

Evidentials in different kinds of questions

The case of German *wohl*

word count: 17.924 words

Regine Eckardt
Konstanz
regine.eckardt@uni-konstanz.de

Abstract: Evidential markers in questions are frequently interpreted in one of two ways: They can be re-oriented to the addressee (interrogative flip) or give rise to conjectural questions. The German particle *wohl* allows to study both readings. I propose that *wohl* in declarative sentences *wohl p* is an inferential evidential, indicating that the prejacent *p* is defeasibly inferred from the speaker's knowledge. The second part analyzes *wohl* in standard questions as a case of interrogative flip, using the framework of Lim (2011). The third part investigates German conjectural verb-end questions with *wohl*. These do not request answers but invite speculative discourse about a given topic. I propose that *wohl* in conjectural questions refers to pooled evidence of speaker and addressee. The denotation of *wohl* verb-end questions explains their pragmatic profile and potentially extends to conjectural questions with evidentials in other languages.

1. Introduction

Evidential markers in declarative sentences serve to indicate the type of evidence that leads the speaker to believe *p*. In questions, they are frequently interpreted in one of two ways: The evidential is re-oriented to the addressee (“interrogative flip”) or the question is interpreted as a conjectural question. The interrogative flip was described for several kinds of evidentials including *direct evidential* (Korean, Lim 2011), *reportative evidential* (Qiang, SanRoque et al. 2017, Murray 2010, chap. 5), *visual evidential* (Qiang, SanRoque et al. 2017:123) or *inferential evidential* (Qiang, SanRoque et al. 2017:123). Conjectural questions are often based on *inferential evidentials*, as for instance in Japanese (Hara 2006, 2018), Salish languages (Littell et al. 2010, Peterson 2010), Italian (Eckardt & Beltrama subm./2018). Finally, (Murray 2010:113) discusses mixed interpretations of evidentials in questions as illocutionary variability. Both the interrogative flip and conjectural questions have been analysed in recent literature but there is so far no account that connects the two phenomena.

The German particle *wohl* allows to study both readings. In declarative sentences *wohl p*, the speaker indicates that s/he assumes *p* rather than knows *p* (Zimmermann 2004, 2008).

- (1) *Der Schlüssel ist wohl noch im Auto.*
The key is wohl still in-the car
‘The key is still in the car, I assume’

The translation is inspired by Zimmermann's analysis but section 2.1 will argue that *wohl* is an inferential evidential. Common to both views is the fact that *p* is anchored to the speaker's knowledge. In standard questions *wohl* shows the interrogative flip.

- (2) *Wo ist wohl der Schlüssel?*
where is wohl the key?
‘Where, do you assume, is the key?’

The question in (2) asks for answers on basis of the addressee's assumptions instead of the speaker's. The question can not be interpreted as "where, according to *my* assumptions, is the key?"

Finally, *wohl* occurs in German verb-end questions. These are interpreted as conjectural questions as in (3).

- (3) *Wo wohl der Schlüssel ist?*
where wohl the key is?
'Where might the key be, I wonder'

German can thus serve as a test case to understand how inferential evidential plus additional factor X conspire to yield the pragmatic profile of conjectural questions.

The structure of the paper is as follows: Section 2 investigates *wohl* in declarative sentences. I argue that *wohl* is an inferential evidential and expresses that the speaker defeasibly infers the prejacent *p* from her knowledge. I propose a first denotation for *wohl* and compare *wohl* and epistemic modals, delineating differences between the two types of expressions. Section 3 studies *wohl* in standard questions. We refine the earlier semantic entry for *wohl* and arrive at an analysis of the interrogative flip for *wohl* on basis of (Lim, 2011). Section 4 reviews *wohl* in German verb-end questions, which are interpreted as conjectural questions. Conjectural questions do not request the addressee to answer but invite speculative discourse about a given topic. This pragmatic profile will be linked to evidential *wohl* in the following manner: Declarative sentences with *wohl* are anchored to the speaker in the sense that the prejacent follows from what the speaker knows. Standard questions are anchored to the addressee in that they request answers that follow from what the addressee knows. The core idea is that *wohl* in conjectural questions is anchored to speaker and addressee together. These questions request answers that follow from pooled knowledge of speaker and addressee. Section 4.2 argues that the possible moves of the addressee in reaction to such questions follow from the proposed denotation. Evidentials in many languages serve as cues of conjectural questions and German conjectural *wohl* in verb-end questions patterns with this typological trend. They can thus serve as a test case for a more general phenomenon.¹ Section 5 revisits the typological evidence in the light of the proposed analysis and concludes.

2. Evidential *wohl* in declarative sentences

The present section investigates declarative sentences like (1) where *wohl* combines with proposition *p*, here 'the key is in the car'. I will abbreviate these as *wohl p* and refer to *p* as the prejacent. Section 2.1 surveys the data, starting with Zimmermann's comprehensive study of *wohl* (Zimmermann 2004, 2008). His careful and detailed observations are summarized in 2.1.1 and serve as our starting point. Sections 2.1.2 and 2.1.3 introduce new data that challenge Zimmermann's ASSUME-based analysis and argue that *wohl* patterns with evidentials of the indirect type in terms of Willett's classification (Willett 1988: 57, Matthewson 2015, Göbel 2018). Sections 2.1.4 and 2.1.5 take a closer look at typical uses of *wohl* and confirm the hypothesis that *wohl* patterns with inferential evidentials. I argue that *wohl p* indicates that *p* follows from

¹ A comprehensive analysis of all types of conjectural questions in German is beyond the scope of the paper.

the speaker's knowledge by defeasible inference. Section 2.1.6 discusses the subjectivity of *wohl*. Section 2.2. introduces a denotation for *wohl* in terms of defeasible inferences. An assertion *wohl p* states that the speaker has relevant knowledge *q* from which *p* defeasibly follows. Section 2.3 discusses how the observed data follow from the proposed analysis. Section 2.4 compares *wohl* to the epistemic modals *must* and *might*. I argue that epistemic modals rest on classical logic whereas *wohl* conveys subjective and defeasible inferences. The comparison can help to shed new light on the much-debated difference between evidentials and modals.

2.1. Data

2.1.1. Assume instead of know

Zimmermann (2004, 2008) was the first to systematize the intuitions behind *wohl p*. The utterance conveys that the speaker wants to assert *p* but is not absolutely certain that *p* holds true. He discusses the minimal contrast in (4) and (5).

- (4) *Hein ist wohl auf See*
 Hein is wohl on sea
 "Hein is at sea I suppose"
- (5) **Ich weiß wo Hein ist: Hein ist wohl auf See.*
 I know where Hein is: Hein is wohl on sea
 I know where Hein is: Hein is *wohl* at sea.

While (4) is a perfectly natural assertion, (5) is incoherent because, as Zimmermann argues, the embedding predicate *know* is incompatible with uncertainty conveyed by *wohl*. Zimmermann also describes the interrogative flip for *wohl* in questions illustrated in (6).

- (6) *Wo ist Hein wohl?*
 Where is Hein wohl?
 What is your guess: where is Hein?

Wohl in questions is possible when the speaker herself already knows the answer, as in exam questions. Question (7), if uttered by the geography teacher, invites the student to guess the answer that the teacher already knows.

- (7) *Was ist wohl die Hauptstadt von Tansania?*
 What is wohl the capital of Tansania
 Teacher to student: "What is the capital of Tansania (— and you may have to guess)?"

Zimmermann concludes from these data that *wohl* in questions is only anchored to the addressee. He also demonstrates that *wohl* always takes highest scope over negation, question formation, conditionals and other semantic operators. I illustrate this for questions in (8)/(9). The question in (8) has only the reading in (9a) whereas (9b) is unavailable. This is shown by the ill-formedness of the attempted answer in (8).

- (8) *Ist Hein wohl auf See?*
 Is Hein wohl at sea
 #*Nein, ich nehme nicht an, dass Hein auf See ist.*
 No I assume not prt that Hein at sea is.
 “No, I don’t assume that Hein is at sea”
- (9) a. { sp assumes (Hein is at sea), sp assumes (not (Hein is at sea)) }
 b. { sp assumes (Hein is at sea), not(sp assumes (Hein is at sea)) }

Zimmermann moreover points out that the content of *wohl* can not be challenged or denied by the addressee. High scope, deniability and negation have since become routine tests in the investigation of evidentiality (Murray 2010, 2014a, 2016) and Zimmermann’s data effectively show that *wohl* passes these tests.

Zimmermann (2008) finally discusses how the different status of evidential and prejacent should be modelled semantically. He proposes that *wohl* denotes $\lambda p. \text{ASSUME}_x(p)$ where the predicate $\text{ASSUME}_x(p)$ is true iff x assumes that p is true. *Wohl* is situated in SpecForceP at LF, thus taking high scope over other logical operators. Suitable syntactic heads decl_{sp} and int_{ad} of ForceP have the semantic effect of anchoring x to speaker or addressee depending on clause type. The denotation of declarative *wohl p* is hence $\text{ASSUME}_{sp}(p)$ and Zimmermann proposes that this is in fact the content of the speaker’s assertion. Pragmatic competition between weaker and stronger assertion ensures that *wohl S* can not be asserted where the speaker knows for certain that p . For similar reasons questions of the form *wohl q?* are inappropriate when the addressee is expected to know the answer.

Zimmermann argues against a two-dimensional analysis that separates at-issue and non-at-issue content (Potts 2005) or a separation in terms of assertion versus presuppositions. Instead, he proposes that after the assertion $\text{ASSUME}_{sp}(p)$ the addressee is free to believe p because s/he shares the speaker’s assumption. In this case the common ground is updated by p . If the addressee expresses doubt the update has to be negotiated or doesn’t happen.

Recent advances in the study of evidentials have yielded more sophisticated frameworks to separate evidential meaning and prejacent. (Murray 2010, 2014b) defines a discourse model where at-issue and non-at-issue content are kept apart not in different dimensions but by the different patterns of interaction that they license in discourse. She demonstrates the adequacy of her account for evidentials in declaratives as well as for questions and her account will be suited to capture the different discourse status of *wohl* and its prejacent. The additional level of complexity will however burden the semantic representations and for this reason I adhere to the simpler one-dimensional view of Zimmermann for now, leaving the exploration of the different dimensions of meaning for the future.

Zimmermann’s analysis is still a classic in that he was the first to systematize the data and offer a formal semantic analysis. The next subsections argue, however, that Zimmermann both under- and overgenerates. We look at the two cases in turn.

2.1.2. Known inferences

Göbel (2017, 2018) points out that *wohl S* can be felicitous even though the speaker knows S for certain and thus should utter a plain assertion. Example (10) replicates the somewhat longer example in (Göbel 2017: (8)).

(10) (A claims that Athens is in Turkey. B provides a map that clearly proves A to be wrong.)

A: *Da hab ich mich wohl geirrt.*
there have I me wohl erred
'Obviously I've been wrong'

In the given scenario speaker A knows perfectly well that he has been wrong. Zimmermann's analysis would thus predict that the utterance in (10) is underinformative and therefore blocked, due to a violation of the maxim of quantity. In fact (10) is a perfectly natural dialogue.

Starting from this observation, Göbel argues that *wohl* is an inferential evidential marker (Willett 1988), i.e. indicates that the speaker believes the prejacent because it can be inferred from the speaker's knowledge. Göbel demonstrates that *wohl* patterns with inferential evidentials in terms of Matthewson's diagnostics (Matthewson 2015) and proceeds to show that this accounts for data like (10) as follows: A wants to highlight that there is new evidence $q =$ 'Athens is in Greece' that entails $p =$ 'A has been wrong'. The content of (10) may be weaker than the plain assertion '*I have been wrong*' but in addition conveys that p follows by inference from newly available information. The account thus explains why (10) is not blocked by the maxim of quantity.

Göbel uses the relation $\text{INF}(i,p)$ to capture "the worlds where i has inferential evidence about p ". While this is helpful to separate *inferential* evidentiality from *reportative* and *direct* evidentiality, the account leaves the nature of inference unexplored. Section 2.1.3 and 2.1.4 fill this gap and conclude that neither statistical likelihood nor classical logical entailment are adequate ways to spell out inferential evidence. Instead, data suggest that defeasible inference is the logical relation to capture the content of *wohl*.

2.1.3. No statistical likelihood

This section presents cases where Zimmermann (2008) potentially overgenerates. It could plausibly be argued that speakers *assume* that p because they *know* that p is highly likely. The analysis predicts that *wohl p* is acceptable in such situations. In actual fact, however, *wohl p* can not be used when the speaker holds p highly likely but does not know anything beyond this. Consider the following scenario: A is supposed to draw a marble from a box that contains one black and nine white marbles. A knows this and has now drawn a marble but can not see its color yet. In this situation (11a) is inappropriate whereas (11b) is a natural utterance.

- (11) a. #*Ich habe wohl eine weiße Murmel gezogen*
I have wohl a white marble drawn
b. ✓ *Ich habe wahrscheinlich eine weiße Murmel gezogen*
I have probably a white marble drawn

Native speakers report the intuition that *wohl p* is inappropriate if the speaker holds p as highly likely on a statistical basis but lacks episodic knowledge that supports p . Episodic knowledge can be witnessed events or facts, but also "safe" knowledge like the present time or date. The next section will provide more examples for episodic

knowledge and attempts to shed more light on this contrast. The contrast in (11) shows that the particle *wohl* is not synonymous with *likely*, *highly likely* or *almost certainly* and Zimmermann's relation ASSUME is too unspecific to account for this observation.

The relevance of episodic information is confirmed by a variant of the above scenario. Assume that bystander C observes the drawing and can see the result. If A sees C's unsurprised face he will infer that the result of the drawing was unsurprising, i.e. as likelihood suggested. In this alternative scenario A has episodic evidence in favour of *p* and (11a) is acceptable.²

2.1.4. Defeasible inference from speaker's knowledge

This section takes a closer look at typical uses of *wohl* in order to gain a better understanding for the reasoning underlying the utterance. Consider the following situation: It is Friday afternoon and A and B wonder where Granny might be. A knows the following.

- q₀: It is Friday afternoon.
- q₁: Granny often goes shopping on Friday afternoon.
- q₂: Her shopping bag and purse are missing.
- q₃: Her slippers are in the hall.

In this situation A can naturally utter (12).

- (12) A: *Oma ist wohl einkaufen gegangen.*
 Granny is wohl shopping gone
 'Granny went shopping I suppose'

By using *wohl*, A conveys the following complex message: "As to the issue at hand (*Where is Granny?*), my guess is *p* = '*Granny went shopping*'. It is strongly suggested by facts *q* that I know for certain. But further facts may force me to withdraw my conclusion." A makes implicit reference to his maximal body of relevant knowledge q₀ - q₃ about Granny's whereabouts and acknowledges that further evidence might force him to change his mind. If A finds out later that q₄ = '*Granny's Wellingtons are missing*' (which she never wears downtown) he can withdraw the inference and instead guess that she went searching for mushrooms. In this case A is correcting an earlier false belief but does not starkly contradict the previous assertion.

Typical uses of *wohl* of this kind suggest that *wohl p* marks *p* as a defeasible inference. Defeasible inferences are inferences that can be invalidated by further evidence. In this they differ from classical inferences which are conservative. It has long been discussed that human inferencing is not always conservative. When we know that *Tweety is a bird*, it is reasonable to infer *Tweety can fly*. However if we add *Tweety is a penguin* as a second premiss we no longer infer *Tweety can fly*. Defeasible logic has been intensely researched in artificial intelligence (see Gabbay et al. 1994 for an overview) but so far not been used in the semantic analysis of particles or evidentials.

² Thanks to Sven Lauer (p.c.) who brought up this example.

Let us take a closer look at the “relevant body of knowledge” behind these defeasible inferences. Relevant knowledge of A typically includes episodic evidence (like Granny’s missing bag) but the speaker may not always be able to explicate why s/he infers the prejacent. Relevant knowledge q can include perceptual evidence “looks as if” that A finds hard to explicate. For instance, an experienced cook could take a look at cookies in the oven and state „*Sie sind wohl fertig*“ (‘they are wohl finished’) without being able to explicate the exact q = their smell, colour and baking time which, taken together, trigger the inference.

Depending on the type of knowledge involved, *wohl p* can come close to other evidentials as in the following example.

- (13) Hein’s wife talking to A: *Hein ist gerade auf See.*
 Hein is just at sea.
 ‘Hein is at sea right now’
 A, later to B: *Hein ist wohl auf See.*
 Hein is wohl at sea.

At first glance (13) looks like a reportative evidential (A has heard that p) but this is not what is conveyed. At the back of A’s mind is knowledge as q_1 = Hein’s wife said that he’s at sea, q_2 = she is usually trustworthy and q_3 = she should know where Hein is. A defeasibly infers from q_1 , q_2 and q_3 that Hein is at sea.³

More schematically, the pattern behind uses of *wohl* in declaratives is as follows. The speaker knows q . q is not conclusive evidence for prejacent p but in face of the issue at hand (“where is Hein?”, “What is Granny doing?”) q is sufficient for the speaker to tentatively infer p . Inferences from privileged knowledge are marked in other languages as well. Von Fintel and Gillies’ (2010) analyze epistemic *must p* as inference from kernel K_a , the set of privileged knowledge of agent a . Likewise, Murray (2014a) assumes that the “kernel of information, evidence” is the source of information for inferential evidentials in Cheyenne. Crucially, *wohl* inferences are not inferences in the sense of classical logic. The prejacent in (12) does not follow *logically* from what A knows, and A would admit this. What A means to say is: to my experience whenever the world fits $q_0 - q_3$ then (12) holds true.⁴ In this, *wohl* inferences differ from those underlying *must*, according to the analysis in (von Fintel & Gillies 2010).

2.1.5. License to ask back

The defeasible inference hypothesis is corroborated by the fact that the addressee can react to *wohl p* by asking ‘*why do you think so?*’. In this respect *wohl* patterns with other evidentials as illustrated on basis of Cheyenne in (Murray 2014a). Asking back to *wohl p* is less offensive than asking back to a plain assertion p , as illustrated by the following pair of dialogues.⁵

³ Interestingly, the same closeness of reportative and inferential evidentials was reported for Cheyenne in Murray (2014a).

⁴ von Fintel & Gillies (2010) argue that *must p* always logically entails p , pointing out examples where the speaker knows p and utters *must p*. The same constellation is possible for *wohl* (see (10), section 2.1.2) but they offer no reason to assume that *wohl* expresses logic necessity.

⁵ I thank Ramona Wallner who pointed out this data to me.

- (14) A: *Oma ist wohl einkaufen gegangen.*
 Granny is wohl shopping gone
 B: *Warum glaubst Du das?*
 Why believe you that
 A: Well, it is Friday and her bag is missing and so is the purse, and ...
- (15) A: *Oma ist einkaufen gegangen.*
 Granny is shopping gone
 B: *Warum glaubst Du das?*
 Why believe you that
 A: Hey man, do you think I am stupid?

B's question in (14) is inoffensive as it takes up A's cue that *p* is (defeasibly) inferred from knowledge rather than based on direct evidence. By using *wohl*, A signaled that there are reasons to believe *p* and B asks for those reasons. B's question in (15) is coherent but more offending. In fact B challenges A's justification to assert *S* and insinuates a violation of the Maxim of Quality.

The differences in impoliteness are gradual and there is no clear-cut divide into polite versus impolite cases of asking back. If A claims something totally implausible that B finds hard to believe then B will ask back, no matter whether A used *wohl* or not. Still, by using *wohl p* the speaker signals that he is prepared to justify a belief whereas speakers who leave out *wohl* do not.

2.1.6. Subjective inference

A final set of data suggest that *wohl p* indicates subjective inference. We discuss two pieces of evidence. First, there are cases where defeasible inferences are part of some objective scientific theory. Our so far hypothesis suggests that *wohl* should be appropriate in such cases. In actual fact it is not, as the following *measles* example will show. Assume that the symptoms *patient has red spots, fever and sore throat* justify the medical diagnosis *patient has the measles*. As all fans of Doctor House will know, diagnoses are defeasible inferences and an atypical development of the disease can trigger additional tests, bring up new information and lead to revised diagnoses. We would therefore expect that medical diagnoses are routinely uttered with *wohl*. This is however not the case. The doctor in (16a) expresses a personal estimate ("according to my experience"). The doctor in (16b) offers a medical diagnosis.

- (16) Doctor summarizing the patient's symptoms: *Sie haben rote Punkte, Halsweh und Fieber:*
- a. *Sie haben wohl die Masern.*
 You have wohl the measles
 'You have red spots, a sore throat and fever: As to my experience, you have the measles.'
- b. *Sie haben die Masern.*
 You have the measles
 'You have the measles (I diagnose)'

Similar contrasts arise in other situations where experts assert defeasible inferences supported by science, for instance in weather forecasts or when identifying a

specimen. The contrast between expert talk (16b) and loose talk (16a) suggests that *wohl p* indicates that the inference *p* rests on the speaker's personal experience. Other persons faced with the same facts might draw different conclusions. The speaker in (16a) voices a personal opinion whereas (16b) conveys a default inference that is supported by objective medical science. Let us call this the 'subjectivity' feature of *wohl*. The simplest way to account for the contrast in (16) could be in terms of pragmatic competition and complexity.

Yet, more evidence in favour of subjectivity suggest that the contrast should be rooted in the meaning of the particle. *Wohl* can not be used when speaker A draws inferences on behalf of B, and in this respect *wohl* differs from epistemic modals like *must/might*. Epistemic *must / might* can be used in mastermind dialogues like the one in (17).

- (17) A (expert): *There might be a red.*
 B (finding out later that actually there was no red): *Hey, why did you tell me that there might be a red? You knew that there wasn't!*
 A: *From what you knew at that point there might have been.*

The expert A has full information and B has to guess correct colors based on the clues that are allowed in the game. Knowing what B can see, A can utter *There must be a red* or *There might be a green* based on what speaker B knows, not based on what A knows (von Fintel & Gillies 2010, 2011 a.o.). This is even possible if the content contradicts A's knowledge, as illustrated in (17): A can justify his claim as being made from B's perspective.

Assertions with *wohl* can not be used in this delegated sense. The effect is, however, difficult to test. We can not simply use *wohl* in the typical mastermind scenarios because the "quick and dirty" stance of *wohl p* is inappropriate in a mastermind scenario where B is in search for the correct solution. We have to consider situations where "quick and dirty" information is sufficient and inferences have to be drawn. Consider the following scenario: At a kindergarden intern B has to assign raincoats to children. Regular teacher A is the expert and knows who wears what. Both know that Lisa is the girl with the wealthiest parents.

- (18) B (intern): *This raincoat is pink and of an expensive brand.*
 A (expert): *Dann ist er wohl von Lisa*
 then is it wohl from Lisa
 ≈ 'Then it presumably belongs to Lisa'

In order to assess the content of A's utterance we must distinguish two versions of the situation. If A knows that the coat is Lisa's (i.e. the prejacent is in fact true) then A can utter (18) to confirm B's assumption. The shift of perspective justifies the violation of the maxim of quantity.

The closer match to mastermind scenarios, however, are situations where A knows that the raincoat does not belong to Lisa but to Clara (whose parents love to show off). If A could draw conclusions on behalf of B, A should still be allowed to assert (18). Let us test this with (19) where A answers with a final fall accent.

- (19) B (intern): *This raincoat is pink and of an expensive brand.*
 A (expert): *Dann ist er wohl von Lisa H*L%*
 then is it wohl from Lisa

B (finding out that the coat belongs to Clara and that A knew): *Hey, why did you tell me it was Lisa's?*

#A: *From what you knew at that point it might have been.*

As we see A can not defend his earlier assertion by pointing out that he took B's perspective. (19) thus differs from mastermind dialogues like the one in (17) which was perfectly natural.⁶

We have reviewed two kinds of evidence: the *measles* example and the *lack of mastermind* observation. Either observation alone may not offer striking evidence for subjectivity but both taken together suggest that *wohl* inferences are subjective in nature. In other words, evidential *wohl p* conveys that the *speaker* has sufficient evidence to infer *p* but that the evidence may be judged differently by other persons. The analysis in section 2.2, to which we now turn, will account for the subjective nature of *wohl*.

2.2. Analysis

In order to analyse *wohl* as marker of defeasible inference I use an implementation of defeasible inferences in terms of modal logic (Reiter 1980) combined with the notion of stereotypical worlds (Kratzer 1991, Lewis 1973). In this section I use the term *agent* instead of speaker/addressee to refer to the person that *wohl* is anchored to.

The underlying intuition is quite simple: Assume that agent *A* knows in w_o that proposition *q* holds true. Hence *A* knows that s/he is in one of the *q*-worlds. Among these there are some where *q* is true under circumstances that match *A*'s expectations about *q*-worlds and others where *q* is true but where *A* would consider the circumstances as abnormal. I use the term *stereotypical* for this notion of normality and “be-as-expected”-ness in the following. When *A* draws inferences from *q*, he focusses on stereotypical *q* worlds leaving aside the odd *q* worlds. More formally, agent *A* defeasibly infers *p* from *q* iff *p* holds true in all the worlds where *q* is true under circumstances that *A* considers normal. Drawing the inference, agent *A* ignores the “odd” worlds, so to speak, where *q* is true under non-normal circumstances.

As our first ingredient we use the set of worlds *w* that make *q* true in a way that, as far as *A* knows, is stereotypical. For instance, if *q* = ‘Tweety is a bird’ and *A* has mainly to do with small-sized birds that fly, then worlds stereotypical for *q* are worlds where Tweety is small-sized and can fly. This is captured by the relation STEREO:

⁶ A final rise accent can rescue the dialogue. An assertion with final rise requests B's confirmation (see Gunlogson 2003 for English) and speaker *A* thus *questions whether B has concluded that the coat is Lisa's*.⁶ The following version of the dialogue is acceptable.

- (1) B (intern): *This raincoat is pink and of an expensive brand.*
A (expert): *Dann ist er wohl von Lisa L*H%*
 then is it wohl from Lisa
B (finding out that the coat belongs to Clara and that A knew all along):
Hey, why did you tell me it was Lisa's?
A: *I did not claim that. I asked whether this was what you concluded.*

A can thus agree with B's inference or can ask for B's inference but can not draw an inference and assert *wohl p* on B's behalf. I disregard non-cooperative dialogue where *A* makes a false claim, volitionally getting B into trouble. To my intuition, uttering (1) with a final fall in the mastermind situation is tantamount to lying.

- (20) Let *STEREO* be a relation on $D_e \times D_s \times D_{\langle s,t \rangle} \times D_s$ with the following truth conditions: For any individual A , world w_o , and proposition q ,
 $STEREO(A, w_o, q, w)$ holds true iff
 w is an epistemic alternative for A in w_o and
 q holds true in w under circumstances that A considers stereotypical.

I will illustrate the definition with the Tweety example. Assume that A knows ‘*Tweety is a bird*’ in w_o . The set $\lambda w.STEREO(A, w_o, \text{‘Tweety is a bird’}, w)$ contains all worlds that are consistent with what A knows and where ‘*Tweety is a bird*’ is true with the details being compatible with A ’s expectations: They will be worlds where Tweety is a canary, a robin or a sparrow and generally worlds where Tweety is a bird that can fly. The epistemic alternatives of A will also include worlds where Tweety is a penguin and thus can not fly but these are disregarded by *STEREO*.

Reference to stereotypical worlds goes back to Kratzer (1991) but the present account differs from her use of stereotypes in important ways. Kratzer assumes that worlds can be stereotypical *per se* whereas the present definition uses stereotypes relative to a given proposition q . This is necessary to account for defeasible inferences later. Simply put, a world that is stereotypical for ‘*Tweety is a bird*’ is not stereotypical for ‘*Tweety is a penguin*’ and we need to capture this distinction in a simple manner. Moreover Kratzer assumes a graded notion of stereotypicality. In addition to the modal base she proposes an ordering source g that lists stereotypes. More stereotypical worlds fulfill more of these stereotypes. To keep matters simple, I omit the notion of degrees of stereotypicality and adopt a simple categorical notion: w is stereotypical for q as far as A ’s experience goes. Further research may show that we need graded stereotypicality but for the present I use the simpler implementation.

Let us review some facts about *STEREO*. According to definition, $STEREO(a, w_o, q, w)$ entails that q holds true in w . It does however not follow that w_o (the actual world of a) is a stereotypical world for q . In fact, w_o can be non-stereotypical for many facts. It will moreover be important that different propositions q, q' can lead to different stereotypical worlds. The sets $\lambda w.STEREO(a, w_o, q, w)$ and $\lambda w.STEREO(a, w_o, q', w)$ are generally different. Finally, different agents a, b can have different experiences about how stereotypical q worlds look. Hence $\lambda w.STEREO(a, w_o, q, w) \neq \lambda w.STEREO(b, w_o, q, w)$, which will help us to account for the subjective nature of defeasible inference.

We can now turn to a modal definition for defeasible inference.

- (21) Let q, r be propositions. Assume that agent a in w_o knows q . Agent a can defeasibly infer r from q iff $\forall w(STEREO(a, w_o, q, w) \rightarrow r(w))$. In other words, all worlds where q is true in a stereotypical manner (as far as a ’s experience goes) are also worlds where r is true.

Let us see how the definitions play out in the case of Tweety, the bird. Let $q_1 = \text{‘Tweety is a bird’}$ and $r = \text{‘Tweety can fly’}$. Assume that agent a knows that q_1 is true. Assume moreover that $\lambda w.STEREO(a, w_o, q_1, w)$ contains only worlds where Tweety is a bird in a manner that a considers stereotypical. Assume that, among other things, a expects that Tweety can fly. Thus $\lambda w.STEREO(a, w_o, q_1, w) \subset r$ and a can defeasibly infer from q_1 that $r = \text{‘Tweety can fly’}$.

Assume next that a gathers new information $q_2 = \text{‘Tweety is an penguin’}$ and thus knows $q_1 \wedge q_2$. The stereotypical worlds $\lambda w.STEREO(a, w_o, q_1 \wedge q_2, w)$ are

different from those for q_1 . If a knows anything about penguins, ‘Tweety can fly’ is false in these worlds. They are thus not worlds where ‘Tweety is a bird’ is true in a stereotypical manner, and that is exactly the point. Based on new information, a draws new inferences and discards former ones. His newly acquired knowledge $q_1 \wedge q_2$ defeasibly entails that Tweety can not fly. Defeasible inference means that adding more premisses can cancel out former inferences, unlike what we find in classical logic and this is the kind of inference marked by evidential *wohl* in German. We can now define the semantic entry for *wohl*.

I adopt the LF structure for *wohl* proposed in (Zimmermann 2008). The particle *wohl* takes scope over the remaining sentence S which denotes the prejacent. The meaning of *wohl* refers to the utterance context c in the following ways: first, it is anchored to the speaker $sp(c)$. Second, there is a current issue that the speaker has to settle, minimally *whether p*.⁷ Third, there is a maximal body of relevant knowledge of $sp(c)$ that pertains to the issue. This leads to the following definition.

- (22) The denotation of *wohl* is a function from propositions to truth values defined as follows: $[[wohl]]^c, w_o = \lambda p \forall w (\text{STEREO}(sp(c), w_o, q(c), w) \rightarrow p(w))$
 It depends on utterance context c and world w_o . The context determines the speaker $sp(c)$, an issue Q and $q(c)$, the maximal body of knowledge of $sp(c)$ that is relevant for the issue.

Let me try to clarify the term “maximal body of knowledge $q(c)$ ”. While q is knowledge of the speaker it should not be mistaken as “everything that the speaker knows”. The speaker has in mind a certain issue—minimally, in the case of a declarative sentence S , the issue *whether S*. q is all and only the knowledge that is relevant for the speaker to decide the issue. Knowledge $q(c)$ is specific enough to serve as a meaningful answer to back-questions: When B asks “why do you think so?” she asks for specific reasons, not for anything or everything A happens to know. Likewise the notion of worlds where q is true under stereotypical circumstances is easier to control if q is a limited specific body of knowledge. Finally q must be maximal to avoid inconsistent inferences. If A knows that *Tweety is a bird* and *Tweety is a penguin* then A should take both into account when forming a belief as to whether Tweety can fly.—A similar notion of indexical knowledge is used in Hara’s analysis of Japanese *youda* which patterns with *wohl* in many respects (Hara 2006).

Let us apply (22) to an example.

- (23) *Hein ist wohl auf See.*
 a. LF: *wohl (Hein ist auf See)*
 b. $[[Hein ist auf See]]^c, w_o = \lambda w. \text{HEIN-AT-SEA}(w)$
 c. $[[wohl (Hein ist auf See)]]^c, w_o$
 $= [[wohl]]^c, w_o ([[Hein ist auf See]]^c, w_o)$
 $= \lambda p \forall w (\text{STEREO}(sp(c^*), w_o, q(c^*), w) \rightarrow p(w)) (\lambda w. \text{HEIN-AT-SEA}(w))$
 $= \forall w (\text{STEREO}(sp(c^*), w_o, q(c^*), w) \rightarrow \text{HEIN-AT-SEA}(w))$

⁷ I refrain from using the term „question under debate“ QUD to avoid predictions that are orthogonal to the present case.

Assume a context c^* where Maria utters (23), having in mind $q = \text{'Hein's duffel bag is missing'}$. Maria is the speaker in c^* and the issue at hand is something like *Is Hein at sea?* or perhaps *Where is Hein?* She knows q and her utterance refers to q (without explicating it). (23) can thus be paraphrased as “given what I know (about the issue), I infer that Hein is at sea”. I follow Zimmermann’s proposal that *wohl S* contributes asserted content (Zimmermann 2008). The assertion (23) can motivate the addressee to adopt Maria’s belief, in which case the common ground gets updated. According to the analysis, the net effect of the assertion in (23) is similar to the assertion *Hein is at sea* but differs in content.

2.3. Predictions

The proposed analysis accounts for the observations on *wohl p* in 2.1. We replicate Zimmermann’s insight that *wohl p* is weaker than $\text{KNOW}_{\text{sp}}(p)$. Zimmermann’s $\text{ASSUME}_{\text{sp}}(p)$ can be seen as a first approximation of the inferential meaning of *wohl*. The analysis is more fine-grained in that it accounts for the intuition that p is labeled as a defeasible inference. We can thus capture the reasoning behind the Granny-example.

- (24) A: *Oma ist wohl einkaufen gegangen.*
 Granny is wohl shopping gone
 relevant privileged knowledge $q = q_0 \wedge \dots \wedge q_3$
 q_0 : It is Friday afternoon.
 q_1 : Granny often goes shopping on Friday afternoon.
 q_2 : Her shopping bag and purse are missing.
 q_3 : Her slippers are in the hall.

The denotation of (24), uttered in a context c with speaker A and addressee B is derived as follows, where $q = q_0 \wedge \dots \wedge q_3$.

$$\begin{aligned} & [[\textit{wohl} (\textit{Oma ist einkaufen gegangen})]]^{c, w_0} \\ & = \lambda p \forall w (\text{STEREO}(A, w_0, q, w) \rightarrow p(w)) (\text{WENT-SHOPING}(\text{GRANNY})) \\ & = \forall w (\text{STEREO}(A, w_0, q, w) \rightarrow \text{WENT-SHOPING}(\text{GRANNY})(w)) \end{aligned}$$

The assertion is true in w_0 iff all worlds that A considers stereotypical for ‘It is Friday afternoon’, ‘Granny often goes shopping on Friday afternoon’, ‘Granny’s shopping bag and purse are missing’ and ‘Granny’s slippers are in the hall’ are worlds where Granny went shopping. Speaker A asserts that if the world is normal for his evidence q , Granny went shopping — which motivates the addressee to adopt the belief that Granny went shopping (Zimmermann 2008).

The utterance implicitly refers to A’s knowledge $q_0 \wedge \dots \wedge q_3$ and the addressee can ask A to spell out the implicit parameter. Thus questions like “*why do you think so?*” are plausible reactions to (24) without being offensive. Back-questions also justify our assumption that *wohl*-inferences rest on a specific body of *relevant* knowledge q rather than an unspecific range of worlds that are generally stereotypical. Reference to a limited body of knowledge allows us to delineate the stereotypical worlds that the speaker has in mind.

Finally, the analysis captures the subjective nature of *wohl* inferences. Whether or not speaker *A* is inclined to utter *wohl S* depends on two factors. First, the content of *wohl p* depends on the body of relevant knowledge *q* that pertains to *S*. What *A* knows can differ from what *B* knows and therefore *wohl S*, uttered by either one, differs in content. Second, the set $\lambda w.\text{STEREO}(A, w_o, p, w)$ which reflects *A*'s personal experiences with *p*-worlds differs from *B*'s expected stereotypical worlds $\lambda w.\text{STEREO}(B, w_o, p, w)$. This accounts for the difference between *defeasible inference from scientific theory* and *subjective opinion* that we saw in the measles example in 2.1.5. If doctor *A* utters “*You have wohl the measles*” she refers to her personal experience with respect to the symptoms listed. She thus leaves it open whether doctor *B* might draw different conclusions from the same symptoms—a semantic nuance that is not included or intended in the plain diagnosis “*You have the measles*”.

What about the observation that *wohl p* is not justified when *p* is merely statistically likely, as in the marble-examples? This observation does not follow immediately but seems to tell us more about how agents determine stereotypical worlds. The marble-example suggests that agents do not perceive a statistically likely outcome of a controlled experiment as more stereotypical than a statistically unlikely one. When we think about worlds where *A* draws a marble (ex. 11), stereotypical worlds for ‘*A drew a marble*’ appear to include worlds where the marble is white (the majority outcome) as well as worlds where the marble is black (the minority outcome). As far as stereotypes go, the unlikely outcome is no less stereotypical than the likely outcomes.⁸ In this case, I think, the data feed back to the proposed analysis and help to understand on what basis speakers decide that a *q*-case can be ignored—or not.⁹

2.4 Modals and evidential *wohl*

The present section surveys some differences between evidential *wohl* and epistemic modals, specifically as discussed in (von Fintel and Gillies 2010, 2011) and (Kratzer 1991). I argue that *wohl p* differs both from *might p* and *must p* in ways that are accounted for in the present analysis.

At first sight, epistemic *must p* is similar to German *wohl p* in that many speakers feel it to be weaker than the plain assertion *p*. For instance, Kratzer (1991) observes that the plain assertion (25a) conveys less uncertainty than the modal (25b).

- (25) a. *She climbed Mount Toby.*
 b. *She must have climbed Mount Toby.*

However, in a comprehensive review of earlier literature von Fintel and Gillies (2010) challenge this intuition and argue that the assertion in (25b) is in fact logically as strong as the one in (25a). According to their analysis, *must(p)* signals that *p* is not included in the privileged knowledge K_A of the speaker (which they label the

⁸ German informants generally agree with surprising consistency that *wohl* is not licensed in the marble scenario. It may be worth pointing out, however, that individual speakers and in particular expert statisticians are able to take *probably p* as weak evidence in favour of *p* and thus accept *wohl p* in this case.

⁹ It was suggested to me that statistical knowledge is not „episodic“ in the sense needed for *wohl*. It is unclear to me how to argue for this. If *A* observes how 9 white marbles and 1 black one are filled into an empty box, this seems no less episodic than *A* seeing Granny’s slippers in the hall.

‘kernel’). In formal terms, there is no $q \in K_A$ such that $q \subseteq p$ or $q \subseteq \neg p$. *Must(p)* presupposes that A has neither direct evidence for p nor for $\neg p$ and asserts that p is logically entailed by K_A .¹⁰ Their findings for *must* are paralleled by *wohl* in several respects. In particular, both items are anchored to the speaker and rest on his/her epistemic background. Both items make use of a privileged type of knowledge —von Fintel and Gillies by referring to the kernel, the present analysis by the speaker’s body of relevant knowledge q , including at least some episodic facts, that pertain to whether S . There are, however, also some important differences that warrant a different analysis.

First, they differ in logical strength. While *must* expresses classical entailment and *might* classical consistency, *wohl* is intermediate in that it expresses defeasible entailment. When the speaker utters *Oma ist wohl einkaufen gegangen* (ex. 12) he is prepared to withdraw the prejacent in the light of further evidence. In contrast, *must p* is logically as strong as p (von Fintel & Gillies, 2010). Note that semantic weakness is compatible with isolated examples where *wohl p* conveys a high level of certainty, as in Göbel’s example (10).

Second, *must/might* differs from *wohl* in scope-taking (Zimmermann 2008: section 3.3.). While modals can take scope below question formation, negation and other logical operators, *wohl* can not. The data in below offer one of many ways to illustrate this point. While *must* in (26) can take scope below negation/question (as evidenced by the answer), *wohl* can only be interpreted with high scope as shown in (9) above, repeated below.¹¹

(26) *Muss Hein in ein Unwetter geraten?*
 must Hein in a thunderstorm get
 “Must Hein necessarily get into a thunderstorm?”
 — *No.* (It is not necessary that Hein gets into a thunderstorm)

(27) *Ist Hein wohl auf See?*
 Is Hein wohl at sea
 #*Nein, ich nehme nicht an, dass Hein auf See ist.*
 No I assume not prt that Hein at sea is.
 #“No, I don’t assume that Hein is at sea”

A final important difference between epistemic *must* and *wohl* was discussed in section 2.1.6. Assertions *must p* are based on the speaker’s knowledge and different speakers with the same knowledge will come to the same conclusions. As a consequence we find *must* in mastermind dialogues where A can assert *must p* as if taking B’s perspective. Similar delegated judgements are not allowed for *wohl*. This justifies the additional subjective factor in our analysis, reference to personal stereotypes in addition to personal knowledge. It would be interesting to test whether evidentials in other languages share this subjectivity.

¹⁰ I restrict the comparison to von Fintel & Gillies’ simpler implementation. They propose an alternative variant in terms of update semantics but the differences between *must* and *wohl* are not affected by the choice of implementation.

¹¹ The differences in scope taking behavior have repercussions on some of von Fintel and Gillies’ data in favor of a logically strong semantics for *must p*. Their inference tests can not be replicated for *wohl* simply because *wohl* can not take scope below the conditional *if...then*.

These differences notwithstanding, some of von Fintel and Gillies' tests in favor of strong *must p* are also passed by *wohl p* and this observation is worth a comment. For instance the authors observe out that assertions *must p* are incompatible with *possibly not p* as in (28) (von Fintel & Gillies, ex. 16).

(28) #*It must be raining but perhaps it isn't raining.*

The observation can be replicated for *wohl*.

(29) #*Es regnet wohl, aber vielleicht regnet es nicht.*
 It rains wohl but perhaps rains it not

According to our analysis, *wohl* in (29) refers to knowledge *q* of the speaker (e.g., 'people come in wearing wet raingear') and restricts attention to worlds *w* where *q* is true in a stereotypical manner. The first clause in (29) states that these are worlds where it is raining. We could thus tentatively explain (29) as follows: The speaker's assertion conveys a simplification ("let's talk about typical *q* worlds") and the speaker can not give up this simplification in the same turn. Admitting 'not rain' as a possibility is tantamount to giving up the simplification, thus the markedness of (29).¹²—If instead we followed von Fintel and Gillies' diagnosis, we'd be forced to conclude that *wohl p* contributes a plain assertion *p*. This claim would be in conflict with the fact that *wohl* inferences are defeasible. An analogous argument holds for other parallels between *must* and *wohl* in von Fintel and Gillies' tests. They can not offer conclusive evidence for logical strength of *wohl p* or else speakers are irrational in their use of *wohl* in German.

A comparison of *wohl* to weak epistemic modals in English and German yields clear results. *Wohl* does not pattern with possibility modals, as demonstrated by the difference between coherent (30) and incoherent (31). Some of the versions of (31) are even ungrammatical.

(30) *It might rain but it might also not rain.*

(31) #*Es regnet wohl und/aber/... es regnet (auch) wohl (auch) nicht.*
 It rains wohl and/but/... it rains (also) wohl (also) not

One interesting similarity remains: Both *might* and *wohl* are re-oriented from speaker to addressee in questions. The question in (32) asks where the key is according to the addressee's knowledge.

(32) *Where might the key be?*

It would be nonsensical to interpret the question as "tell me where I believe the key might be".¹³ Section 3 adopts Lim's (2011) account to achieve the epistemic anchoring of assertions and questions to speaker, addressee or both.

¹² The effect might be similar to Portner's (1998) observation that modal bases remain constant throughout a limited piece of discourse. As a consequence, the sequence of clauses in (29) is incoherent.

¹³ A similar flip occurs for *wohl* in questions, which motivate Eckardt + Beltrama (subm./2018) to propose an analysis of *wohl* similar to *might* in terms of clouds of possible denotations (von Fintel & Gillies 2011).

Our final point of comparison is Kratzer's (1991) discussion of the Mount-Toby-examples, repeated below.

- (33) a. *She climbed Mount Toby.*
b. *She must have climbed Mount Toby.*

According to Kratzer, (33b) is a necessity modal with realistic modal base and stereotypical ordering source *g*. According to the analysis (33b) is logically weaker than (33a) (*pace* von Fintel & Gillies) and thus comes close to the meaning of *wohl*. Kratzer proposes that the ordering source contains "nonreliable" information, such as "maps, guide books, or hearsay". We should thus be able to paraphrase (33b) as "in all worlds *w* that are as the maps, guidebooks and hearsay describe, she has climbed Mount Toby" and the assertion is weaker than (33a) because it leaves open that maps or guidebooks (or hearsay) are wrong and she did not climb Mount Toby.

While I agree that stereotypes motivate defeasible inference, I think that the division of labour in Kratzer's paraphrase is still unbalanced even if her intuitions may be correct. I doubt whether wrong maps are the typical source of uncertainty in (33b). We do not normally worry about the correctness of maps or books but have in mind evidence like "*She went from X to Y*" or "*She went in direction Z and disappeared*". This could be hearsay but it could even be secure knowledge. Further knowledge could be "*Between X and Y is Mount Toby, as this map indicates*" (bringing in maps as a source of evidence). So far the speaker relies on facts. Uncertainty comes in where stereotypes are involved like *If she follows the way from X to Y she will normally not side-track*. Among the worlds that make the evidence true (*She went from X to Y, Between X and Y is Mount Toby, as this map indicates*) the most stereotypical worlds are those where *She follows the way from X to Y without side-tracking* and thus support *She has climbed Mount Toby*. We might thus suspect that Kratzer's account for *must p* comes in fact close to the present analysis of *wohl p*. It should be stressed, however, that my interpretation of Kratzer goes beyond (Kratzer 1991) which does not discuss specific examples.

Unlike Kratzer, the present account relativizes stereotypes to a proposition *q* and assumes that worlds are not stereotypical as such but stereotypical in a certain respect. This is inspired by the debate about inertia worlds in the analysis of the English progressive (Dowty 1979, Parsons 1990, Portner 1998) where it was argued that worlds at a time *t* are never *inert* in the abstract, bringing all ongoing events to their natural end but can only be inert for a certain given event: if John is crossing the road at *t* when he is hit by a truck, then inertia worlds from John's perspective are those where the truck disappears, but inertia worlds from the truck driver's perspective would be those where John never leaves the sidewalk. In a similar vein, I propose that worlds are never stereotypical as such but stereotypical for a given proposition. Thinking about Tweety the penguin, it would be difficult to decide whether stereotypical worlds *w* are those where Tweety can fly or those where he can not. Keeping the identity of Tweety constant, we would probably assume the latter. But then how could a speaker ever conclude from 'Tweety is a bird' that 'Tweety kann wohl fliegen' (Tweety can wohl fly)? Relativized stereotypical worlds offer a simple way to capture the semantics of *wohl*.¹⁴

¹⁴ I leave it open whether stereotypes relative to *q* can be captured in terms of Kratzer's ordering source *g*.

This concludes the discussion of *wohl* in declarative sentences and we can now turn to standard questions.

3. Evidential *wohl* in standard questions

While *wohl* in assertions is anchored to the speaker, it is anchored to the addressee in standard questions. The interrogative flip is shared by evidential markers in other languages and the present section adopts Lim’s (2011) analysis for Korean evidentials to the case of German *wohl*. Lim’s basic idea is strikingly simple. While questions normally denote sets of propositions, questions with evidentials have a more complex denotation. They denote a set of *characters* in the sense of Kaplan (1989) and thus anticipate possible utterances of the addressee. The characters account for the fact that the uttering person—the addressee of the question—will be the anchor for evidentials. Thus the flip from speaker to addressee is predicted.

In order to implement this idea for *wohl* we adjust the semantics as in (34) and assume that *wohl* maps propositions to characters. *Wohl* takes scope over the remaining clause *S* and combines with the denotation $[[S]]$ ^{c*} in utterance context *c**.

(34) *Meaning of ‘wohl’ (final version):*

$$[[\textit{wohl}]]$$
^{c*} = $\lambda p \lambda c \lambda w_o. \forall w (\text{STEREO}(sp(c), w_o, q(c), w) \rightarrow p(w))$

‘Given prejacent *p* and context *c*, the speaker *sp(c)* asserts that given her relevant knowledge *q(c)* with respect to the issue *Q* in *c*, all worlds where *q* is true under stereotypical circumstances are worlds where *p* holds true.’

The contribution of *wohl* in assertions is the same as in the earlier version (22), as illustrated in (35).

(35) *Hein ist wohl auf See.*

a. LF: *wohl* (*Hein ist auf See*)

b. $[[\textit{Hein ist auf See}]]$ ^{c*} = $\lambda w. \text{HEIN-AT-SEA}(w)$

c. $[[\textit{wohl} (\textit{Hein ist auf See})]]$ ^{c*}

$$= [[\textit{wohl}]]$$
^{c*} ($[[\textit{Hein ist auf See}]]$ ^{c*})

$$= \lambda p \lambda c \lambda w_o. \forall w (\text{STEREO}(sp(c), w_o, q(c), w) \rightarrow p(w)) (\lambda w. \text{HEIN-AT-SEA}(w))$$

$$= \lambda c \lambda w_o. \forall w (\text{STEREO}(sp(c), w_o, q(c), w) \rightarrow \text{HEIN-AT-SEA}(w))$$

The sentence denotes a character. Following Lim, I propose that the *c* argument in assertions is instantiated by the utterance context. Assume that *c** is a context where Maria utters (35). She relies on knowledge *q(c*)* = ‘Hein’s duffel bag is missing’. The denotation is instantiated with *c** and thus conveys the following.

(36) $\lambda w_o. \forall w (\text{STEREO}(\textit{maria}, w_o, \textit{‘duffel bag missing’}, w) \rightarrow \text{HEIN-AT-SEA}(w))$

‘all stereotypical worlds where *what I know is true* (namely, Hein’s duffel bag is missing) are worlds where Hein is at Sea’

Maria’s evidence *q* remains implicit. The addressee learns that *something* that Maria knows allows her to infer *Hein is at sea*. The addressee can trust and share Maria’s

inference and thus effect common ground update (Zimmermann 2008) or ask for Maria's evidence q (2.1.3).¹⁵

While the two semantic entries for *wohl* make identical predictions for assertions only (34) can account straightforwardly for the interrogative flip. I adopt a Hamblin semantics for questions, where Q denotes the set of propositions that are answers of Q .¹⁶ We also know that *wohl* scopes over question operators and thus combines with the denotation of Q .¹⁷ We assume pointwise semantic composition and thus derive a set of characters for the question *wohl* Q ? The derivation is illustrated in (37) for the question 'where is Hein?' with possible answers 'Hein is at Sea', 'Hein is at Hawaii' and 'Hein is at home'.

- (37) *Wo ist Hein wohl?*
 where is Hein wohl
 'where, do you think, is Hein?'
 a. $[[\textit{wo ist Hein?}]]$ ^{c*}
 $= \{ \lambda w. \text{HEIN-AT-SEA}(w), \lambda w. \text{HEIN-AT-HAWAII}(w), \lambda w. \text{HEIN-AT-HOME}(w) \}$
 b. $[[\textit{wohl (wo ist Hein)}]]$ ^{c*} = $[[\textit{wohl}]]$ ^{c*} ($[[\textit{wo ist Hein}]]$ ^{c*})
 $= \{ \lambda c \lambda w_o. \forall w (\text{STEREO}(sp(c), w_o, q(c), w) \rightarrow \text{HEIN-AT-SEA}(w))$
 $\lambda c \lambda w_o. \forall w (\text{STEREO}(sp(c), w_o, q(c), w) \rightarrow \text{HEIN-AT-HAWAII}(w))$
 $\lambda c \lambda w_o. \forall w (\text{STEREO}(sp(c), w_o, q(c), w) \rightarrow \text{HEIN-AT-HOME}(w)) \}$

The question denotes a set of characters that could all be paraphrased as "whoever answers the question in context c^* , s/he defeasibly infers from what s/he knows that p ". In other words, the addressee is offered a choice of utterances in response to (37) and whichever she chooses will hedge the answer with *wohl*. Assume that Tom utters (37) to Maria in c . The context parameter in the set of answers is not instantiated by c but freeze to wait for c^* where Maria provides an answer. Whichever of the proposed utterances, it will be instantiated with Maria's knowledge $q(c^*)$ relevant to Q and Maria's stereotypes. We thus predict the evidential flip in questions.

Lim's analysis may look highly unorthodox in that indexicality is *de-indexicalized*, so to speak. Context parameters, instead of being instantiated deictically, are "frozen" and conserved for future use. Similar analyses would not be adequate for classical indexicals in English or German such as pronouns and tense. The account is yet reminiscent of the semantics of shiftable indexicals in indirect and embedded indirect speech (Eckardt 2012) and might be typical for pragmatic particles and evidentials in general.

A final objection might be that the semantic entry of *wohl* seems over-complex and one should aim to derive the flip from general rationality principles. Yet, the additional level of complexity is justified once we take more languages and evidentials into account. San Roque et al. (2017) report on languages where some or all evidentials are prohibited in questions or give rise to different readings. If the flip rests on the special semantic type of *wohl* in German, *-te-* in Korean and other

¹⁵ Eventually an analysis should separate the assertion „Hein is at sea“ from the background information „the speaker infers this defeasibly from what she knows“. This can be achieved by rephrasing the account in terms of Murray (2014a).

¹⁶ We could instead use Groendijk + Stokhof's semantics for questions but I want to keep matters simple at this point. It will be important Section 4 that an analysis in terms of inquisitive semantics is not necessary to account for conjectural questions, *pace* Farkas (2017), Roelofson&Farkas (2017), Hara (2018).

¹⁷ Apart from the data in Zimmermann 2008, see also Lim 2011 for type-logical reasons.

flipping evidentials, we expect that other evidentials can not freeze indexicals and thus do not trigger flip. If the flip reading follows from general pragmatic principles, the missing readings must be accounted for in syntax. The extra complexity in (34) is thus an advantage of the present analysis.¹⁸

We now turn to the final part of the paper: The use of evidentials in conjectural questions and specifically *wohl* verb-end questions in German.

4. Conjectural verb-end questions in German

Conjectural questions are questions that do not request an answer from an addressee, like when we ask ourself a question in soliloqui. While most questions can be used in this sense, many languages can also mark conjectural questions by words or grammar. These conjectural questions thus *differ* from standard questions both in form and in pragmatic profile. In form they include extra words or morphemes or show non-standard syntax. At the meaning side they have the following pragmatic profile:

- a. they do not request an answer
- b. the addressee can remain silent without violating the rules of discourse
- c. they invite speculations based on pooled knowledge
- d. the speaker does not expect the addressee to know the answer
- e. but if the addressee happens to know, answering is a licit reaction.

These properties characterize German verb-end questions with *wohl*, as shown in 4.1. More generally, they cohere with data on conjectural questions elsewhere in the literature and thus serve as a tentative approximation of the pragmatics of conjectural questions.

I do not include the frequently used characterization that conjectural questions are “questions asked in the absence of an addressee” or “questions asked to oneself” (Jang 1999, Jang & Kim 1998, Miyagawa 2012 a.o.). This characterization is problematic in several respects. For one, not only conjectural questions but also standard questions can be asked in the absence of an addressee. Likewise, conjectural questions can be asked in the presence of an addressee and even with a clear communicative intention. Thus the absence of an addressee is neither necessary nor sufficient to characterize questions that are conjectural in form. Furthermore criteria such as “the presence of an addressee” become vague when we take into account play-acting by the speaker. Analyses of conjectural questions that rest on criteria like the physical presence or absence of second persons in context inherit these weaknesses. Instead, we aim at an analysis of conjectural questions that predicts the pragmatic profile above.

4.1. Data

¹⁸ For a survey of other flip accounts, see Lim (2011) who discusses Faller (2002), Garreth (2001) and Murray (2010), comparing their accounts for interrogative flip to the present analysis. I refer the reader to his arguments.

German questions that combine evidential *wohl* with verb-end syntax are interpreted as conjectural questions. The paradigm is summarized below where (38) repeats *wohl* in declaratives, (39) shows the interrogative flip and (40) presents *wohl* in a question in verb-end syntax. Verb-end syntax is normally found in subordinate clauses in German and thus (40) “looks like” a subordinate question but is not.

(38) *Der Schlüssel ist wohl noch im Auto.*
 The key is wohl still in-the car
 ‘The key is still in the car (as I defeasibly infer)’

(39) *Wo ist wohl der Schlüssel?*
 where is wohl the key?
 ‘Where, do you think, is the key?’

(40) *Wo wohl der Schlüssel ist?*
 where wohl the key is?
 ‘Where might the key be, I wonder’

The use of evidential *wohl* in (40) is mandatory in order to achieve the conjectural question reading. Constituent questions in verb-end syntax need *wohl* (or the archaic modal *mag*, see 46) to form an acceptable conjectural question.

(41) **Wo der Schlüssel ist?*
 where the key is?
 unavailable: ‘Where might the key be, I wonder’

While it might be tempting to propose that conjectural verb-end questions are elliptical constructions and in fact spell out as “*Ich frage mich, wo ...*” (‘I wonder where ...’), mandatory *wohl* offers a strong counterargument against this analysis. The particle *wohl* is not mandatory in questions embedded under verbs like *sich fragen* (‘wonder’). If (40) was an elliptical construction, we would expect that any overt subordinate question can give rise to ellipsis. Thus a question like (41) should be grammatical—which it is not. (Truckenbrodt 2011, Zimmermann 2011) offer further arguments in favour of a root clause analysis for (40).

Let us next delineate the pragmatic profile of conjectural questions. They are often described as “not requesting an answer from the addressee” (Truckenbrodt 2006, Lohnstein 2000, 2007, Altmann 1987, Oppenrieder 1989) which is more adequate than the criterion “no addressee” (e.g. Jang & Kim 1998). Conjectural questions are regularly used in the presence of a hearer, as in the following example. The question can initiate friendly joint speculations about the given topic, Karl.

(42) (A: I haven’t had any news about Karl in a long time. — B: Me neither. —)
 A: *Ob er wohl immer noch kubanische Zigarren mag?*
 whether he wohl still Cuban cigars likes
 ‘I wonder whether he still likes Cuban cigars’ (Truckenbrodt 2006)

The attested example (43) is similar in nature and intention.

- (43) (A and B, in coffee bar, observe a lonely stranded mattress leaning at the house next door.)
 A: *Wer die wohl da hingestellt hat?*
 Who that-one wohl there put has
 ‘Who may have left that one there I wonder’

Verb-end *wohl* questions are restricted to situations where the speaker expects that the addressee does not know the answer. Truckenbrodt argues that (44) is inappropriate.

- (44) A: I haven’t heard any news from Karl in a long time.
 B: I visited him last weekend.
 #A: *Ob er wohl immer noch kubanische Zigarren mag?*
 whether he wohl still Cuban cigars likes

If, however, the addressee happens to know the answer s/he can assert it. In this case *wohl* will not normally be used, as in the following example.

- (45) (Maarten and his wife Nicolien have just watched a cow giving birth to a calf. Maarten is an academic expert in “rural culture” and regularly visits farmers.)
Sie fahren weiter, ein Stück hinter dem Ehepaar. “Was wohl jetzt aus dem Kalb wird?”, fragte Nicolien. “Das wird geschlachtet”, sagte er. “Es ist ein Bullenkalf.” “Sofort?”, fragte sie erschrocken. ...
 ‘They were moving on, a little behind the other couple. What do you think might happen to the calf?, Nicolien asked. – It will be slaughtered, said he. It is a he-calf. – Immediately?, asked she, shocked....’
lit: ‘what wohl now to the calf happens?’
 (Voskuil, *Het Bureau 7*. Transl. by Gerd Busse)

All scenarios have in common that A wants to engage B in a speculative conversation about Karl, the calf or the nature of orphaned mattresses. The hearer can *decline* to speculate without triggering a conversational crisis, unlike if a standard question remains unanswered (Farkas & Bruce 2010). Yet, a topic has been proposed. Similar observations are reported for other languages (Valenzuela 2003 on Shipobo-Konibo, Peterson (p.c.) on Salish languages) and they should be taken seriously.

Before turning to the analysis let me review the full landscape of conjectural questions in German to give an idea of the overall complexity. Constituent verb-end questions can also get a conjectural interpretation when the archaic modal *mag* is used instead of *wohl*. *Mag* is cognate to English *may/might* but does not share the meaning of the modern English modals. The link fits nicely with the fact that CQ are marked with an uncertainty hedge but it does not offer the basis for a compositional analysis. Contemporary German speakers have no clear intuitions about the use and meaning of *mag* in assertions and I therefore leave *mag* unanalysed in the present paper.¹⁹

- (46) *Wo der Schlüssel sein mag?*
 where the key be may
 ‘where the key may be I wonder’

Polar questions pose a special case in that they allow conjectural interpretations without *wohl*.

¹⁹ *Mag* as a modal should not be mixed with modern G *mag* in the sense of *like, be fond of*.

- (47) *Ob der Schlüssel im Auto ist?*
 if the key in-the car is
 ‘Whether the key is in the car I wonder’

Some native speakers do not accept (47) at the beginning of a discourse (Gutzmann 2011).²⁰ In contrast, informants agree that polar verb-end questions with *wohl* are acceptable without contextual restrictions. I therefore assume that polar verb-end questions with *wohl* are the standard case and thus deviate from earlier authors who view (47) as the standard case of German conjectural questions and posit that verb-end syntax alone suffices to trigger conjectural readings (Oppenrieder 1989, Lohnstein 2000, 2007, Truckenbrodt 2006, Zimmermann 2013). Their assumption is problematic at least in that it can not explain why (41) is ungrammatical. A more detailed critique can be found in 4.3. and I leave polar questions like (47) for future research.

A last way to phrase conjectural verb-end questions in German makes use of *bloß/nur* (‘only’). This is possible both in polar and constituent questions.

- (48) *Wo bloß der Schlüssel ist!?*
 where only the key is
 ‘where in heaven may the key be (I wonder)’

Questions with *bloß/nur* have an exasperated undertone and I tentatively translate them as *wh-in-heaven* questions in English (Rawlins 2009/2013). The contribution of *bloß/nur* in questions has yet to be researched and conjectural questions of this type will also be left aside. The present analysis is limited to verb-end questions with *wohl* as a mandatory semantic element. Possible extensions to other cases will be briefly discussed in the final section.

4.2. Analysis

Let me once more start with the basic idea. Inferential evidentials indicate that the sentient agent *knows* certain propositions and *infers* other propositions. The sentient agent is the speaker in assertions, the addressee in questions. I propose that conjectural questions ask for answers that are defeasibly inferred from *pooled knowledge of speaker and addressee*. Speaker A’s intention behind the question could be paraphrased as “which answers do we get if we pool our beliefs and draw defeasible inferences?” A proposes to pool knowledge and then decide on plausible inferences. Given that defeasible inferences are in play, the addressee B can not start inferring from his private knowledge because the speaker could know facts that defeat these inferences. Faced with A’s proposal—wrapped in a question—the addressee has hence three ways to react:

1. the addressee can engage in joint speculations on the given topic

²⁰ Acceptance is facilitated in situations where the polar question is interpreted as a guess (‘the key is in the car’) rather than a question (Oppenrieder 1989). The restrictions on licensing contexts are however unclear and speakers report shifting intuitions.

2. the addressee can leave the question alone because he is (obviously) not authorized to provide a answer unless further information has been exchanged
3. the addressee happens to know the true answer to the question. Asserting the answer is then a permitted reaction to the speaker's request.

The formalization makes use of a silent operator *SHARE* that serves two purposes. In syntax, *SHARE* blocks movement of the verb to C^0 and thus ensures verb-end syntax. Semantically, the operator instantiates the sentient agent of *wohl* with $sp(c) \oplus ad(c)$, the plurality of speaker and addressee. We first implement an analysis for *wh*-verb-end questions before turning to polar verb-end questions.

4.2.1. Wh-verb-end questions

Conjectural *wohl* questions in German suggest that the conjectural meaning comes about by evidential plus a further factor *X* coded as verb-end syntax. I follow Bayer and Obenauer's (2011) minimal CP / ForceP analysis for German. In standard main clauses the verb is fronted to C^0 , yielding V2 syntax (declaratives) or V1 syntax (questions, imperatives). Open or silent elements in C^0 block verb-movement and thus force verb-end syntax.

I propose that the syntax and pragmatics of *wh*-verb-end questions is determined by the silent operator *SHARE*. Syntactically, *SHARE* is situated in C^0 of questions. It must be licensed by the presence of a *wh*-feature. The *wh*-constituent is fronted to SpecC like in ordinary questions, but *SHARE* in C^0 prevents the verb from moving to second position and thus forces verb-end syntax.

The meaning of *SHARE* in context *c* effects a context shift defined in (49). The function **** maps contexts to contexts in the following way:

- (49) For context *c* and question at issue *Q* in *c* let c^{**} be the context with
- $$sp(c^{**}) = sp(c) \oplus ad(c)$$
- $$q(c^{**}) = q_{sp(c)} \wedge q_{ad(c)} \text{ where}$$
- $q_{sp(c)}$ = the maximal relevant knowledge of *sp(c)* about *Q* in *c*
 $q_{ad(c)}$ = the maximal relevant knowledge of *ad(c)* about *Q* in *c*
all other context parameters of c^{**} as in *c*.

The context c^{**} is thus like *c* with speaker and addressee as responsible agents.²¹ Note that (49) slightly extends our earlier notion of context in that it includes the maximal relevant knowledge of the addressee about *Q*. This has not so far been an acknowledged context parameter. Yet it is natural to assume that, given a question at issue, both interlocutors have *some* knowledge that pertains to *Q* (if only tautology *T*) and that we can thus make use of $q_{ad(c)}$. We can now define the denotation of *SHARE* as follows.

- (50) $[[\text{SHARE}]]^c = c^{**}$

SHARE derives the context with jointly responsible agents and makes it available for its sister constituent. The meaning of *SHARE* limits the questions in which it can

²¹ Similar contexts with plural speakers are used in von Stechow and Gillies (2011) in their analysis of *might*.

occur. SHARE can only make a semantic contribution if it meets a function that takes contexts as its argument. As we saw in section 3, clauses do not usually denote characters because the context-dependent elements are interpreted indexically. Evidential *wohl* is special in that it can “freeze” context parameters for future instantiation. We therefore predict that SHARE is only felicitous if *wohl* or other freezing operators are part of the sister clause. Let us see how the analysis plays out in an example and assume that A utters to B:

- (51) *Wo Hein wohl ist?*
 where Hein wohl is
 ‘where might Hein be, I wonder’

The syntax of (51) is as in (51a).

- (51) a. [_{CP} [_{SpecC} *wo*] [_C SHARE [_{IP} *Hein wohl t_I ist*]]]

At LF *wohl* c-commands the remaining clause. SHARE takes highest scope and is interpreted last.²² Semantic composition thus proceeds in the following steps.

- (51) b. [[*Wo ist Hein?*]]^c
 = { $\lambda w.$ HEIN-AT-SEA(w), $\lambda w.$ HEIN-AT-HAWAII(w), $\lambda w.$ HEIN-AT-HOME(w) }

- (51) c. [[*wohl (wo ist Hein?)*]]^c
 = { $\lambda c \lambda w_o. \forall w$ (STEREO($sp(c)$, w_o , $q(c)$, w) \rightarrow HEIN-AT-SEA(w))
 $\lambda c \lambda w_o. \forall w$ (STEREO($sp(c)$, w_o , $q(c)$, w) \rightarrow HEIN-AT-HAWAII(w))
 $\lambda c \lambda w_o. \forall w$ (STEREO($sp(c)$, w_o , $q(c)$, w) \rightarrow HEIN-AT-HOME(w)) }

- (51) d. [[SHARE (*wohl (wo ist Hein?)*)]]^c
 = { $\lambda w_o. \forall w$ (STEREO($sp(c) \oplus ad(c)$, w_o , $q_{sp(c)} \wedge q_{ad(c)}$, w) \rightarrow HEIN-AT-SEA(w))
 $\lambda w_o. \forall w$ (STEREO($sp(c) \oplus ad(c)$, w_o , $q_{sp(c)} \wedge q_{ad(c)}$, w) \rightarrow HEIN-AT-HAWAII(w))
 $\lambda w_o. \forall w$ (STEREO($sp(c) \oplus ad(c)$, w_o , $q_{sp(c)} \wedge q_{ad(c)}$, w) \rightarrow HEIN-AT-HOME(w)) }

The resulting question can be paraphrased as follows: “Where—if we pool our knowledge—would we infer Hein to be? Would you and me together expect Hein at sea, Hein at home or Hein at Hawaii?”

In order to provide an answer, speaker and addressee have to agree on their relevant pooled knowledge $q_{sp(c)} \wedge q_{ad(c)}$ and about the stereotypical circumstances of making it true. Note that pooled knowledge is not the same as shared knowledge in the sense of the common ground CG: A and B must aim to maximize the relevant knowledge that pertains to the question. The addressee B can not offer an answer right away unless he knows what speaker A knows about the issue. As long as he doesn’t, B’s inferences could be defeated by A’s knowledge. Remember also that B is not permitted to draw inferences on A’s behalf (2.1.6). Let us review some scenarios.

Scenario 1. The addressee B does not know where Hein is and decides to react. The addressee must request A’s information $q_{sp(c)}$ and contribute $q_{ad(c)}$. Once both agree on stereotypical worlds where $q_{sp(c)} \wedge q_{ad(c)}$ is true they can agree on an answer. This is the

²² Alternative orders of composition would clash for type reasons.

scenario where the interlocutors engage in joint speculation. The course of speculation as well as its endpoint are vague; it would be misleading to view conjectural questions as a kind of quiz that must be resolved.

Scenario 2. The addressee B does not know where Hein is and does not know what A might know about the issue. Even if B knows facts from which an answer can be inferred, his inference could be defeated by facts that A knows. B is therefore not in a position to answer. It would even be redundant to say “*I don’t know*” because A expects that B does not know. B is permitted to remain silent.²³ If (51) was a standard question the silent addressee would be uncooperative: he neither provides an answer nor a comment to the end that he is ignorant about the question. For conjectural questions of this kind, however, silence is the conventional way to confirm ignorance.²⁴

Scenario 3. The addressee B does know where Hein is. Let us assume that $p = \text{Hein is at Hawaii}$. The logic of question (51) entails that B is authorized to answer p in this particular case. The addressee B knows p . Therefore all epistemic alternatives of B are included in p . For any further proposition r , the stereotypical r worlds (of the addressee) are therefore also in p : $\lambda w. \text{STEREO}(B, w_o, r, w) \subset p$. Thus no matter what further evidence r the speaker may provide, the inference that p will remain. In brief, known answers are predicted to be indefeasible and therefore no further speculation is needed to settle the question about Hein’s whereabouts.

Scenario 3 is an important option. It not only accounts for the “calf”-example in (45), we also predict that conjectural questions must be answered if the speaker is knowledgeable. This allows us to understand why speakers can only use verb-end questions with *wohl* when they believe that the addressee does not know the answer. Answers are not only allowed by general pragmatic cooperativity principles but necessary in the sense that the addressee in scenario 3 is able and thus obliged to react to the speaker’s request. It is also reasonable to assume that verb-end questions have non-standard syntax and additional evidential are therefore more complex (or *marked* in the sense of Levinson 2000) than standard questions. If the speaker wants to get an answer and believes that the addressee knows the answer he’d prefer the standard question in comparison to the marked verb-end question. The speaker resorts to the marked option *only* if the intention behind the question is more complex than “asking”. Verb-end questions with *wohl* are therefore restricted to situations where the speaker does not believe that the addressee knows the answer.²⁵

It also follows that verb-end questions with *wohl* do not occur in other non-standard question situations. They can not be used as rhetorical questions, i.e. when A knows the answer and believes that B also knows the answer. Apart from the fact that

²³ This may be by convention. Yet it seems a „reasonable“ convention as all other possible reactions are superfluously wordy.

²⁴ This is comparable to silence as conventional means to accept a claim in Farkas & Bruce (2010) account for assertions at the table. Interestingly, Littell et al. (2010) assume the same reason for conjectural questions remaining unanswered, even though their analysis differs from the present one in its semantic/pragmatic core.

²⁵ The account predicts that informed addressees who do not answer a conjectural question are uncooperative. There is to date no empirical research as to whether this prediction is true. To my intuition, the speaker can complain once she discovers that information has been withheld. Uncooperativity is however less evident than in the case of standard questions to which silence is not a permissible move in dialogue.

standard questions, once again, are the less marked form for this question type, rhetorical questions should be viewed as a grammatical structure in their own right as speakers use prosody as an additional cue that triggers the rhetorical reading. Consider finally exam situations where A knows the answer and wants to test whether B does, too. The request conveyed in conjectural questions is incompatible with this type of situation, as speaker A volunteers to contribute his relevant body of knowledge in joint discussion. In an exam situation, this is exactly what the examiner does not want to do. The present analysis hence predicts that verb-end questions with *wohl* are not appropriate in exams, which is in fact the case.²⁶

The proposed analysis can capture the pragmatic profile of conjectural verb-end questions in German, as discussed for the case of constituent questions. The dual case, polar verb-end questions with *wohl*, follows the same steps of analysis which however map to syntax in slightly different ways. The next subsection details the implementation of this case; the differences are restricted to the relation between syntax and semantics and do not affect the semantic and pragmatic core of the analysis.

4.2.2. Polar verb-end questions with *wohl*

Polar verb-end questions in German differ from the earlier case in showing *ob* in C^0 . Unlike the question complementizer, this ‘*ob*’ occurs in root clauses without being licensed by a matrix predicate. The entry thus differs from standard *ob* in syntax, let us call it ob_{CQ} for the moment. Let us moreover assume that ob_{CQ} has the same denotation as SHARE in *wh*-verb-end questions:

$$(52) \quad [[ob_{CQ}]]^c = c^{**}$$

where c^{**} is derived from c as in (49)

The C^0 -head ob_{CQ} is therefore limited to the same syntactic and semantic environments as SHARE in 4.2.1. The composition is illustrated in (53). The question operator ? derives the polar question meaning and takes scope below *wohl* and ob_{CQ} .

(53) *Ob Hein wohl auf See ist?*

$$(53) \quad a. [[?Hein ist auf See]]^c = \{\lambda w. \text{HEIN-AT-SEA}(w), \lambda w. \neg \text{HEIN-AT-SEA}(w)\}$$

$$(53) \quad b. [[wohl(?Hein ist auf See)]]^c =$$

$$\{\lambda c \lambda w_o. \forall w (\text{STEREO}(sp(c), w_o, q(c), w) \rightarrow \text{HEIN-AT-SEA}(w))$$

$$\lambda c \lambda w_o. \forall w (\text{STEREO}(sp(c), w_o, q(c), w) \rightarrow \neg \text{HEIN-AT-SEA}(w))\}$$

$$(53) \quad c. [[ob_{CQ}(wohl(?Hein ist auf See))]]^c =$$

$$\{\lambda w_o. \forall w (\text{STEREO}(sp(c) \oplus ad(c), w_o, q_{sp(c)} \wedge q_{ad(c)}, w) \rightarrow \text{HEIN-AT-SEA}(w))$$

$$\lambda w_o. \forall w (\text{STEREO}(sp(c) \oplus ad(c), w_o, q_{sp(c)} \wedge q_{ad(c)}, w) \rightarrow \neg \text{HEIN-AT-SEA}(w))\}$$

The resulting question can be paraphrased as follows: “What—if we pool our knowledge—would we expect? Would you and me together expect that Hein is at sea

²⁶ I thank the reviewers for bringing up the issue.

or that Hein not at sea?” As before the addressee can react in three ways: Engage in speculative discourse, leave the question unanswered or provide an answer, if known.

In summary I propose that conjectural questions with *wohl* ask for answers that defeasibly follow from pooled knowledge. The question can not be answered unless the interlocutors have shared their relevant knowledge *q* and agreed on stereotypical worlds where *q* is true. At the beginning of discourse in particular, the interlocutors have no pooled knowledge and the addressee can not provide a simple answer. Instead, the addressee can remain silent or engage in speculative discourse about the given topic.

The speaker expects that the addressee does not know the answer. In case the speaker is wrong and the answer *is* known to the addressee, he is allowed and in fact expected to answer. Verb-end questions with *wohl* thus compete with standard questions as a way to gather information. Standard questions, being shorter and in standard syntax, are less marked and therefore the preferred way to request information. This explains why conjectural *wohl* questions are restricted to contexts where the speaker does not request an answer from the addressee.

4.3. Earlier analyses of conjectural questions

The present section surveys earlier formal analyses of conjectural questions and relates them to the present account.

(Lohnstein 2007, Truckenbrodt 2006) investigate German polar verb-end questions and propose that subordinate clause syntax is their key feature. Both authors assume that verb movement to C^0 is a necessary prerequisite to express a speech act in German. The pragmatic profile of conjectural questions supposedly emerges as the result of two conflicting cues: The speaker utters a question but one that does not express a proper speech act. Roughly speaking, the addressee interprets these cues as “the speaker wonders about Q” and “I am not supposed to do anything about it”. Truckenbrodt (2006) models the two cues in terms of syntactic features in ForceP. Some feature constellations are only possible in verb-end clauses and do not express that the speaker requests a reaction from the addressee whereas other constellations (triggered by verb movement to C^0) express a request and thus a speech act proper. While the analysis captures the difference between standard polar questions and (conjectural) polar verb-end questions, it fails to predict *wohl* as an obligatory element in conjectural *wh*-questions (see (41)). It is also challenged by German verb-end questions that *do* convey requests: Verb-end questions can serve as repeat questions that draw the interlocutor’s attention back to an open question (Oppenrieder 1989, Disselkamp 2017). (Plunze & Zimmermann 2006) call into doubt the claim that conjectural questions do not request anything from the addressee and point out that “not answering” and “not doing anything” should be kept apart. Finally, the analysis is tailored for German in that subordinate clause syntax is not a triggering feature for conjectural questions in other languages. The present analysis is better suited to understand the interaction between evidentials and the pragmatic profile of questions, an aspect to be taken up in Section 5. (Zimmermann 2011) mentions *wohl* as an element of German conjectural questions and notes a certain “harmony” of *wohl* in questions and verb-end syntax, however without further analysis.

Evidentials in Salish languages are in focus in (Littell, Matthewson and Peterson 2010). The authors discuss inferential evidentials as cues for conjectural

questions and propose to capture the meaning of evidentials in terms of presuppositions, roughly “the agent has evidence that entails p ”. In questions, they argue, each possible answer p' presupposes that the addressee has evidence which entails p' . According to this analysis, the question as a whole presupposes that the addressee has evidence in favour of any possible answer p' to the question. This being always an unlikely and often a contradictory presupposition, they argue, the addressee is relieved from the obligation to answer. The account thus agrees in spirit with the present analysis in that conjectural questions are viewed as too demanding to be answered. However, the analysis overgenerates because the predicted semantic interaction of evidentials and questions should generalize to all evidentials in other languages. In view of the fact that evidentials often show the interrogative flip instead, this is problematic. It is also open whether the authors would maintain their analysis for Salish inferential evidentials like *k'a* (St'át'imcets), as they argue in other work that evidentials pattern with modal operators rather than presupposition triggers (Matthewson, Davis & Rullmann 2007).

Japanese conjectural questions have been at the focus of attention in a series of papers in recent years. Among those are conjectural questions marked with the evidential morpheme *daroo* which are particularly relevant for our case. The syntactic approaches in (Sugimura, 1986, Miyagawa 2012, Oguro 2017) take an extended speech act phrase as their starting point. The presence / absence of *daroo* as well as honorific markers is mediated by the presence / absence of a SpeakerPhrase and HearerPhrase in the sense of (Speas & Tenny 2003). While the accounts are adequate in their predictions of grammatical and ungrammatical questions, the interface to semantics as well as the meaning of conjectural questions remains open. It is unclear whether the authors want to claim that a sentence without HearerP is ungrammatical in the presence of an addressee (and, vice versa, a sentence with HearerP is ungrammatical in soliloqui) as they fail to spell out how syntactic features, pragmatic restrictions and the world relate to each other.—More interesting for the present account are the semantic analyses of *daroo* in assertions and questions by Yurie Hara. (Hara 2006) analyzes *daroo* as inferential evidential and compares its interpretation in assertions to those of several other Japanese evidential morphemes. (Hara, 2018) undertakes a semantic analysis of *daroo* in conjectural questions in terms of inquisitive semantics (Ciardelli & Roelofson 2012). The chosen framework is ideally suited to model discourse situations where an issue (proposition or question) is at the speaker's mind, disregarding whether a question has been openly posed or not. (Hara 2018) proposes that *daroo* conveys that the denotation of the prejacent is an issue for the speaker, where “issue” in inquisitive semantics covers both (traditional) propositions and questions. The complex pattern of Japanese questions / assertions with or without *daroo* emerges as a joint effect of *daroo* and an interpretation for sentence accents in Japanese (final rise/fall, see Hara 2012, Miyagawa 2012). While the analysis correctly predicts the data under investigation, the denotation of evidential *daroo* no longer captures the evidential meaning that was detailed in earlier work (Hara 2006). Evidential assertions of the form *daroo*+S, according to the most recent (Hara 2018), are synonymous to the proposition ‘the speaker knows S’; the observed hedging effect of the evidential is attributed to Gricean competition between less and more complex assertion.

Since the work of Gunlogson (2003) there is a rising interest in frameworks that model the conversational scoreboard (Farkas & Bruce 2010, Farkas & Roelofson 2017, Farkas 2017). Farkas and Roelofson envisage a novel division of labour between words that determine semantic content, on one side, and other cues

(words/morphemes) that serve to determine the profile of the sentence in discourse, on the other side. Farkas (2017) brings this vision to bear on Romanian conjectural questions with particle *oare*. She codes the contribution of *oare* in questions in terms of the table model (Farkas & Bruce 2010) by an instruction that the conjectural question can be removed from the table without the addressee providing an assertion in answer to the question. In terms of the table model, the analysis predicts that conjectural *oare* questions can remain unanswered without leading to a situation of crisis, and without blocking the dialogue in an instable state.

While the analysis is extremely helpful to get a better understanding for the ontology of moves and reactions in natural language dialogue, it is less suited to understand the semantic link between evidential in assertions and evidential in question—which is not a shortcoming of Farkas’ analysis, given that *oare* is not an evidential marker in Romanian. A table-based analysis leads us to expect that any morpheme could serve as a cue for conjectural questions. The aim of the present analysis, in contrast, is to understand the typological fact that evidentials are highly correlated with conjectural questions. We want to understand the semantic closeness between evidential and conjectural question rather than stipulating it as an accidental lexical fact.

5. Summary and Outlook

5.1. Summary

The present paper investigates the meaning and use of the German discourse particle *wohl* in different sentence types. Its use in declarative sentences suggest that *wohl* is an evidential of the inferential type (Willett 1988). When the speaker utters *wohl p*, s/he has relevant knowledge *q* with respect to a current issue (minimally *whether p?*) and that *q* defeasibly entails that *p*. The utterance content can be paraphrased as “given what I know I defeasibly infer that *p*”, thus refining earlier analyses (Zimmermann 2004, 2008). I propose a denotation of *wohl* where “defeasibly inferred” is spelled out in terms of a modal analysis.²⁷ Turning to *wohl* in standard questions, the most important observation is the interrogative flip. While *wohl* is anchored to the speaker’s epistemic background in assertions it is anchored to the addressee in questions. This can be captured by transferring the analysis in (Lim 2011) to *wohl* which leads to the final denotation in (34), repeated below:

(54) *Meaning of ‘wohl’ (final version)*

$$[[\textit{wohl}]]^{c*} = \lambda p \lambda c \lambda w_o. \forall w (\text{STEREO}(sp(c), w_o, q(c), w) \rightarrow p(w))$$

For any prejacent *p*, the speaker *sp(c)* asserts that given her maximal body of relevant knowledge *q(c)* with respect to the current issue in *c*, all worlds that make *q* true in the stereotypical way are worlds where *p* holds true.

Wohl is “freezing” the indexical parameters for future instantiation in context. In declarative sentences the relevant context is the utterance context. Questions refer to the utterance context of the prospective answers where the present addressee is the speaker. (54) thus predicts the interrogative flip. Finally we looked at *wohl* in verb-

²⁷ (Korotkova 2014, 2017) argues convincingly that a denotation for evidentials in terms of modal logic does not entail that the evidential is a „modal“ in the linguistic sense—and vice versa.

end questions. German verb-end questions with *wohl* are interpreted as conjectural questions. The particle *wohl* is mandatory in conjectural *wh*-questions and possible in conjectural polar questions and the present analysis is geared towards these cases. I propose that verb-end syntax in conjectural questions is forced by elements in C^0 that block V-to- C^0 movement. In polar questions this element is ob_{CQ} and in *wh*-questions it is silent SHARE. Both operators make the same semantic contribution: They anchor *wohl* to the group of $sp(c) \oplus ad(c)$, their pooled knowledge and their shared inferences. The essence of German conjectural *wohl* questions Q is an invitation to pool relevant knowledge q about Q and to defeasibly derive answers p . Reactions are limited to one of three ways: The addressee can accept the invitation and enter in speculative dialogue; remain silent (because the question is too demanding); or—if the answer happens to be known to the addressee—can answer the question. Conjectural questions compete with standard questions which are the preferred means for the speaker to request an answer. Therefore verb-end *wohl* questions are restricted to contexts where the speaker believes that the addressee does not know the answer to Q .

The present analysis differs substantially from earlier accounts for German verb-end questions in that I take the evidential as the core cue of conjectural questions. Earlier accounts were centered around non-standard syntax which, in the case of polar questions, can suffice to trigger the conjectural question reading. The particle *wohl* was taken to be a pragmatically congruent but essentially superfluous add-on, a view that can not explain why *wohl* is mandatory in conjectural *wh*-questions. The strong semantic link between evidentials and conjectural questions is confirmed when we look at a wider range of languages, as the final survey shows.

5.2 Outlook: Evidentials in conjectural questions in other languages

Typological literature on evidentials is typically focussed on evidentials as bound morphemes. The present perspective is somewhat broader as we include free morphemes, re-interpreted tense forms and other ways to express evidentiality. My survey rests on the recent summaries in San Roque et al. 2017, Hintz & Hintz 2017 but includes several well-researched further cases. These are their findings on evidentials in questions:

Some languages, like Eastern Pomo (SanRoque et al. 2017) allow evidentials in questions that are anchored to the speaker, but these cases seem rare and yield readings that are difficult to paraphrase. Much more common in questions are the interrogative flip or an interpretation as conjectural question. The interrogative flip is reported for Quiang (SanRoque 2017), Tsafiki (Aikhenvald 2004a), Nganasan (Uralic, Aikhenvald 2004a), Macedonian (Friedmann 2003), Turkish (Merikli 2016), Korean (Lim 2011), Cuzco Quechua (Faller 2002) along with German *wohl* as investigated here.

A broad range of non-related languages use evidentials to mark conjectural questions. These include Ecuador Quechua (San Roque et al. 2017), Gitksan, St'át'imcets and Neleʔkepmxcín (Littell et al. 2010), Cuzco Quechua (Faller 2002), Cheyenne (Murray 2010, 2004a, 2016), Tariana (Aikhenvald 2003), Shipobo-Konibo (Valenzuela 2003), Japanese (Hara 2006, 2018). Italian has grammaticized a second reading for future tense in assertions, which can be interpreted as evidential (Mari 2010). Italian evidential future triggers conjectural questions (Eckardt & Beltrama, subm./2018) which, according to informants, serve to initiate joint speculative discourse (Zucchi, p.c.). Overall there are recurring remarks to the end that

conjectural questions invite joint speculation (Valenzuela 2003 on Shipobo-Konibo, Peterson (p.c.) for Salish languages).

How can we analyse questions where evidentials trigger a conjectural reading directly? Let me use *<evid>* as a cover term for these. The evidentials *<evid>* in these languages can not be context-freezing operators or else we predict interrogative flip. The evidential in assertions should have a denotation like the one assumed for *wohl* in (22) whereas the evidential in a question additionally triggers the change from utterance context *c* to *c***. We could propose the following second entry for *<evid>* in questions:

$$(55) \quad [[\langle \text{evid} \rangle]]^c \\ = \lambda p. \lambda w_o. \forall w (\text{STEREO}(sp(c) \oplus ad(c), w_o, q_{sp(c)} \wedge q_{ad(c)}, w) \rightarrow p(w))$$

The proposed *<evid>* in questions anchors answers to the epistemic background of speaker and addressee and thus predicts that the question invites joint speculation on basis of pooled knowledge. The analysis assumes that *<evid>* in questions integrates the semantic factors that play out in German into one overt morpheme. Let me stress that I do not claim that all inferential evidentials in other languages are necessarily synonymous to *wohl*. The crucial common structure is their anchoring to an agent and its interplay with context and sentence type.

To complete the picture we can look at languages that use other cues for conjectural questions, like the particle *oare* in Romanian (Farkas 2017) or *yara* in Japanese (Oguro 2017). To make a specific proposal, the cue *<cue>* in such questions could have the following denotation.

$$(56) \quad [[\langle \text{cue} \rangle]]^c \\ = \lambda p. \lambda w_o. \forall w (\text{STEREO}(sp(c) \oplus ad(c), w_o, q_{sp(c)} \wedge q_{ad(c)}, w) \rightarrow p(w))$$

It takes scope over question formation and combine with a proposition, once again merging the meanings of *wohl* and SHARE. German verb-end syntax in polar questions could be such a further cue (see 47). The denotation in (56) in fact severs the meaning of conjectural inquisitives from the expression of evidentiality.

The present analysis of German verb-end questions has thus provided semantic elements that might be in play in other cases where conjectural questions and evidentials meet. We tentatively proposed an independent operator that can turn question meanings into question denotations that trigger the reactions we see for conjectural questions. Future in-depth studies of evidentials and their effects in other languages will have to show whether the account captures the pragmatics of conjectural questions in a universal sense.

References

- Aikhenvald, A. Y. 2003. *A Grammar of Tariana from Northwest Amazonia*. Cambridge University Press, Cambridge.
- Aikhenvald, A.Y. 2004a. *Evidentiality*. Oxford University Press, Oxford.
- Aikhenvald, A.Y. 2004b. Evidentiality: problems and challenges. In: van Sterkenburg, P. (Ed.), *Linguistics Today – Facing A Greater Challenge*. John Benjamins, Amsterdam/Philadelphia, 1–29.

- Altmann, Hans. 1987. Zur Problematik der Konstitution von Satzmodi als Formtypen. In Jörg Meibauer (ed.), *Satzmodus zwischen Grammatik und Pragmatik*. Tübingen: Niemeyer, 22–56.
- AnderBois, Scott. 2016. Illocutionary mirativity: The case of Yucatec Maya *bakáan*. In Bui Thuy and Ivan Rudmila-Rodica (eds.), *Proceedings of SULA 9: Semantics of Under-Represented Languages in the Americas*. Amherst, MA: GLSA Publications.
- AnderBois, Scott. 2017. An illocutionary account of reportative evidentials in imperatives. In: *Proceedings of Semantics and Linguistic Theory SALT 27*.
- Ciardelli, Ivano A. and Roelofsen, Floris. 2015. Inquisitive dynamic epistemic logic. *Synthese*, 192(6), 1643–1687.
- Davis, Christopher, Christopher Potts and Margaret Speas. 2007. The pragmatic values of evidential sentences. In T. Friedman and M. Gibson (eds), *Proceedings of SALT XVII*, Ithaca, NY: Cornell University, 1–88.
- den Dikken, Marcel and Anastasia Giannakidou. 2002. From *Hell* to polarity: “aggressively non-d-linked” *wh*-phrases as polarity items. *Linguistic Inquiry* 33, 31–61.
- Disselkamp, Gisela. 2017. The Pragmatics of Speaker Repeat Questions. Poster, presented at *ESSLLI 2017*.
- Dowty, David. 1979. *Word meaning and Montague Grammar: The semantics of verbs and times*. *Generative Semantics and Montague’s PTQ*, Studies in Linguistics and Philosophy 7, Kluwer, Dordrecht.
- Eckardt, Regine. 2006. *Meaning Change in Grammaticalization*. Oxford: Oxford University Press.
- Eckardt, Regine. 2012. Particles as speaker indexicals in free indirect discourse. *Sprache und Datenverarbeitung* 35(2)/36(1), 99 – 119.
- Eckardt, Regine & Andrea Beltrama. subm./2018. *Evidentials in Questions*. Submitted to Chris Pinon (ed.): *Proceedings of CSSP 2017*, Paris.
- Faller, Martina. 2002. *Evidentiality in Cuzco Quechua*. PhD dissertation, Stanford University.
- Farkas, Donka. 2017. Going beyond the prototypical. Special declaratives and special interrogatives. Paper presented at *Stanford Colloquium*, December 2017.
- Farkas, Donka. 2018. What is special in non-canonical questions? Paper presented at the Workshop *Meaning in Questions MiQ*, June 2018, Konstanz.
- Farkas, Donka & Kim B. Bruce. 2010. On reacting to assertions and polar questions. *Journal of Semantics* 27(1), 81 – 118.
- Friedman, V.A. 2003. Evidentiality in the Balkans with special attention to Macedonian and Albanian. In: Aikhenvald, A.Y., Dixon, R.M.W. (eds.), *Studies in Evidentiality*. John Benjamins, Amsterdam/Philadelphia, pp. 189–218.
- Gunlogson, Christine. 2003. *True to Form: Rising and Falling Declaratives as Questions in English*. New York: Routledge.
- von Fintel, Kai & Anthony Gillies. 2010. *Must ... stay ... strong!* *Natural Language Semantics* 18, 351 – 383.
- von Fintel, Kai & Anthony Gillies. 2011. *Might made right*. In A. Egan & B. Weatherson (eds.), *Epistemic modality*. Oxford and New York: Oxford University Press, 108–130.
- Göbel, Alex. 2017. Evidentiality and undirected questions. A New Account of the German Discourse Particle *wohl*. Paper presented at the Penn Linguistics Conference 41, March 25, 2017. Handout online.

- Göbel, Alex. 2018. Evidentiality and Undirected Questions: A New Account of the German Discourse Particle *wohl*. *University of Pennsylvania Working Papers in Linguistics*, 24(1), 77 - 86.
- Gabbay, Dov M., Hogger, C. J., & Robinson, J. A. (eds.). 1994. *Handbook of Logic in Artificial Intelligence and Logic Programming*, Volume 3: *Nonmonotonic Reasoning and Uncertain Reasoning*. Oxford and New York: Oxford University Press.
- Garrett, Edward John. 2001. *Evidentiality and Assertion in Tibetan*. PhD dissertation, UCLA.
- Gutzmann, Daniel. 2011. Ob einer wohl recht hat? Zwei Satzmodustheorien für das Deutsche im Vergleich. *Deutsche Sprache* 39, 65 – 84.
- Hamblin, C. L. 1973. Questions in Montague English. *Foundations of Language* 10, 41–53.
- Hara, Yurie. 2006. Non-propositional modal meaning. Ms, Semantics Archive: https://www.semanticsarchive.net/Archive/WUxZjFiM/darou_hara.pdf Accessed July 2018.
- Hara, Yurie. 2012. On the interaction among sentence types, bias, and intonation: A rating study. GLOW in AsiaIX (2012), poster session. Online at http://faculty.human.mie-u.ac.jp/~glow_mie/glow_IX_index.html
- Hara, Yurie. 2018. *Daroo* as an entertain modal: An inquisitive approach. *Japanese/Korean Linguistics* 25, 1 – 13.
- Hintz, Daniel J. & Diane M. Hintz. 2017. The evidential category of mutual knowledge in Quechua. *Lingua* 186/187, 88 – 109.
- Jang, Youngjun & Il-Kon Kim. 1998. Self-addressed questions and quantifier interpretation. *Korean Linguistics* 9, 191–209.
- Jang, Youngjun. 1999. Two types of question and existential quantification. *Linguistics* 37(5), 847–869.
- Korotkova, Natasha. 2014. Evidentials in attitudes: do’s and don’ts. In Eva Csipak & Hedde Zeijstra (eds.) *Proceedings of SuB 19*, 320–337.
- Korotkova, Natasha. 2017. Diagnosing the semantic status of evidentials. Talk at the workshop *Questioning speech acts*, University of Konstanz. [\[abstract\]](#)
- Kratzer, Angelika. 1991. Modality. In: von Stechow, A. and D. Wunderlich (eds.) *Semantics/Semantik. An International Handbook*. Berlin and New York: De Gruyter, 639 – 650.
- Levinson, Steven. 2000. *Presumptive Meanings*. Boston, MIT Press.
- Lewis, David. 1973. *Counterfactuals*. Blackwell, Oxford.
- Lim, Dong Sik. 2010. *Evidentials and Interrogatives: A case study from Korean*. PhD thesis, University of Southern California.
- Lim, Dong Sik. 2011. Evidentials in Interrogatives. In I. Reich (ed.): *Proceedings of Sinn und Bedeutung* 15, Universität des Saarlandes (2011), 419–433.
- Littell, P., Matthewson, L., Peterson, T., 2010. On the semantics of conjectural questions. In: Peterson, T., Sauerland, U. (Eds.), *Evidence from Evidentials*, University of British Columbia Working Papers in Linguistics 28, 89–104.
- Lohnstein, Horst. 2000. *Satzmodus – kompositionell. Zur Parametrisierung der Modusphrase im Deutschen*. Berlin, New York: Akademie Verlag.
- Lohnstein, Horst. 2007. On clause types and sentential force. *Linguistische Berichte* 209, 63–86.
- Matthewson, Lisa, Davis, H., and Hotze Rullmann. 2007. Evidentials as epistemic modals: Evidence from St’át’imcets. *The Linguistic Variation Yearbook* 7.

- Matthewson, Lisa. 2015. Evidential Restrictions on Epistemic Modals. In: L. Alonso-Ovalle & P. Menendez-Benito (eds.), *Epistemic Indefinites*. Oxford: Oxford University Press, 141–160.
- McCready, Eric and N. Ogata. 2007. Evidentiality, modality and probability. *Linguistics and Philosophy*, 30(2), 147 – 206.
- Miyagawa, Shigeru. 2012. Agreements that occur mainly in the main clause. In Aelbrecht, L., L. Haegeman & R. Dye (eds.): *Main Clause Phenomena: New Horizons*. Amsterdam/Philadelphia: John Benjamins, 79 - 112.
- Merikli, Benjamin. 2016. *Modelling indirect evidence*. MA thesis, University of California at Los Angeles.
- Moore, R. 1987. Possible-world semantics for autoepistemic logic. In M. L. Ginsberg (ed.) *Readings in nonmonotonic reasoning*. San Francisco: Morgan Kaufmann, 137 – 142.
- Munaro, Nicola and Cecilia Poletto. 2008. Sentential Particles and Clausal Typing in Venetian Dialects. In B. Shaer, P. Cook, W. Frey, C. Maienborn (eds.) *Dislocated Elements in Discourse: Syntactic, Semantic and Pragmatic Perspectives*. New York: Routledge, 173–199.
- Murray, Sarah. 2010. Evidentiality and the structure of speech acts. PhD thesis, Rutgers University, New Brunswick.
- Murray, Sarah. 2014a. Evidentials and questions in Cheyenne. In: Lima, S. (ed.), *Proceedings of Semantics of Under-Represented Languages in the Americas 5*.
- Murray, Sarah. 2014b. Varieties of Update. *Semantics and Pragmatics*, 7(2), 1–53.
- Murray, Sarah. 2016. Evidentiality and Illocutionary Mood in Cheyenne. *International Journal of American Linguistics* 82(4), 487 – 517. DOI: 10.1086/688604
- Obenauer, Georg. 2004. Non-standard *wh*-questions and alternative checkers in Pagotto. In: Lohnstein, H., Trissler, S. (eds.): *The syntax and semantics of the left periphery*. Amsterdam/Philadelphia: John Benjamins, 343–384.
- Oguro, Takeshi. 2017. Speech Act Phrase, Conjectural Questions and Hearer. In: *Proceedings of the 40. Annual Penn Linguistics Conference*.
- Oppenrieder, Wilhelm. 1989. Selbständige Verb-letzt-Sätze: Ihr Platz im Satzmodussystem und ihre intonatorische Kennzeichnung. In: Altmann, H./ Batliner, A./Oppenrieder, W. (eds), *Zur Intonation von Modus und Fokus im Deutschen*. Tübingen: Niemeyer, 163–244.
- Parsons, Terence. 1990. *Events in the Semantics of English*. Cambridge MA: MIT Press.
- Peterson, Tyler. 2016. Mirativity as Surprise: Evidentiality, Information, and Deixis. In *Journal of Psycholinguistic Research* 45, 1327 – 1357; doi: 10.1007/s10936-015-9408-9
- Peterson, Tyler and Uli Sauerland (eds). 2010. *Evidence from Evidentiality* Vancouver: University of British Columbia Working Papers in Linguistics, vol. 28.
- Plunze & Zimmermann. 2006. On Truckenbrodt on verb-end questions. *Theoretical Linguistics* 32, .
- Portner, Paul. 1998. The Progressive in Modal Semantics. *Language* 74(4), 760–787.
- Rawlins, Kyle. 2009 / 2013. A semantics for extreme ignorance questions. *Linguistic Society of America, Annual Meeting*, January 2009 and Linguistic Colloquium Göttingen, 2013. Handout available at http://www.engl-ling.uni-goettingen.de/epistemic/Program_files/rawlins_epistemic_handout.pdf (accessed April 2018).

- Reiter, Raymond. 1980. A logic for default reasoning. *Artificial Intelligence* 13, 81–132.
- Roelofson, Floris & Donka Farkas. 2015. Polarity particle responses as a window onto the interpretation of questions and assertions. *Language* 91(2), 359 – 414.
- San Roque, Lila, Simeon Floyd & Elisabeth Norcliffe. 2017. Evidentiality and Interrogativity. *Lingua* 186/187, 120 – 143.
- Speas, Margaret and Carol Tenny. 2003. Configurational properties of point of view roles. In: In DiSciullo, A. (ed.), *Asymmetry in Grammar*. John Benjamins, Amsterdam/Philadelphia, 315–344.
- Speas, Margaret. 2007. On the Syntax and Semantics of Evidentials. *The Linguistic Compass*.
- Sugimura, R. 1986. Japanese honorifics and situation semantics. *Proceedings of COLING 86*, 507 – 510.
- Strasser, Christian and Antonelli, G. Aldo. 2016. Non-monotonic Logic. In *The Stanford Encyclopedia of Philosophy* (Winter 2016 Edition), Edward N. Zalta (ed.), URL = <<https://plato.stanford.edu/archives/win2016/entries/logic-nonmonotonic/>>.
- Tenny, C.L., 2006. Evidentiality, experiences, and the syntax of sentience in Japanese. *Journal of East Asian Linguistics* 15, 245–288.
- Traugott, Elizabeth Closs. 1988. Pragmatic Strengthening and Grammaticalization. *Proceedings of the Fourteenth Annual Meeting of the Berkeley Linguistics Society* BLS 14, 406–416.
- Truckenbrodt, Hubert. 2006. On the Semantic Motivation of Syntactic Verb Movement to C in German. *Theoretical Linguistics* 32, 257–306.
- Truckenbrodt, Hubert. 2013. Selbständige Verb-Letzt-Sätze. In J. Meibauer, M. Steinbach & H. Altmann (eds.), *Satztypen im Deutschen*. Berlin: de Gruyter Mouton, 232–246.
- Valenzuela, Pilar M., 2003. Evidentiality in Shipibo-Konibo, with a comparative overview of the category in Panoan. In: Aikhenvald, A.Y., Dixon, R.M. W. (Eds.), *Studies in Evidentiality*. Amsterdam/ Philadelphia: John Benjamins, 33–61.
- Willett, Thomas, 1988. A cross-linguistic survey of the grammaticalization of evidentiality. *Studies in Language* 12, 51–97.
- Zimmermann, Malte. 2004. Zum ‘Wohl’: Diskurspartikeln als Satztypmodifikatoren. *Linguistische Berichte* 199, 253–286.
- Zimmermann, Malte. 2008. Discourse particles in the left periphery. In B. Shaer, P. Cook, W. Frey, C. Maienborn (eds.): *Dislocated Elements in Discourse*. London: Routledge, 200–231
- Zimmermann, Malte. 2011. Discourse particles. In von Heusinger, K., C. Maienborn and P. Portner (eds.) *Semantik/Semantics. An International Handbook* (HSK 33.2). Berlin: de Gruyter, 2012–2038.
- Zimmermann, Malte. 2013. Ob-VL-Interrogativsatz. In J. Meibauer, M. Steinbach & H. Altmann (eds.) *Satztypen im Deutschen*. Berlin: de Gruyter Mouton, 84–104.