Evidential proposition: “The speaker heard/inferred that Ivan bought a new car.”
- B: Tova ne e vjarno.
this not be.3SG true
✓ “It’s not true that Ivan bought a new car.”
✗ “It’s not true that the speaker heard/inferred that Ivan bought a new car.”

Notwithstanding their non-central discourse status, evidential implications are typically informative. Evidential sentences do not impose preconditions on the input context the way (most) presupposition triggers do. For example, (51A) could be uttered in a context in which it is not already known that the speaker heard or inferred something. The sentence could also be uttered in a context in which it is implied that the speaker heard something but it is not clear what. This second use of evidential sentences is illustrated in (52). After the first sentence is processed, the context does not encode any specific information about what exactly the speaker had heard from Ivan and thus the evidential implication (that the speaker heard that Ivan bought a new car) is still informative.

- (52) Govori-x s Ivan. Toj kupi-I nov-a kola.
talk-PAST with Ivan he buy-EV new-FEM car
“I talked to Ivan. (He told me that) he has bought a new car.”

In sum, the secondary discourse status of the evidential implication does not preclude the possibility that it introduces discourse-new information, just like the scope proposition does. In Section 7, I will analyze the evidential proposition not as presupposed but rather as informative content that is not at issue (cf. Pott’s 2005 use of the term “conventional implicature” for such meanings).

6.2 Projection properties

Not-at-issue implications are well known to *project*, i.e. they are preserved when their triggers are syntactically embedded under entailment-canceling operators such as negation, modals, or attitude verbs (see Potts 2005; Simons et al. 2010; AnderBois et al. 2013; Koev 2013). What about evidential meanings? While it is often noted that the evidential implication is immune to the presence of negation in the sentence, the projection properties of evidential implications have not received much attention in the literature (but see Faller 2002; Sauerland & Schenner 2007; Şener 2011; Tonhauser to appear). One reason for that might be that evidential markers are relatively difficult to syntactically embed, although this varies significantly across languages (see Aikhenvald 2004: §8.1–8.2). In this section, I show that although the distribution of the Bulgarian evidential in embedded environments is somewhat restricted, there is good evidence for the projective behavior of the evidential proposition.

The Bulgarian evidential marker can co-occur with negation (53) or modal verbs (54). In both cases, the operator is part of the evidential scope, as the English translations make clear.

- (53) Ivan **ne** bi-**I** vkûšti.
Ivan **not** be-**EV** home
“Ivan is not at home, as I heard/inferred.”
- (54) Dnes **može-I-o** da vali.
today **might-EV-NEUT** to rain
“It might rain today, as I heard/inferred.”

In addition, the evidential marker can occur quite naturally in embedded clauses under verbs of saying.²⁷

- (55) Petûr kaza- \emptyset _{PAST}, će na pazar-a prodava-**I-i** domat-i.
Peter say-PAST that at market-DEF sell-**EV-PL** tomato-PL
“Peter said that they sell tomatoes at the market.”
- (56) Učen-i-te trvûrdja-t, će na Mars ima-**I-o** voda.
scientist-PL-DEF claim-PRES that on Mars there.is-**EV-NEUT** water
“The scientists claim that there is water on Mars.”

Other than that, evidential embedding under operators gives mixed results. In conditional sentences, the evidential can occur in both the antecedent and the consequent, or in the consequent only. Either way, the interpretation is one in which the evidential takes the entire conditional sentence as its scope (57). What is prohibited is to only evidentially mark the antecedent (58).

- (57) Ako toj e / bi-**I** v Sofia, štja-**I** da se obadi.
if he be.3SG / be-**EV** in Sofia will-**EV** to REFL call
“If he is in Sofia, he will call, as I heard.”
- (58) *Ako toj bi-**I** v Sofia, šte se obadi.
if he be-**EV** in Sofia will REFL call

The distribution of the evidential under propositional attitude verbs is more nuanced. While it can be embedded under verbs of saying (recall (55)-(56)), embedding under other propositional predicates is not always possible. Embedding under factive verbs can be acceptable or degraded (59)-(60) while embedding under *believe*-type verbs is typically ruled out (61)-(62).²⁸

- (59) Marin **nauči**- \emptyset _{PAST}, će Vessela bi-**I-a** v London.
Marin **learn**-PAST that Vessela be-**EV-FEM** in London
“Marin learned that Vessela was in London.”
- (60) ?Petûr **sûžaljava**- \emptyset _{PRES}, će na pazar-a njama-**I-o** domat-i.
Peter **regret**-PRES that at market-DEF there.is.not-**EV-NEUT** tomato-PL
“Peter regrets that they don’t sell tomatoes on the market.” (attempted)

²⁷Here I ignore the import of the evidential in embedded clauses. This semantic role of embedded evidentials is discussed in more detail below.

²⁸These data are in line with the findings in Sauerland & Schenner (2007). A reviewer cites several apparently good examples of evidential embedding under factives or mental state verbs. This is consistent with the variability of judgment in (59)-(62).

- (61) ?Učen-i-te **vjarva-t**, če na Mars ima-I-o život.
 scientist-PL-DEF **believe**-PRES that on Mars there.is-EV-NEUT life
 “The scientists believe that there is life on Mars.” (attempted)
- (62) *Petyr **misli**-Ø_{PRES}, če na pazar-a prodava-I-i domat-i.
 Peter **think**-PRES that at market-DEF sell-EV-PL tomato-PL
 “Peter thinks that they sell tomatoes on the market.” (attempted)

It is possible that subordinating constructions impose idiosyncratic restrictions on evidential marking in the clauses they select. Rather than trying to account for these complex data, I will focus on the clear-cut cases of embedded evidentials under negation, modals, or verbs of saying and investigate whether in these cases the evidential implication projects.

We already saw in (53)-(54) that the evidential implication projects past negation or modals. Thus, the only question that remains is whether the evidential implication also projects past verbs of saying. I will argue that this is indeed so and that in such cases the evidential implication associated with the embedded clause is anchored to the speaker.

Sauerland & Schenner (2007) observe that when the evidence source of the speaker and the attitude holder do not match, the embedded evidential retains its speaker-orientation. In (63), an evidentially-marked embedded clause is ruled out because the speaker has direct evidence for the proposition expressed by that clause. The sentence is infelicitous despite the fact that the attitude holder has indirect evidence and as such provides a suitable perspective for the evidential to latch on to.

- (63) *Milena told Maria that Todor has red hair and Maria believes her. Maria says: “Todor imal červena kosa” [=EV(Todor has red hair)]. I saw Todor’s red hair with my own eyes.*

*Maria kaza-Ø_{PAST}, če Todor ima-I červen-a kosa.
 Maria say-PAST that Todor have-EV red-FEM hair

(Sauerland & Schenner 2007: 5)

Similarly, the utterer of (64) has direct evidence that her husband is a millionaire while the TV channel has indirect evidence. Even so, the use of an evidential sentence is degraded.²⁹

- (64) *The speaker knows that her husband is a millionaire. A TV channel learns about the husband’s financial status from a secondary source.*

?Po televizija-ta s̆obšti-x-a, če s̆prug-ût mi bi-I milioner.
 on television-DEF announce-PAST-3PL that husband-DEF my be-EV millionaire

“On TV they announced that my husband is a millionaire.” (attempted)

Interestingly, there seems to be some amount of crosslinguistic variation with regard to these data. In other languages that allow evidential embedding, the evidential implication can shift and take a non-speaker-orientation. This has been claimed e.g. for Tibetan (see Garrett 2001), Turkish

²⁹Notice that the utterer of (63)-(64) has both direct and indirect evidence for the embedded proposition and yet the use of an evidential sentence is not felicitous. The same is true for main clauses. Faller (2012) offers a Gricean explanation for why in such “double-source” contexts sentences with indirect evidentials are not felicitous.

(see Şener 2011), and Korean (see Lee 2013). In the Turkish example in (65), the utterer has direct evidence while the reported speaker has indirect evidence. The embedded clause can be marked by the direct evidential *-DI* or the indirect evidential *-mİş*, thus suggesting that evidential markers in Turkish can take the perspective of the speaker or that of another agent.

(65) *Berna told Seda that Ayşe has red hair and Seda believes her. Seda says: “Ayşe has red hair”. I (speaker) saw Ayşe’s red hair with my own eyes.*

Seda Ayşe’nin saç-ı kızıl-dı / kızıl-mış de-di.
 Seda Ayşe-GEN hair-POSS red-DIR.EV / red-INDIR.EV say-PAST-DIR.EV

[“Seda said that Ayşe has red hair.”] (Şener 2011: 93)

Such data are in contrast to Bulgarian, where the evidential implication seems to be anchored to the utterer of the sentence.

We see that the evidential implication is not modified by the presence of negation or modals in the sentence. In addition, when the evidential is embedded under a verb of saying, the evidential implication seems to retain its speaker-orientation, at least in Bulgarian. While these findings do not explain the restricted possibilities for the occurrence of the evidential in embedded constructions, they do show that when syntactic embedding is allowed, the evidential implication projects. We then need an analysis which renders the evidential contribution “invisible” to propositional operators. In Section 7, I will derive evidential projection by flagging semantic content with propositional variables and making operators sensitive to those variables.

6.3 Summary

In this section, we found that while the evidential proposition is informative, it is not at issue or is secondary to the main point of the sentence, which is expressed by the scope proposition. In addition, we uncovered a fairly complex pattern of the occurrence of the Bulgarian evidential in embedded environments: possible under negation, modals, or verbs of saying, harder or impossible in conditional antecedents or under other attitude predicates. Importantly, we saw that when the evidential can syntactically co-occur with an operator, the evidential implication projects. These findings support the view that evidential implications pertain to the larger class of Pott’s (2005) “conventional implicatures”, i.e. secondary entailments that project.

7 Formal account

Let us take stock of the empirical properties of evidential sentences in Bulgarian that need to be captured by the formal proposal. Our main findings are listed below.

- (66) i. The Bulgarian evidential has a spatiotemporal meaning. It introduces a non-future learning event and requires that it is spatiotemporally distant from the event described by the sentence (see Section 4).
- ii. Evidential sentences typically commit their utterer to the scope proposition (see Section 5).

- iii. If a secondary speech context is saliently present in the discourse, the scope proposition can undergo perspective shift and be attributed to another agent (see Section 5.2).
- iv. The evidential proposition is not at issue yet it is informative (see Section 6.1).
- v. If the evidential marker can co-occur with an entailment-canceling operator, the evidential implication projects (see Section 6.2).

In this section, I present a formal account that captures all of the above mentioned properties of Bulgarian evidential sentences. Some of these properties – e.g. the possibility that the scope proposition undergoes perspective shift (66iii) or the not-at-issue discourse status of the evidential proposition (66iv) – describe discourse-level interactions of evidential sentences and thus necessitate a dynamic semantics. To this end, I introduce an update semantics in which sentences express functions from input information states to output information states (see e.g. Heim 1982; Veltman 1996; Beaver 2001; Bittner 2011; Koev 2013).

7.1 An update semantics

I assume basic types for individuals (δ), events (ε), times (τ), locations (λ), possible worlds (ω), assignment functions (s), and truth values (t). Important complex types include types for propositions (ωt , i.e. sets of possible worlds), types for information states (st , i.e. sets of assignment functions), and types for updates ($(st)st$, i.e. functions from information states to information states). I also make use of a complex type for speech contexts, which are quadruples consisting of one individual (the speaker), two propositions (the discourse commitments of the speaker and the context set), and a time (the speech time). For example, the speech context $c = \langle \text{sp}_c, \text{dc}_c^{\text{sp}}, \text{cs}_c, \text{t}_c \rangle$ is of type $\delta \times (\omega t) \times (\omega t) \times \tau$.³⁰

Models consist of non-empty and pairwise disjoint sets of model-theoretic objects of the basic types listed above and the basic interpretation function I . Higher-order domains for objects of complex types are recursively built from these sets. The basic interpretation function I and assignment functions (g, h, \dots) respect typing, i.e. they assign to a term of some type a model-theoretic object of the same type. Information states (σ, σ', \dots) are sets of assignment functions.

The interpretation function $\llbracket \cdot \rrbracket$ is recursively defined on three kinds of terms: primitive terms, functional terms, and dynamic terms. Primitive terms are variables or constants of any type and are interpreted in the usual way. That is, for a primitive term α , an assignment function g , and an information state σ , $\llbracket \alpha \rrbracket^g$ is $g(\alpha)$ if α is a variable, and $\llbracket \alpha \rrbracket^g$ is $I(\alpha)$ if α is a constant.³¹

Functional terms involve a function operating on a term and can be of individual, propositional, temporal, or locational type. The interpretation rules for functional terms are listed below.

(67) *Functional terms*

(where c is a speech context term; e is an event term; and p is a propositional term)

- a. $\llbracket \text{sp}(c) \rrbracket^g = \text{proj}_1(\llbracket c \rrbracket^g)$,
- $\llbracket \text{dc}^{\text{sp}}(c) \rrbracket^g = \text{proj}_2(\llbracket c \rrbracket^g)$,

³⁰Other speech context coordinates, such as the location of c or the world of c , can easily be added but are not essential for our purposes.

³¹I take the freedom of superscripting $\llbracket \cdot \rrbracket$ with a different number of parameters depending on what is really needed in the particular environment.

- $$\begin{aligned} \llbracket \mathbf{cs}(c) \rrbracket^g &= \text{proj}_3(\llbracket c \rrbracket^g), \\ \llbracket \mathbf{time}(c) \rrbracket^g &= \text{proj}_4(\llbracket c \rrbracket^g) \\ \text{b. } \llbracket \boldsymbol{\tau}(e) \rrbracket^g &= \text{the time of } \llbracket e \rrbracket^g, \\ \llbracket \boldsymbol{\lambda}(e) \rrbracket^g &= \text{the location of } \llbracket e \rrbracket^g \\ \text{c. } \llbracket \mathbf{max}(p) \rrbracket^\sigma &= \{w \mid \text{for some } g \in \sigma : w \in \llbracket p \rrbracket^{g,\sigma}\} \end{aligned}$$

The terms in (67a) take a speech context and select one of its coordinates via projection functions. For example, $\mathbf{sp}(c)$ stands for the first coordinate or the speaker of the context denoted by c , $\mathbf{dc}^{\text{SP}}(c)$ stands for the second coordinate or the discourse commitments of the speaker of the context denoted by c , etc. The terms in (67b) take an event and refer to its temporal or spatial parameters, respectively. Finally, the term in (67c) refers to the maximal value of a propositional term across the given information state. For example, if $\sigma = \{g_1, g_2, g_3\}$ and p is a propositional variable such that $g_1(p) = \{\}$, $g_2(p) = \{w_1\}$, $g_3(p) = \{w_2\}$, then $\llbracket \mathbf{max}(p) \rrbracket^\sigma = \{w_1, w_2\}$.³²

Dynamic terms modify information states: they produce an output information state from an input information state by manipulating (removing or adding) assignments. The interpretation rules for dynamic terms of different shapes are given below.

(68) *Dynamic terms*

(where p, p_1, p_2 are propositional terms; u_1, \dots, u_n are terms of any type; t_1, t_2 are temporal terms; e_1, e_2 are event terms; φ, ψ are dynamic terms; and x is a variable of any type)

- a. $\sigma \llbracket R_p(u_1, \dots, u_n) \rrbracket = \{g \in \sigma \mid \text{for all } w \in \llbracket p \rrbracket^{g,\sigma} : \langle w, \llbracket u_1 \rrbracket^{g,\sigma}, \dots, \llbracket u_n \rrbracket^{g,\sigma} \rangle \in \llbracket R \rrbracket^{g,\sigma}\}$
- b. $\sigma \llbracket u_1 = u_2 \rrbracket = \{g \in \sigma \mid \llbracket u_1 \rrbracket^{g,\sigma} = \llbracket u_2 \rrbracket^{g,\sigma}\}$
- c. $\sigma \llbracket t_1 < t_2 \rrbracket = \{g \in \sigma \mid \llbracket t_1 \rrbracket^{g,\sigma} \text{ temporally precedes } \llbracket t_2 \rrbracket^{g,\sigma}\},$
 $\sigma \llbracket t_1 \leq t_2 \rrbracket = \{g \in \sigma \mid \llbracket t_1 \rrbracket^{g,\sigma} \text{ temporally precedes or overlaps with } \llbracket t_2 \rrbracket^{g,\sigma}\}$
- d. $\sigma \llbracket p_1 \emptyset p_2 \rrbracket = \{g \in \sigma \mid \llbracket p_1 \rrbracket^{g,\sigma} \cap \llbracket p_2 \rrbracket^{g,\sigma} = \{\}\},$
 $\sigma \llbracket p_1 \subseteq p_2 \rrbracket = \{g \in \sigma \mid \llbracket p_1 \rrbracket^{g,\sigma} \subseteq \llbracket p_2 \rrbracket^{g,\sigma}\}$
- e. $\sigma \llbracket e_1 \Delta e_2 \rrbracket = \{g \in \sigma \mid \llbracket \boldsymbol{\tau}(e_1) \rrbracket^{g,\sigma} \neq \llbracket \boldsymbol{\tau}(e_2) \rrbracket^{g,\sigma} \text{ or } \llbracket \boldsymbol{\lambda}(e_1) \rrbracket^{g,\sigma} \neq \llbracket \boldsymbol{\lambda}(e_2) \rrbracket^{g,\sigma}\}$
- f. $\sigma \llbracket \varphi \wedge \psi \rrbracket = \sigma \llbracket \varphi \rrbracket \llbracket \psi \rrbracket$
- g. $\sigma \llbracket \exists x \rrbracket = \{h \mid \text{there is a } g \in \sigma \text{ s. t. for all variables } y : \text{if } y \neq x \text{ then } h(y) = g(y)\}$

The interpretation rule in (68a) says that updating the information state with a lexical condition of the form $R_p(u_1, \dots, u_n)$ only keeps assignments which verify that whatever entities u_1, \dots, u_n stand for are related in the way specified by R throughout the worlds denoted by p . The subscripted propositional variable can be intuitively thought of as collecting the worlds in which the given condition holds (see Stone 1999; Brasoveanu 2010; AnderBois et al. 2013; Koev 2013). This feature of the formal system enables us to keep the scope proposition and the evidential proposition separate and thus will be crucial in modeling the not-at-issue discourse status and projective nature of the evidential proposition. The interpretation rules in (68b)-(68e) express logical relations between two terms and remove assignments from the information state that do not verify those relations.³³ Of particular importance is the dynamic term $e_1 \Delta e_2$ in (68e), which expresses the condition that the events denoted by e_1 and e_2 are temporally or spatially disjoint and thus captures

³²Notice that while (67a)-(67b) depend on individual assignment functions, (67c) depends on entire information states. The σ superscript on $\llbracket \cdot \rrbracket$ is thus needed in order to state an interpretation rule for $\mathbf{max}(p)$.

³³I occasionally use the same relation symbol in the representation language and the metalanguage.

the key meaning of the Bulgarian evidential. The rule in (68f) is the standard rule for dynamic conjunction and states that updating with a conjunction amounts to the sequential update first with the left and then with the right conjunct. The rule in (68g) is the only one that can introduce new assignments into the information state. This rule assigns random values to the variable x by introducing assignments that differ from some existing assignment at most with respect to the value they assign to x .

We now have enough formal apparatus in place and can turn to modeling the meaning of Bulgarian evidential sentences.

7.2 The meaning of evidential sentences

I first discuss sentences without evidentials, as in (69). I assume that declarative sentences are headed by a force operator DECL (cf. Rizzi 1997; Cinque 1999; Krifka 2001). Such operators are anaphoric to speech contexts (typically, to the utterance context) and introduce a discourse referent that encodes the propositional content of the entire sentence. The logical representation for (69) is given in (70).

- (69) DECL _{k} ^{p} Ivan ^{x} celuna ^{e} - $\mathcal{D}_{\text{PAST}}$ Maria ^{y}
 DECL Ivan kiss-PAST Maria
 “Ivan kissed Maria.”

- (70) a. $\exists p \wedge$
 b. $\exists x \wedge x = ivan \wedge \exists y \wedge y = maria \wedge \exists e \wedge kiss_p(e, x, y) \wedge \tau(e) < \mathbf{time}(k) \wedge$
 c. $\mathbf{dc}^{\text{SP}}(k) \subseteq p$

In order to facilitate the mapping from surface strings to logical representations, in the surface string I mark the introduction of a discourse referent by a superscript and an anaphoric dependency to it by a subscript (cf. Barwise 1987). The sentence in (69) introduces four variables: a propositional variable p , an event variable e , and two individual variables x and y . The entire sentence is anaphorically dependent on k , which is a designated variable referring to the *context of utterance*. The logical representation of this sentence in (70) consists of three major parts: (70a) introduces a set of worlds, (70b) specifies that in each of those worlds there is a past event of Ivan kissing Maria, and (70c) requires that the speaker is publicly committed to any such worlds. Put simply, by uttering (69), the speaker commits herself to the proposition that Ivan kissed Maria. If that proposition is accepted by the addressee, the context set will be restricted by that proposition. This last move can be logically represented as $\mathbf{cs}(k) \subseteq p$.

Since k is a speech context variable, it can in principle be assigned values in which $\mathbf{dc}^{\text{SP}}(k)$ and $\mathbf{cs}(k)$ are non-maximal. In order to get to the full discourse commitment set of the speaker DC^{SP} and the full context set CS at a given information state σ , we need to refer to the maximized values of $\mathbf{dc}^{\text{SP}}(k)$ or $\mathbf{cs}(k)$, respectively. The definitions in (71) achieve exactly that.

- (71) *Speaker’s discourse commitments, Context set*
 a. $DC^{\text{SP}}(\sigma) := \llbracket \mathbf{max}(\mathbf{dc}^{\text{SP}}(k)) \rrbracket^\sigma$
 b. $CS(\sigma) := \llbracket \mathbf{max}(\mathbf{cs}(k)) \rrbracket^\sigma$

In felicitous discourses it will hold that for any information state σ , $DC^{SP}(\sigma) \subseteq CS(\sigma)$, i.e. the speaker is minimally committed to the context set, and potentially more.

In the logical translation in (70) above, the descriptive content of the sentence is expressed by (70b) while (70a) and (70c) describe the declarative force of the sentence. In order to keep those two layers separate, I introduce the abbreviation in (72).

(72) *Declarative operator*

(where p is a propositional variable, c is a speech context variable, and φ is a dynamic term in which p occurs free)

$$\mathbf{decl}_c^p(\varphi) := \exists p \wedge \varphi \wedge \mathbf{dc}^{\mathbf{SP}}(c) \subseteq p$$

This abbreviation allows us to write (70), the logical representation of (69), as follows.

$$(73) \quad \mathbf{decl}_k^p(\exists x \wedge x = \mathit{ivan} \wedge \exists y \wedge y = \mathit{maria} \wedge \exists e \wedge \mathit{kiss}_p(e, x, y) \wedge \boldsymbol{\tau}(e) < \mathbf{time}(k))$$

Let us now consider evidential sentences. In (74), the evidential morpheme introduces a non-future learning event (of the speaker acquiring the scope proposition) and states that it is spatiotemporally distant from the event described by the sentence. The part in the representation that is contributed by the evidential morpheme is underlined.

$$(74) \quad \text{a. } \mathbf{DECL}_k^p \text{ Ivan}^x \text{ celuna}_{p-\emptyset_{\text{PAST}}}^{e_l} \mathbf{I}_k^{e_l} \text{ Maria}^y$$

DECL Ivan kiss-PAST-EV Maria

“Ivan kissed Maria, as I learned at a different time or location.”

$$\text{b. } \mathbf{decl}_k^p(\exists x \wedge x = \mathit{ivan} \wedge \exists y \wedge y = \mathit{maria} \wedge \exists e \wedge \mathit{kiss}_p(e, x, y) \wedge \underline{\exists e_l \wedge \mathit{learn}_{\mathbf{cs}(k)}(e_l, \mathbf{sp}(k), p) \wedge \boldsymbol{\tau}(e_l) \leq \mathbf{time}(k) \wedge e \Delta e_l \wedge \boldsymbol{\tau}(e) < \boldsymbol{\tau}(e_l)})$$

The presence of the dynamic term $e \Delta e_l$ in the underlined portion of the representation captures the fact that evidential sentences in Bulgarian require that the described event and the learning event are spatiotemporally distant, i.e. their times or locations differ (recall (68e)). This accounts for the claimed spatiotemporal meaning of the Bulgarian evidential (see property (66i)). In addition, the declarative operator in (74) expresses a public commitment to the proposition that Ivan kissed Maria. This in turn accounts for the fact that the speaker is committed to the scope proposition, thus capturing property (66ii). The scope proposition will only be added to the context set if it is accepted by the addressee. This fact is what makes the scope proposition at issue.³⁴ In contrast, the proposition that the speaker learned the scope proposition at a given time and place is directly added to the context set. This is formally achieved by subscripting the *learn* predicate in (74b) not with p (the scope proposition variable) but rather with $\mathbf{cs}(k)$. This ensures that the evidential proposition restricts the context set by virtue of the fact that the sentence has been uttered and accounts for the intuition that the evidential proposition is informative yet it is not at issue, i.e. not up for discussion.³⁵ This part of the semantics captures property (66iv).

³⁴This two-stage process of introducing and accepting information is often taken to be the hallmark of assertions (see Stalnaker 1978; 1998; Groenendijk & Roelofsen 2009; Farkas & Bruce 2010; Murray 2010; 2014; AnderBois et al. 2013; Koev 2013).

³⁵Modeling not-at-issueness by directly adding information to the context set has previously been proposed for implications triggered by Cheyenne evidentials and English appositive relative clauses (see Murray 2010; 2014; AnderBois et al. 2013).

Sentences in which the scope proposition undergoes perspective shift minimally differ from non-shifted evidential sentences in that they refer to a secondary speech context (rather than the current context of utterance). In (75), the speaker repeats what her mentally challenged friend has said without believing it. In uttering this sentence, the speaker makes reference to this previous speech context, represented here as c , and attributes the scope proposition to the speaker of that secondary context. The declarative operator is now subscripted with c , not k , and the restriction it encodes is $\mathbf{dc}^{\text{SP}}(c) \subseteq p$, not $\mathbf{dc}^{\text{SP}}(k) \subseteq p$. There are thus no commitments entailed for the speaker.

- (75) a. DECL_c^p izvûnzemn-i-te^x predloži_p^e-Ø_{PAST}-I_k^{e_l}-i rabota^z na Eli^y
 DECL alien-PL-DEF offer-PAST-EV-3PL job to Eli
 “The aliens offered Eli a job (I heard it but I don’t believe it).”
- b. decl_c^p($\exists x \wedge x = \text{aliens} \wedge \exists y \wedge y = \text{eli} \wedge \exists z \wedge \text{job}_p(z) \wedge \exists e \wedge \text{offer}_p(e, x, y, z) \wedge \exists e_l \wedge \text{learn}_{\text{cs}(k)}(e_l, \mathbf{sp}(k), p) \wedge \tau(e_l) \leq \mathbf{time}(k) \wedge e \Delta e_l \wedge \tau(e) < \tau(e_l)$)

This analysis captures the possibility that scope propositions are shifted and explains why the speaker may not be committed to it, thus accounting for property (66iii). Even so, since the evidential part refers to the utterance context, the speaker remains committed to the evidential proposition. This is consistent with the intuitions about shifted sentences with evidentials, as discussed above.

The final property of evidential sentences that needs to be formally captured is that the evidential implication projects past propositional operators (recall property (66v)). The projection property turns on two major factors: the fact that the evidential contribution states a restriction directly on the context set and the way propositional operators interact with semantic content. The former fact was already discussed above and was the reason why *learn* predicates are subscripted with $\text{cs}(k)$ (see (74b), (75b)). With respect to the latter, I follow Stone (1999) and Stone & Hardt (1999) in assuming that propositional operators express a relationship between propositions (see also Brasoveanu 2010; AnderBois et al. 2013; Koev 2013). For example, negation states that the proposition expressed by the negated sentence is disjoint from the proposition expressed by the scope proposition: *Ivan didn’t kiss Maria* says that the worlds denoted by the negated sentence are disjoint from the worlds in which Ivan kisses Maria.³⁶ Similarly for attitude verbs: *Maria said that Todor has red hair* describes worlds in which Maria’s utterance refers to worlds in which Todor has red hair. These ideas are encoded in the following abbreviations for negation and verbs of saying.

(76) *Propositional operators*

(where x is an individual variable; e is an event variable; p and q are propositional variables; and φ is a dynamic term in which q occurs free)

- a. $\mathbf{not}_p^q(\varphi) := \exists q \wedge \varphi \wedge p \text{ } \mathbf{\not\subseteq} \mathbf{max}(q)$
 b. $\mathbf{say}_p^{e,q}(x, \varphi) := \exists e \wedge \exists q \wedge \varphi \wedge \text{say}_p(e, x, q)$

According to (76a), negating a dynamic term φ amounts to introducing a proposition that encodes the content of φ and stating that the content expressed by the negated sentence is disjoint from that proposition. Since the positive proposition is encoded by the propositional variable q , the negative proposition (represented as p) needs to be disjoint from the maximized value of q . (76b) is based

³⁶This analysis regards actions described in negated sentences not as “non-existing” but rather as modally remote, i.e. as happening in possible worlds that are remote from the actual world (see Stone 1997, Stone & Hardt 1999).

on a similar idea: a sentence of the form *A said that* φ introduces a proposition (represented as q) for what φ describes and states that A is committed to that proposition in the worlds of saying (represented as p).

An example of a negated sentence without evidentials is given in (77). Here q encodes the proposition that Ivan kissed Maria and p encodes the proposition that Ivan didn't kiss Maria.

- (77) a. DECL_k^p Ivan^x **ne**_p^q celuna_q^e-Ø_{PAST} Maria^y
 DECL Ivan **not** kiss-PAST Maria
 “Ivan didn't kiss Maria.”
 b. $\text{decl}_k^p(\text{not}_p^q(\exists x \wedge x = \text{ivan} \wedge \exists y \wedge y = \text{maria} \wedge \exists e \wedge \text{kiss}_q(e, x, y) \wedge \tau(e) < \text{time}(k)))$

Importantly, the view that operators express relations between propositions allows them to target constituents in their syntactic scope *selectively*. That is, constituents are interpreted in the scope of an operator only if they are relativized to the propositional variable introduced by that operator. The rest of the structure is interpreted as if it were outside the syntactic scope of the operator. This is illustrated in (78), the evidential counterpart of (77).

- (78) a. DECL_k^p Ivan^x **ne**_p^q celuna_q^e-Ø_{PAST}-**I**_k^{e_l} Maria^y
 DECL Ivan **not** kiss-PAST-EV Maria
 “Ivan didn't kiss Maria, as I learned at a different time or location.”
 b. $\text{decl}_k^p(\text{not}_p^q(\exists x \wedge x = \text{ivan} \wedge \exists y \wedge y = \text{maria} \wedge \exists e \wedge \text{kiss}_q(e, x, y) \wedge \exists e_l \wedge \text{learn}_{\text{cs}(k)}(e_l, \text{sp}(k), p) \wedge \tau(e_l) \leq \text{time}(k) \wedge e \Delta e_l \wedge \tau(e) < \tau(e_l)))$

Here the evidential proposition (that the speaker learned that Ivan kissed Maria at some distant time or location) is correctly predicted to project even if we assume that the evidential is in the syntactic scope of the negation. This is so because the *learn* predicate is subscripted with $\text{cs}(k)$, not with q , and thus is not bound by the negation operator. Overall, by uttering (78a) the speaker commits herself to the proposition that Ivan did not kiss Maria and directly adds to the context set the information that she learned about it at a distant time or location.³⁷

Modeling projection out of attitude verbs follows the same recipe. Given the abbreviation for verbs of saying in (76b), the sentence below receives the logical representation as shown. (In order to keep the presentation transparent, I disregard less relevant temporal information.)

- (79) a. DECL_k^p Maria^x **kaza**_p^{e, q}, **če** Todor^y ima_q^{e'}-**I**_k^{e_l} **červen-a kosa**^z
 DECL Maria **say** that Todor have-EV red-FEM hair
 “Maria said that Todor has red hair (I haven't seen it myself).”
 b. $\text{decl}_k^p(\exists x \wedge x = \text{maria} \wedge \text{say}_p^{e, q}(x, \exists y \wedge y = \text{todor} \wedge \exists z \wedge z = \text{red.hair} \wedge \exists e' \wedge \text{have}_q(e', x, y) \wedge \exists e_l \wedge \text{learn}_{\text{cs}(k)}(e_l, \text{sp}(k), q) \wedge \tau(e_l) \leq \text{time}(k) \wedge e' \Delta e_l))$

In this sentence, the evidential marker occurs in the syntactic scope of a verb of saying. However, the learning is relativized to the context set worlds and is thus independent of the *say*-worlds. This explains why the evidential implication projects out of embedded clauses.

³⁷The projection of the evidential out of modals can be accounted for in a similar way. See Koev (2013: ch.4) for appropriate definitions; see also AnderBois et al. (2013) for an implementation in a slightly different formal system.

Given that the above example describes a secondary speech context and assuming that it is represented as c , can the evidential implication shift to that context? For example, could we have $learn_{dc^{sp}(c)}(e_l, sp(c), q)$ in (79b), where the evidential information is anchored to Maria’s commitments? In Section 6.2 we found no evidence for the possibility of such shift in Bulgarian, which might suggest that Bulgarian evidentials are lexically specified to refer to the context of utterance. At the same time, we saw that in languages like Turkish the evidential content can be anchored to an agent who is not the speaker. What is important to note is that the proposed formal analysis is flexible enough to accommodate this point of crosslinguistic variation and could accommodate a larger set of languages.

7.3 Summary

In this section, I introduced a formal account that can capture all of the major interpretational properties of evidential sentences in Bulgarian: the fact that such sentences encode a spatiotemporal distance between the described event and the learning event, the fact that the speaker is typically committed to the scope proposition (except in cases of a perspective shift), the fact that the evidential proposition is not at issue but is informative, and finally the fact that the evidential implication is an instance of projective meaning. The formal account was not just able to capture the semantics of the Bulgarian evidential; it also revealed different ways in which evidential sentences interact with the larger discourse.

8 Conclusion and the typology of evidentials

This paper started off with the observation that evidential sentences in Bulgarian give rise to the intuition that the speaker obtained the described information from an indirect source. This intuition is directly captured by the traditional account, which states that indirect evidentials mark non-witnessed events. One challenge for the traditional account came from late realization scenarios, in which the speaker witnesses an event (without being immediately aware that she does) but can later use an evidential sentence to describe it. The potential temporal displacement between the actual event and the event of acquiring evidence for it brought us to the temporal account, which tries to derive the intuition of indirectness in evidential sentences from the temporal relationship between the described event and the learning event. However, we saw that the temporal account makes no specific predictions about evidential source in present tense sentences, which in Bulgarian are compatible with an indirect information source while in Korean they require direct perceptual evidence. Both the traditional and the temporal account are challenged by blindfolding scenarios, in which the speaker acquires the described proposition from a secondary source at the actual event and yet a later use of a (present tense) evidential sentence is less felicitous.

The core proposal was that the notion we need is that of “spatiotemporal distance” between the described event and the learning event. The use of an evidential sentence in Bulgarian is acceptable when the learning event is spatially or temporally disjoint from the described event. This proposal integrated ideas from both the traditional account (by adopting the view that evidentiality distances the speaker from the described event) and the temporal account (by making use of the notion of a learning event). The spatiotemporal account could explain the Bulgarian data, including the behavior of evidential sentences in late realization and blindfolding scenarios. In addition, the

spatiotemporal account could accommodate some amount of crosslinguistic variation, including languages like Korean, which agree with Bulgarian on most of the data but importantly differ with regard to the interpretation of present tense evidential sentences.

We observed that evidential sentences are associated with two propositions: the scope proposition, expressed by the non-evidential component of the sentence, and the evidential proposition, triggered by the evidential marker itself. I argued that the utterer is usually committed to both propositions. However, while the scope proposition can undergo perspective shift and be attributed to another agent, this does not seem possible for the evidential proposition, which projects past negation and modal operators in Bulgarian (but not necessarily in Turkish). In addition, we noticed a difference in discourse status between the two propositions: the scope proposition is at issue and can be directly rejected in subsequent discourse while the evidential proposition is not at issue and is automatically added to the context set.

The formal proposal was primarily tailored to fit the Bulgarian data. However, it has broader implications for the typology of evidentials as it can reduce the apparent diversity of evidential markers across languages. Several classes of evidentials have been distinguished in the literature and one major criterion for drawing the boundaries is the strength of the scope proposition. First, some evidentials are claimed to operate on the illocutionary level, e.g. *-si* in Cuzco Quechua (see Faller 2002; 2011), *-séstse* in Cheyenne (see Murray 2010; 2014), or *soo-da* in Japanese (see McCready & Ogata 2007). According to these authors, illocutionary evidentials merely “present” the evidential scope and imply no commitments on part of the speaker. Another class of evidentials are modal evidentials, such as *sollen* in German (see Faller 2006) or *-ku7* in St’át’imcets (see Matthewson et al. 2007). Modal evidentials imply some degree of uncertainty on part of the speaker but the scope proposition cannot be entirely disbelieved. Finally, what one might call “spatiotemporal evidentials” fully commit the speaker to the scope proposition. As argued above, this class includes the Bulgarian *-l* marker, and may as well be extended to include *-sqa* in Cuzco Quechua (see Faller 2004) or *-te* in Korean (see Chung 2005; Lim 2010; Lim & Lee 2012; Lee 2013). I have shown that the criterion of scope proposition strength is not as sharp as it may initially appear. Modal accounts can be recast in non-modal terms and examples of apparent lack of commitment are plausibly due to a perspective shift. While many differences still remain (e.g. with respect to the possibility of scopal interaction of evidentials with other scope-bearing elements), I hope that this work makes an important step towards recognizing evidentials across languages as a more uniform linguistic category.

Acknowledgments

I am deeply thankful to Maria Bittner, Roger Schwarzschild, and three anonymous reviewers for invaluable input on this paper. I am also indebted to Veneeta Dayal, Anthony Gillies, Daniel Hole, Sarah Murray, Giorgos Spathas, and the audiences at *SALT* 21 and the University of Stuttgart for suggestions and criticism. Finally, I would like to thank my language informants: Daniela Dimitrova, Svetoslav Koev, and Donka Stefanova.

References

- Abusch, Dorit. (1997), 'Sequence of tense and temporal de re'. *Linguistics and Philosophy* 20: 1–50.
- Aikhenvald, Alexandra. (2004), *Evidentiality*. Oxford University Press. Oxford.
- Amaral, Patricia, Craig Roberts, & E. Allyn Smith. (2007), 'Review of *The Logic of Conventional Implicatures* by Chris Potts'. *Linguistics and Philosophy* 30: 707–749.
- Anand, Pranav & Valentine Hacquard. (2013), 'Epistemics and attitudes'. *Semantics & Pragmatics* 6-8: 1–59.
- AnderBois, Scott, Adrian Brasoveanu, & Robert Henderson. (2013), 'At-issue proposals and appositive impositions in discourse'. *Journal of Semantics*. doi: 10.1093/jos/fft014
- Anderson, Lloyd B. (1986), 'Evidentials, paths of change, and mental maps: typologically regular asymmetries'. *Advances in Discourse Processes* 20: 273–312.
- Asher, Nicholas & Daniel Bonevac. (1985), 'How extensional is extensional perception?'. *Linguistics and Philosophy* 8: 203–228.
- Asher, Nicholas & Sylvain Pogodalla. (2010), 'A Montagovian treatment of modal subordination'. *Proceedings of SALT* 20: 387–405.
- Barwise, Jon. (1981), 'Scenes and other situations'. *Journal of Philosophy* 78(7): 369–397.
- Barwise, Jon. (1987), 'Noun phrases, generalized quantifiers and anaphora'. In Peter Gärdenfors (ed.), *Generalized Quantifiers*. Kluwer. 1–29.
- Beaver, David I. (2001), *Presupposition and Assertion in Dynamic Semantics*. Center for the Study of Language and Information.
- Bittner, Maria. (2011), 'Time and modality without tenses or modals'. In Renate Musan & Monika Rathert (eds.), *Tense across Languages*. Niemeyer. Tübingen. 147–188.
- Brasoveanu, Adrian. (2010), 'Decomposing modal quantification'. *Journal of Semantics* 27: 437–527.
- Chierchia, Gennaro & Sally McConnell-Ginet. (2000), *Meaning and Grammar: An Introduction to Semantics*. MIT Press. Cambridge, Massachusetts/London, England. Second edition.
- Chung, Kyong-Sook. (2007), 'Spatial deictic tense and evidentials in Korean'. *Natural Language Semantics* 15(3): 187–219.
- Cinque, Guglielmo. (1999), *Adverbs and Functional Heads: A Crosslinguistic Perspective*. Oxford University Press. New York/Oxford.
- de Haan, Ferdinand. (1999), 'Evidentiality and epistemic modality: Setting boundaries'. *Southwest Journal of Linguistics* 18(1): 83–101.
- DeLancey, Scott. (1997), 'Mirativity: The grammatical marking of unexpected information'. *Linguistic Typology* (1): 33–52.
- DeLancey, Scott. (2001), 'The mirative and evidentiality'. *Journal of Pragmatics* 33: 369–382.
- Faller, Martina. (2002), *Semantics and Pragmatics of Evidentials in Cuzco Quechua*. PhD thesis. Stanford University.
- Faller, Martina. (2004), 'The deictic core of 'non-experienced past' in Cuzco Quechua'. *Journal of Semantics* 21(1): 45–85.
- Faller, Martina. (2006), 'Evidentiality below and above speech acts'.
<http://personalpages.manchester.ac.uk/staff/martina.t.faller/documents/Evidentiality.Above.Below.pdf>
- Faller, Martina. (2011), 'A possible worlds semantics for Cuzco Quechua evidentials'. *Proceedings of SALT* 20: 660–683.

- Faller, Martina. (2012), 'Evidential scalar implicatures'. *Linguistics and Philosophy* 35 (4): 285–312.
- Farkas, Donka & Kim B. Bruce. (2010), 'On reacting to assertions and polar questions'. *Journal of Semantics* 27(1): 81–118.
- Fleck, David. (2007), 'Evidentiality and double tense in Matses'. *Language* 83(3): 589–614.
- Fitneva, Stanka. (2001), 'Evidential marking and reliability judgments: Evidence from Bulgarian'. *Journal of Pragmatics* 33: 401–420.
- Frank, Anette. (1996), *Context Dependence in Modal Constructions*. PhD thesis, University of Stuttgart.
- Garrett, Edward John. (2001), *Evidentiality and Assertion in Tibetan*. PhD thesis, UCLA.
- Gennari, Silvia. (2003), 'Tense meaning and temporal interpretation'. *Journal of Semantics* 20: 35–71.
- Geurts, Bart. (1999), *Presuppositions and Pronouns*. Elsevier. Amsterdam.
- Groenendijk, Jeroen & Floris Roelofsen. (2009), 'Inquisitive semantics and pragmatics'. *Stanford Workshop on Language, Communication and Rational Agency*.
- Harris, Jesse & Christopher Potts. (2009), 'Perspective-shifting with appositives and expressives'. *Linguistics and Philosophy* 32: 523–552.
- Heim, Irene. (1982), *The Semantics of Definite and Indefinite Noun Phrases*. PhD dissertation, MIT.
- Iatridou, Sabine. (2000), 'The grammatical ingredients of counterfactuality'. *Linguistic Inquiry* 31(2): 231–270.
- Izvorski, Roumyana. (1997), 'The present perfect as an epistemic modal'. *Proceedings of SALT 7*: 222–239.
- Kalsang, Jay Garfield, Margaret Speas, & Jill de Villiers. (2013), 'Direct evidentials, case, tense and aspect in Tibetan: Evidence for a general theory of the semantics of evidential'. *Natural Language & Linguist Theory* 31: 517–561.
- Kamp, Hans & Uwe Reyle. (1993), *From Discourse to Logic*. Kluwer. Dordrecht/Boston/London.
- Karttunen, Lauri. (1972), 'Possible and must'. In Kimball, J. (ed.), *Syntax and Semantics* 1. Academic Press. 1–20.
- Karttunen, Lauri. (1976), 'Discourse referents'. In McCawley, James D. (ed.), *Syntax and Semantics 7: Notes from the Linguistic Underground*. Academic Press. 363–385.
- Karttunen, Lauri & Stanley Peters. (1979), 'Conventional implicature'. In Choon-Kyu Oh & David A. Dinneen (eds.), *Syntax and Semantics 11: Presupposition*. Academic Press. 1–56.
- Klein, Wolfgang. (1994), *Time in Language*. Routledge. London/New York.
- Koev, Todor. (2011), 'Evidentiality and temporal distance learning'. *Proceedings of SALT 21*: 115–134.
- Koev, Todor. (2013), *Apposition and the Structure of Discourse*. PhD thesis, Rutgers University.
- Kratzer, Angelika. (1991), 'Modality'. In Arnim von Stechow & Dieter Wunderlich (eds.), *Semantics: An International Handbook of Contemporary Research*. De Gruyter. 639–650.
- Krifka, Manfred. (2001), 'Quantifying into question acts'. *Natural Language Semantics* 9: 1–40.
- Lee, Jungmee. (2013), 'Temporal constraints on the meaning of evidentiality'. *Natural Language Semantics* 21: 1–41.
- Lim, Dong Sik. (2010), *Evidentials and Interrogatives: A Case Study from Korean*. PhD thesis, University of Southern California.

- Lim, Dongsik & Chungmin Lee. (2012), 'Perspective shifts of Korean evidentials and the effect of contexts'. *Proceedings of SALT 22*: 26–42.
- Lin, Jo-Wang. (2006), 'Time in a language without tense: The case of Chinese'. *Journal of Semantics* 23: 1–53.
- Lyons, John. (1977), *Semantics 2*. Cambridge University Press. Cambridge.
- Matthewson, Lisa. (2006), 'Temporal semantics in a superficially tenseless language'. *Linguistics and Philosophy* 29: 673–713.
- Matthewson, Lisa, Henry Davis, & Hotze Rullmann. (2007), 'Evidentials as epistemic modals: evidence from St'át'imcets'. In Jeroen Van Craenenbroeck & Johan Rooryck (eds.), *Linguistic Variation Yearbook 7*. John Benjamins. 201–254.
- McCready, Eric & Norry Ogata. (2007), 'Evidentiality, modality and probability'. *Linguistics and Philosophy* 30(2): 147–206.
- Munro, Robert, Rainer Ludwig, Uli Sauerland, & David W. Fleck. (2012), 'Reported speech in Matsigenka: Perspective persistence and evidential narratives'. *International Journal of American Linguistics* 78(1): 41–75.
- Murray, Sarah. (2010), *Evidentiality and the Structure of Speech Acts*. PhD thesis, Rutgers University.
- Murray, Sarah. (2014), 'Varieties of update'. *Semantics & Pragmatics* 7-2: 1–53.
- Nikolaeva, Irina. (1999), 'The semantics of Northern Ostyak evidentials'. *Journal de la Société Finno Ougrienne* 88: 131–159.
- Ogihara, Toshiyuki. (1996), *Tense, Attitude, and Scope*. Kluwer. Dordrecht.
- Papafragou, Anna. (2006), 'Epistemic modality and truth conditions'. *Lingua* 116: 1688–1702.
- Peterson, Tyler Roy Gösta. (2010), *Epistemic Modality and Evidentiality in Gitksan at the Semantics-Pragmatics Interface*. PhD thesis, University of British Columbia.
- Potts, Christopher. (2005), *The Logic of Conventional Implicatures*. Oxford University Press. Oxford.
- Reichenbach, Hans. (1947), *Elements of Symbolic Logic*. Macmillan. New York.
- Rett, Jessica & Sarah Murray. (2013), 'A semantic account of mirative evidentials'. *Proceedings of SALT 23*: 453–472.
- Rizzi, Luigi. (1997), 'The fine structure of the left periphery'. In Liliane Haegeman (ed.), *Elements of Grammar*. Kluwer. Dordrecht. 281–337.
- Roberts, Craige. (1989), 'Modal subordination and pronominal anaphora in discourse'. *Linguistics and Philosophy* 12(6): 683–721.
- Sauerland, Uli & Matthias Schenner. (2007), 'Embedded evidentials in Bulgarian'. *Proceedings of Sinn und Bedeutung* 11: 495–509.
- Şener, Nilüfer. (2011), *Semantics and Pragmatics of Evidentials in Turkish*. PhD thesis, University of Connecticut.
- Shanon, Benny. (1976), 'On the two kinds of presupposition in natural language'. *Foundations of Language* 14(2): 247–249.
- Simons, Mandy, Judith Tonhauser, David Beaver, & Craige Roberts. (2010), 'What projects and why'. *Proceedings of SALT 20*: 309–327.
- Smirnova, Anastasia. (2013), 'Evidentiality in Bulgarian: Temporality, epistemic modality, and information source'. *Journal of Semantics* 30: 479–532.
- Speas, Peggy. (2010), 'Evidentials as generalized functional heads'. *Linguistik aktuell: Amsterdamer Arbeiten zur theoretischen & angewandten Linguistik* 156. 127–150.

- Stalnaker, Robert. (1978), 'Assertion'. In Peter Cole (ed.), *Syntax and Semantics 9: Pragmatics*. Academic Press. 315–332.
- Stalnaker, Robert. (1998), 'On the representation of context'. *Journal of Logic, Language, and Information* 7(1): 3–19.
- Stone, Matthew. (1997), 'The anaphoric parallel between modality and tense'. *IRCS Report 97-06*. University of Pennsylvania.
- Stone, Matthew. (1999), 'Reference to possible worlds'. *RuCCS TR 49*.
- Stone, Matthew & Daniel Hardt. (1999), 'Dynamic discourse referents for tense and modals'. In Harry C. Bunt & Reinhard Muskens (eds.), *Computing Meaning I*. Kluwer. 301–319.
- Strawson, Peter F. (1950), 'On referring'. *Mind* 59(235): 320–344.
- Syrett, Kristen & Todor Koev. (2014), 'Experimental evidence for the truth conditional contribution and shifting information status of appositives'. *Journal of Semantics*. doi: 10.1093/jos/ffu007
- Tonhauser, Judith. (2011), 'Temporal reference in Paraguayan Guaraní, a tenseless language'. *Linguistics and Philosophy* 34: 257–303.
- Tonhauser, Judith. (2012), 'Diagnosing (not-)at-issue content'. *Proceedings of SULA 6*: 239–254.
- Tonhauser, Judith. (to appear), Reportative evidentiality in Paraguayan Guaraní. *Proceedings of SULA 7*.
- von Fintel, Kai & Anthony Gillies. (2007), 'An opinionated guide to epistemic modality'. In: Gendler, Tamar Szabó, & John Hawthorne (eds), *Oxford Studies in Epistemology 2*. Oxford University Press. 32–62.
- von Fintel, Kai & Anthony Gillies. (2010), 'Must . . . stay . . . strong!' *Natural Language Semantics* 18(4): 351–383.
- Veltman, Frank. (1996), 'Defaults in update semantics'. *Journal of Philosophical Logic* 25: 221–261.
- Willett, Thomas. (1988), 'A cross-linguistic survey of the grammaticization of evidentiality'. *Studies in Language* 12(1): 51–97.