EVIDENTIALITY AND THE STRUCTURE OF SPEECH ACTS

by

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ABSTRACT OF THE DISSERTATION

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Many languages grammatically mark *evidentiality*, i.e., the source of information. In assertions, evidentials indicate the source of information of the speaker while in questions they indicate the expected source of information of the addressee. This dissertation examines the semantics and pragmatics of evidentiality and illocutionary mood, set within formal theories of meaning and discourse. The empirical focus is the evidential system of Cheyenne (Algonquian: Montana), which is analyzed based on several years of fieldwork by the author.

In Cheyenne, evidentials are part of the illocutionary mood paradigm. Based on this grammatical system and crosslinguistic data in the literature, I propose a new theory of evidentials. I argue that evidentials contribute *not-at-issue* content, which cannot be directly challenged or denied. This content is added directly to the common ground, without negotiation. In contrast, *at-issue* content, the main point of a sentence, is proposed to the common ground, up for negotiation.

This analysis of evidentials implies a more articulated theory of assertion and other speech acts. In particular, I argue that all speech acts are structured into three components: presentation of the at-issue proposition, a non-negotiable update that directly restricts the common ground, and a negotiable update that imposes structure on the common ground. I implement this proposal in an update semantics with

individual, modal, and propositional discourse referents. The distinction between at-issue and not-at-issue information comes out as an instance of grammatical centering in the modal domain. The presentation of the at-issue proposition is modeled as the introduction of a propositional discourse referent. This predicts that only the at-issue proposition can be referred to in subsequent discourse, and the non-challengeability of the evidential falls out as a special case of propositional anaphora.

The proposed analysis can be extended to evidentials and related phenomena in other languages. While there are real crosslinguistic differences in the behavior of evidentials, there are also many commonalities. The proposed analysis captures the properties that all evidential systems share, but is fine-grained enough to account for variation. On this analysis, evidentials crosslinguistically form a natural semantic class.

Acknowledgments

My interest in evidentials began at Wayne State University in a typology class with Martha Ratliff. She gave me a grammar of Tariana (Aikhenvald 2003), which has an entire chapter dedicated to evidentials, and I was instantly captivated. I am grateful to many people at Wayne, and at The LINGUIST List, for their support early in my career: Ljiljana Progovac, Susan Vineberg, Tony Aristar, Helen Aristar-Dry, Martha Ratliff, Geoffrey Nathan, Margaret Winters, my classmates in linguistics and philosophy, and all of my friends and coworkers at LINGUIST. Susan deserves special thanks for encouraging me to go to Rutgers for graduate school.

At Rutgers a few years later, after trying to convince several other people to study evidentials, I finally got the opportunity to do so myself in a semantics seminar on indirect reports with Maria Bittner. Maria's seminars are rigorous and infinitely rewarding, and I have never learned so much as from her hands-on approach to logic. She encouraged me to pursue my interest in fieldwork, and helped me to understand the symbiotic relationship that can exist between fieldwork and theory. As chair of my dissertation, she has looked over innumerable drafts, always with suggestions for improvement, and has helped me through some difficult spots. From Semantics II in my second semester, Maria has been a teacher, advisor, mentor, and friend.

My first semantics class ever was in my first semester at Rutgers: Semantics I with Roger Schwarzschild. That class changed my life. Before the class, I knew I loved logic and language; afterwards, I knew I loved semantics. In the years since,

Roger has been a constant presence in my academic life, from seminars to meetings to research groups to potlucks. He has the keen ability to see the essential properties of a proposal, and to ask difficult questions. Roger always challenged me to work out the details of my assumptions, and I always learned a lot in the process.

Also in my first semester at Rutgers was my Cognitive Science Proseminar, where I first heard from Matthew Stone about his work. I didn't really know what he was talking about, but I knew I wanted to. Since then, my conversations with Matthew have had a substantial effect on my view of semantics and interdisciplinary research. He has always carefully read and considered my work, and consistently has sharp and insightful comments. Over the years, I have greatly benefited from his guidance and pioneering perspective, as well as his personal support and encouragement.

I first met Jeroen Groenendijk at the 2007 Amsterdam Colloquium and got to know him while auditing a seminar of his on Inquisitive Semantics at NYU. Several of the ideas proposed in this dissertation were inspired by that seminar, in particular the idea that, if assertions are proposals to update the common ground, as in Groenendijk and Roelofsen (2009), then perhaps some information is directly added to the common ground. I have always enjoyed our meetings, especially our collective wonderings about the application of various logics to various natural language phenomena.

Another person who has had a sizable effect on the content of this dissertation is Jason Stanley. Though not an official member, Jason was a de facto member of my committee. He also supervised an independent study I completed as part of my Graduate Certificate in Cognitive Science. We read much of the philosophical work on epistemic modality and discussed how the various issues were related to the study of evidentiality. This project fused itself with my dissertation project, and has greatly refined the way that I see many of the issues surrounding evidentiality.

This work has directly benefitted from conversations with many others over the years, including Chris Barker, David Beaver, Adrian Brasoveanu, Veneeta Dayal,

For helping me get by, with vegan baking experiments, brunches, euchre, late night diner sessions, shared meals, and David Lynch-a-thons, I must thank Will, Paula, Patrick, Zelda, John, Charles, Jimmy, Tere, Ale, Charlotte, Seughun, Aaron, Jeremy, Will, Matt, Gabe, Alex, Josh, Dub, Danny, Jessica, Sam, Adrian, Adam, Carlos, Karen, MJ, Jenny, Ian, Tom, Carlotta, Eliot, Lisa, Katy, Benjie, Ryan, Roger, Karina, Jane, Alan, Ken, Susan, Matthew, Doug, Jason, Andrea, Bertsch, and Adam.

Finally, I give my sincerest thanks to my family, for their love and support over all of my years, especially the last few: to my parents, my extended family, Tivi, and to Will, who knows.

Contents

Part II Formal Implementation   117

Chapter 5   A Hamblin Semantics for Evidentials in Declaratives   118

Chapter 6   A Hamblin Semantics for Evidentials and Questions   140

List of Tables

List of Figures

xv

List of Abbreviations

Cheyenne Glosses

.	meaning part boundary, e.g., 'walk.to'
-	morpheme boundary
+	fused morpheme, e.g., 3+FUT
=	clitic boundary
1	first person
12	first person plural inclusive
13	first person plural exclusive
2	second person
3	third person
1:2	first person acting on second person
A	animate
ahte	reflexive/reciprocal suffix
an	anaphor
B	inanimate

CIS	cislocative (toward speaker)
CNJ	conjectural prefix
CNTR	contrast
DEP	dependent clause prefix
<u>DEP</u>	dependent clause suffix
DIR	unmarked direct evidential
EP	epenthesis
FUT	future
HAB	habitual
IMP	imperative mood
MOD	agreement that appears with negation and the conjectural evidential
NAR	narrative evidential
neg	negation
OB	inanimate object agreement
OBV	obviative
OPT	optative
OS	object over subject in Person Prefix Hierarchy, 'inverse voice'
PL	plural
PRS/REC	present/recent past
PST	distant past

PSV	passive
rm	removed obviative
RPT	reportative evidential
SG	singular
SO	subject over object in Person Prefix Hierarchy, 'direct voice'
TRL	translocative (away from speaker)
Y/N	interrogative mood
y/n	interrogative clitic

Cheyenne Orthography

V̇	voiceless vowel
V́	high pitch vowel
š	voiceless alveolar fricative (IPA: ʃ)
'	glottal stop (IPA: ʔ)

Chapter 1

Introduction

Evidentiality is the encoding of information source, which can be direct (e.g., visual, auditory) or indirect (e.g., based on reports, inference, conjecture). In many languages, evidentiality is grammatically marked on every sentence. In declarative sentences, evidentials indicate the speaker's source of information. In questions, evidentials indicate the expected source of information for the requested answer. Questions with evidentials may have additional interpretations, depending on the language.

Various evidential systems have recently been studied and a semantic classification of evidentials has begun to emerge. This classification is empirical, based on several diagnostics that test, for instance, the projection properties of evidentials and the speaker's commitment to the truth or possibility of the evidential's scope (Faller 2002, 2006a,b; a.o.). So far, two types of evidentials have been identified: there are ILLOCUTIONARY EVIDENTIALS, as in Cuzco Quechua (Faller 2003, 2006a) and Kalaallisut (Bittner 2008), and EPISTEMIC EVIDENTIALS, as in German (Faller 2006a) and St'át'imcets (Matthewson et al. 2007). Illocutionary evidentials are similar to certain English parentheticals, e.g., *I take it* in *That's the postman, I take it*, while epistemic evidentials behave more like modals, e.g., *must* in *That must be the postman*.

These two types of evidentials have inspired two different types of analyses. Illo-

cutionary evidentials have been analyzed as speech act operators (e.g., Faller 2002), while epistemic evidentials have been analyzed as modals with an evidential presupposition (Izvorski 1997; Matthewson et al. 2007).

This dissertation examines the semantics and pragmatics of evidentiality and illocutionary mood, set within formal theories of meaning and discourse. The empirical focus is evidentials in Cheyenne (Algonquian: Montana), which are part of the illocutionary mood paradigm. This study is based on original fieldwork that combines recent work in formal semantics, including semantic diagnostics aimed at differentiating types of meaning (e.g., Faller 2002; Simons 2007; Matthewson et al. 2007), with Cheyenne reference materials (e.g., Leman 1980b; Fisher et al. 2006).

Evidentials in Cheyenne represent a typologically new kind of evidential system, a variety of illocutionary evidentials. They are part of the illocutionary mood paradigm of the language, and, while they largely pattern with illocutionary evidentials, they show novel interactions with questions. As with other illocutionary evidentials, the evidential contribution in Cheyenne is parenthetical-like. For example, a statement with a reportative evidential (John won-RPT) can loosely be translated to English as *John won, I hear*, with the evidential translated as the parenthetical *I hear*. Like a parenthetical, this evidential contribution cannot be directly challenged; that is, the addressee cannot reply *no* or *that's not true* to mean *you didn't hear that*. However, the interaction of evidentials and questions in Cheyenne is unlike the pattern described with other illocutionary evidentials. Cheyenne content questions containing evidentials display a property that I call illocutionary variability. For example, depending on the context, the Cheyenne content question with a reportative 'where 3-live-RPT?' can mean *Given what you heard, where does he live?* or *He lives somewhere, I wonder where.* In the later case, the illocutionary force is shifted from a direct question to a statement of uncertainty.

Based on this grammatical system and crosslinguistic data in the literature, I

propose a new theory of evidentials that can be extended to evidentials and related phenomena in other languages. Specifically, I argue for four new results.

First, I show that evidentials crosslinguistically share a core set of properties. While there are several dimensions of variation, there are also striking crosslinguistic generalizations. This points to the need for a unified analysis that can capture these shared properties, treating evidentials crosslinguistically as a natural semantic class, while being fine-grained enough to account for the variation.

Second, I argue that evidentials contribute not-at-issue content. Sentences with evidentials are analyzed as making three contributions: the presentation of the at-issue proposition (the scope of the evidential), a not-at-issue restriction that directly updates the common ground, and an illocutionary relation that structures the common ground, representing a proposal to update the common ground.

Third, I argue that all speech acts are structured into these three components. Building on Hamblin (1973) and Groenendijk and Stokhof (1984b), I apply this proposal to another type of speech act: questions. On this view, Cheyenne grammar reveals a hitherto missed semantic class, to wit, evidentials and other illocutionary mood markers. This proposal is motivated by Cheyenne evidentials and illocutionary mood, but it can be extended to evidentials and related phenomena in other languages, accounting for crosslinguistic variation in their interpretation.

Fourth, I propose a compositional dynamic implementation that accounts for the interaction of evidentials and questions, various phenomena involving Cheyenne question words, facts about the (non)challengeability of evidentials, varying levels of commitment that the speaker has to the scope of the evidential, and the interaction of evidentials with propositional anaphora.

This dissertation is organized into two parts, as follows. In Part I, *Evidentials as Not-at-Issue Content*, I propose an analysis where evidentials contribute not-at-issue content. This proposal is based specifically on the evidential system of Cheyenne,

but it is designed to account for the properties that all evidential systems share.

In Chapter 2, I give a sketch of Cheyenne grammar. Cheyenne morphosyntax is relatively complex, and I hope this chapter will be useful to those who are interested in the details of the Cheyenne data. This introduction will aid in reading the morphological glosses and will provide a background for understanding the evidential system of Cheyenne in the larger grammatical context. This chapter can also serve as a general introduction to Cheyenne grammar, but I focus on topics that are centrally relevant to the subsequent discussion of evidentials and illocutionary mood. I describe the evidential system of Cheyenne, which distinguishes an unmarked direct evidential and three overtly marked indirect evidentials. I also discuss the illocutionary mood paradigm and the various question formation strategies. In addition, I detail the interaction of evidentials and questions in Cheyenne, a pattern that, to my knowledge, has not been described before.

In Chapter 3, I describe the two empirical types of evidentials that have been identified in the literature. I discuss various semantic diagnostics and their application to evidentials in a few representative languages. I locate Cheyenne in the crosslinguistic classification of evidentials by applying these diagnostics to Cheyenne evidentials. It is shown that Cheyenne patterns with illocutionary evidentials, except for a novel pattern of interactions with questions. However, I also show that, while there are real differences in the behavior of evidentials crosslinguistically, there are also many commonalities. This points to the need for a unified analysis that treats evidentials crosslinguistically as a natural class but can also represent the crosslinguistic differences.

In Chapter 4, I propose a new theory of evidentials. I argue that evidentials contribute not-at-issue content, which cannot be directly challenged or denied. This content is added directly to the common ground, without negotiation. In contrast, at-issue content, the main point of a sentence, is proposed to be added to the common

ground, up for negotiation. This analysis of evidentials implies a more articulated theory of assertion and other speech acts. In particular, I argue that all speech acts are structured into three components: the presentation of the at-issue proposition, a non-negotiable update that directly restricts the common ground, and a negotiable update that imposes structure on the common ground.

In Part II, *Formal Implementation*, I formally implement the ideas presented informally in Part I. Two implementations are given. The first can represent two of the three proposed speech act components. The second implementation improves on the first, representing all three components.

In Chapters 5 and 6, adaptations of Murray (2010b) and Murray (2010a), respectively, I give an implementation of the analysis proposed in Part I in a static framework, using Hamblin-style representations to distinguish not-at-issue and at-issue content without positing a separate level of illocutionary meaning. Chapter 5 focuses on declarative sentences while Chapter 6 focuses on questions and their interactions with evidentials. This implementation captures two of the three proposed components of speech acts: information that is directly added to, or imposed on, the common ground (the not-at-issue restriction) and information that is proposed to be added to the common ground (the illocutionary relation). This implementation brings out the parallel between types of evidentials (e.g., conjectural, reportative) and accounts for the intuitions that the information contributed by the evidential in declarative sentences is new, not presupposed, and affects the truth conditions.

In Chapters 7 and 8, I develop a dynamic implementation of the proposed analysis in an update semantics that represents both truth conditions and discourse referents (Update with Centering, Bittner 2010, to appear). Chapter 7 focuses on evidentials in declarative sentences while Chapter 8 focuses on questions, including questions that contain evidentials. Building on the previously introduced implementation, this implementation captures all three of the proposed components of speech acts. The

component missing in the previous implementation, the presentation of the at-issue proposition, is modeled as the introduction of a propositional discourse referent for the at-issue proposition. Facts about the (non)challengeability of evidentials fall out as a special case of propositional anaphora. The proposed implementation also accounts for the presuppositional nature of evidentials in questions and allows a clear definition of answerhood. Furthermore, it sheds light on the phenomenon of illocutionary variability, described above. In Update with Centering (Bittner 2010, to appear), everything is an update, so there is no semantic type difference between the two interpretations of content questions with evidentials (question and statement of uncertainty). Finally, this implementation accounts for phenomena involving Cheyenne question words, which have variable quantificational force depending on their environment.

Chapter 9 is the conclusion. I discuss the implications of the proposed theory and briefly outline how it can be extended to nonrestrictive relative clauses.

This dissertation also includes five appendices. In Appendix A, I give proofs for some of the examples from Chapters 5. In Appendix B, I define a fragment of Update with Centering, Update with Modal Centering, reproducing the definitions from Bittner (to appear). In Appendix C, I give sample information states for examples from Chapter 7 and Chapter 8. Appendix D lists the evidential paradigms and other uses of the Cheyenne evidentials. In Appendix E, I give a list of question words, divided into interrogative verbs and interrogative nouns.

Part I

Evidentiality as Not-at-Issue Content

Chapter 2

Grammatical Sketch of Cheyenne

Contents

2.1 Introduction

One of the goals of this dissertation is to describe the semantic properties of Cheyenne evidentials and, more generally, the illocutionary mood system. To do so, it is useful to give a bit of grammatical context. Cheyenne morphosyntax is relatively complex, and the evidentials and illocutionary moods are verbal suffixes.

In this chapter, I give a brief overview of Cheyenne grammar. This introduction is intended to aid in reading the glosses throughout this dissertation and to place the

discussed data in a larger grammatical context. I also hope this chapter can serve as an introduction to Cheyenne grammar for anyone who has a general interest in the language.

This chapter is organized as follows. In Section 2.2, I provide background information about the Cheyenne language and briefly discuss the various sources of data used in this dissertation. The structure of the Cheyenne verb is described in Section 2.3, including various types of verbal affixes and the order in which they occur. In particular, I focus on the marking of person, number, animacy, obviation, temporal information, and illocutionary mood, as well as the distinctions between intransitive and transitive verbs and matrix and subordinate verbs. In Section 2.4, I discuss the evidential system of Cheyenne and the larger illocutionary mood paradigm to which the evidentials belong. The various interpretations of Cheyenne evidentials are discussed in Section 2.5. In Section 2.6, I present the various strategies for forming polar and content interrogatives in Cheyenne. Section 2.7 is a summary.

2.2   Language Information and Data Sources

Cheyenne is a Plains Algonquian language spoken in Montana and Oklahoma. The dialects spoken in these two areas, Northern Cheyenne (Montana) and Southern Cheyenne (Oklahoma), are closely related, distinguished by only a few lexical items (Leman 1999). Cheyenne is an endangered language, with around 1,000 remaining fluent native speakers in Montana, most of whom are over 50 years of age. In general, Cheyenne children are not acquiring the language. However, many Cheyennes speak the language regularly and many make efforts to speak the language to their children and grandchildren. In addition, there are several ongoing organized language revitalization efforts, including language classes in the local schools and summer language

camps for kids offered by Chief Dull Knife College[1].

The data presented in this dissertation primarily comes from the author's field-work, supplemented with existing language materials including a Cheyenne grammar (Leman 1980b), collections of texts (Leman 1980a, 1987), and a dictionary (Fisher et al. 2006). Consulting with native speakers, I glossed and translated all of the examples that occur in the dissertation, even the ones from the supplementary sources. Thus, the citations for examples throughout the dissertation refer to where the Cheyenne originally occurred. The morphological glossing and translation, and thus any errors therein, are mine.

Most of the examples from my fieldwork come from elicitation sessions or (modified) texts, but some are examples that I observed or overheard, or heard in a Cheyenne language class. The elicited data from fieldwork was collected during several field trips to the Northern Cheyenne Indian Reservation in Montana between 2006 and 2010. During these field trips, I not only worked with consultants during elicitation sections, but I tried to attend every event where I could hear Cheyenne, to observe the way the language is actually used in day to day life. I also have been trying to learn the language. At home, I work with language learning materials and read the Cheyenne texts. While in Montana, I have audited a few Cheyenne languages class sessions and have volunteered at the language immersion camps for kids.

For the elicitation sessions, I worked with several consultants, all of whom are native speakers of Cheyenne. Cheyenne was used whenever possible, but given that I am in the early stages of learning the language, English was often also used. I would work on the same material with several different people. Elicitation tasks included acceptability judgements about and corrections of various kinds of examples in a given context and thinking of contexts in which certain examples could be used. Ex-

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[1]A tribal college located on the Northern Cheyenne Indian Reservation, http://cdkc.edu/

amples included constructed examples in constructed contexts, constructed dialogues and texts, naturally occurring examples in naturally occurring contexts, textual examples in their original textual contexts, slight modifications of textual examples in their original contexts, textual examples in modified contexts, translations of English examples relative to a specific context, and questions about what sentence(s) would be used in a given context. The contexts were either given descriptively or made grammatically explicit (discourse context). In addition, I worked with consultants to reformat, gloss, and give idiomatic translations to several texts.

Fieldwork on evidentials and illocutionary mood involves complex phenomena explored via in-depth diagnostics from the semantic literature (e.g., Faller 2002; see also Chapter 3). However, I aimed to minimize complications by basing the examples on existing texts, drawing on general knowledge of the language, and providing rich contexts for the elicited materials.

2.3   The Cheyenne Verb

Cheyenne is a polysynthetic, mainly agglutinative language that marks agreement with subject and object arguments on the verb. As in many polysynthetic languages, word order is grammatically unspecified ('free'), but sensitive to discourse context (Leman 1999). The verb itself has a templatic structure (see Spencer 1991; Rice 2000; a.o.), which is diagramed in Table 2.1. Each slot in the verbal template is numbered, and the types of affixes that appear in that slot are given below each number. Optional affixes are listed in parentheses, slots that can contain more than one affix are indicated by a superscripted plus, and affixes appearing only with transitive verbs are given in square brackets. Example morphemes that can occur in each verbal slot are given below each slot label. Slots II, VIII, and IX are listed as required, but they are often filled by unmarked defaults. For example, the temporal slot II is often filled

by an unmarked default indicating present or recent past (PRS/REC). Singular agreement, which goes in slot VIII, is also unmarked. The mood slot is often filled with a default indicating direct evidence (DIR), which I will later gloss as the parenthetical *I'm sure*. For now, I will omit this parenthetical. The direct evidential is discussed in detail below in Section 2.4.[2]

I	II	III	IV	V	VI	VII	VIII	IX
person–	temporal–	(directional)–	(prefix$^+$)–	root	–(suffix$^+$)–	[voice]–	arguments$^+$–	mood
1	PST	TRL	neg	see	cause	SO	3PL.A.OBV	RPT
2	FUT	CIS	again	give.up	be	OS	2PL	IMP
3	PRS/REC		back	sing	by.hand	1:2	3PL.B	Y/N

Table 2.1: Template of the Cheyenne Verb

As an illustration of this template, consider example (2.1), a common Cheyenne farewell. In (2.1), nearly all of the verbal slots are filled.

(2.1)
I	II+III	IV	V	VII	VIII	IX	(Fisher et al. 2006)
Né-	*sta-*	*évà-hóse-*	*vóom*	*-atsé*	*-me*	*-Ø.*	
2-	FUT+TRL-	back-again-	see$_A$	-1:2	-2PL	-DIR	

'I will see you all again soon.'

The verbal template in Table 2.1 is somewhat of a simplification. For example, slot IV can contain multiple affixes of various types, which typically appear in a fixed order. For example, the habitual prefixes *okhe-* (hab) and the negation prefix *sáa-* (neg) both occur in slot IV. However the habitual *okhe-* must occur before the negative *sáa-*, as in example (2.2), below.

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[2]In Algonquianist terms, roughly, slot IV can include initials and preverbs, slot VI is for medials and finals, and IX is the mode slot. Initials and finals cannot be used independently to form verbs However, an initial and a final together can form a complex verb root. For example, the initial *hest* 'take' and the final *an* 'by hand' can combine to form the verb root 'take by hand', as in *é-hest-an-a-Ø* 3-take-by.hand-OB-DIR 'He took it by hand' (Fisher et al. 2006; entry for *hest-*).

(2.2) I   IV   V   VIII   IX
       é-   ohkė-sáa-   néhnetamé   -he   Ø.
       3-   hab-neg-   give.up   MOD$_B$ -DIR
       'He doesn't give up.'

An intransitive verb in Cheyenne minimally includes a person prefix[3], which agrees with the subject, and a root. Verbs must also include temporal information, argument agreement suffixes, and mode; however, there is an unmarked default for each of these. The default tense is present/recent past, the default number suffix is singular, and the default mode is the direct evidential. As in (2.3), I choose to only explicitly mark the default evidentials given the focus of the dissertation. Intransitive verbs can be formed from nouns with the equative suffix -*ve*, as in (2.3b).[4]

(2.3)   a. I   V   IX
            Ná-   néméne   -Ø.
            1-   sing   -DIR
            'I am singing.'

         b. I   V   VI   IX   (Fisher et al. 2006)
            É-   hetane   -ve -Ø.
            3-   man   -be -DIR
            'He is a man.'

Transitive verbs share the above requirements of intransitive verbs but also require a voice suffix, which occurs in slot VII, e.g., -*ae* in (2.4).

(2.4) I   V   VII VIII   IX   (Leman 1980b; p.55)
       Ná-   vóom   -ae -ne-o'o   -Ø.
       1-   see   -OS -12PL-3PL   -DIR
       'They saw us (exclusive).'

---

[3]Person prefixes also indicate possession on nouns, e.g., *nà-sémo* 'my boat' (Leman 1980b; p.12).

[4]Verbs can be formed in a variety of ways, such as with a noun and a derivational suffix, as in (2.3b), or with other bound forms. Leman (1980b) classifies bound forms as 'initials', 'medials', and 'finals'. For example, the verb *É-tsėhe'ėst-oésta* 3-long-wear.dress 'She's wearing a long dress' is formed from the initial *tsėhe'ėst-* 'long' and the final -*oésta* 'wear.dress'. Neither of these can independently function as a verb root: **é-tsėhe'ėst* 'it's long', **é-oésta* 'she's wearing a dress'.

There is only one person prefix position in Cheyenne. When there are multiple arguments of the verb, they compete for this position. The person prefix on a transitive verb marks the topmost argument on the hierarchy given in Figure 2.1.
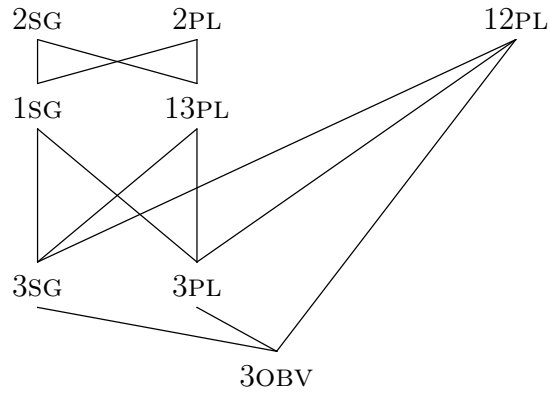
Figure 2.1: Person Prefix Hierarchy

The forms on each tier are marked with the same prefix. The person prefix for 2SG, 2PL, and 12PL is *né-*. The person prefix for 1SG and 13PL is *ná-*. All third person forms are marked with the prefix *é-*.

Since only one argument can be represented by the person prefix, a series of voice suffixes, e.g., direct voice and inverse voice (Leman 1980b), indicate which argument the prefix is marking. These suffixes do so by indicating which argument of a transitive verb is higher in the Person Prefix Hierarchy (See Figure 2.1) and, thus, which argument the person prefix is marking. For example, in (2.5a) the SO (subject over object) suffix indicates that the person prefix represents the subject, while in (2.5b) the OS (object over subject) suffix indicates that the person prefix represents the object.

(2.5)　　a. I　　　V　　　VII　IX　　　　　　　　　　　　　　　　　(Leman 1980b; p.55)
　　　　　　Ná-　*vóóm*　*-o*　*-Ø*.
　　　　　　1-　　see_A　　-SO　-DIR
　　　　　　'I saw him.'

b. I V VII IX   (Leman 1980b; p.55)
  Ná- *vóom* *-a* *-Ø.*
  1- see$_A$ -OS -DIR
  'He saw me.'

Certain person combinations require specific voice suffixes. For example, the suffix *-aaʹe* '3.OBV:3SG' indicates third person obviative acting on third person (proximate)[5] singular and *-atse* '1:2' indicates first person acting on second person.

The examples in (2.5) additionally show that verb stems are lexically typed for the animacy of the object, or internal argument (glossed subscript 'A' for animate and 'B' for inanimate). Compare the sentences in (2.5) and (2.6a), which have animate objects, with the sentences (2.6b) and (2.6c), which have inanimate objects.[6]

(2.6) a. *Ná-mév-o-Ø* *váótséva.*   (Leman 1980b; p.56)
    1-eat$_A$-SO-DIR deer$_A$
    'I ate deer.'/'I ate the deer.'

  b. *Ná-mes-e-Ø* *hoʹévohkótse.*
    1-eat$_B$-OB-DIR meat$_B$
    'I ate meat.'

  c. *Ná-vóóht-a-Ø.*   (Leman 1980b; p.87), cf., (2.5a)
    1-see$_B$-OB-DIR
    'I saw it.'

Animacy typing is not common with intransitive predicates, e.g., (2.3), above. However, it does occur with some intransitive predicates, like (2.7). It is possible that such typing indicates that the subject of such predicates is actually the internal argument.

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[5] *Obviative* third person, sometimes written as 4 instead of 3, is backgrounded – not the center of attention, in the sense of Grosz et al. (1995). This contrasts with the foreground or topical third person, called *proximate*, which is the center of attention. The proximate third person is the default, and I will gloss this simply as '3', while obviative third person will be indicated by the gloss '3.OBV'.

[6] From the above examples, it may seem that the animacy typing is separable from the verb stem, e.g., *-v/-s* for (2.6a/b), *-m/-ht* for (2.5)/(2.6c). However, as not all cases are so clear cut, I have glossed them as fused.

(2.7)   a. *É-ma'eta-Ø.*   ([Fisher et al. 2006](#))
          3-be.red$_A$-DIR
          'He's red.'

       b. *É-má'o-Ø.*   ([Leman 1980b](#); p.43)
          3-be.red$_B$-DIR
          'It's red.'

When the object of a transitive predicate is inanimate, as in (2.6b,c), there is no voice suffix. Instead, there is a suffix indicating that the object is inanimate (glossed OB). This inanimate object suffix is strictly speaking not a voice suffix, but it occurs in the voice slot, and thus the two types of suffixes may be seen as part of the same, more general paradigm.[7]

A component of negation also agrees in animacy, but always with the subject of the verb. The standard way of marking negation in Cheyenne is with the prefix *saa-* and an agreement suffix: *-hé* for animate subjects, as in (2.8a,c), and *-hane* for inanimate subjects, as in (2.8b). I gloss this MOD as it occurs in contexts other than negation, including as part of the conjectural evidential (see Section 2.4).

(2.8)   a. *Ná-sáa-némené-he-Ø.*   ([Leman 1980b](#); p.32)
          1-neg-sing-MOD$_A$-DIR
          'I did not sing.'/'I am not singing.'

       b. *É-sáa-ma'ó-hane-Ø.*   ([Leman 1980b](#); p.45)
          3-neg-be.red$_B$-MOD$_B$-DIR
          'It is not red.'

       c. *Ná-sáa-vóóht-ó-he-Ø.*   ([Leman 1980b](#); p.91)
          1-neg-see$_B$-OB-MOD$_A$-DIR
          'I did not see it.'

Another aspect of Cheyenne grammar that is relevant to the discussion of the evidential system is the marking of person and number. Cheyenne distinguishes between

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[7]The reflexive/reciprocal suffix also appears in this morphological slot.

third person *proximate* (topic) and third person *obviative* (background). There are singular and plural proximate forms, but only one, number-neutral obviative form. Obviation and number are marked by suffixes on both nouns and verbs, as in (2.9).

(2.9)   a. *Hetane   é-néméne-Ø.*
         man   3-sing-DIR
         'The man sang.'

         b. *Hetane-o'o   é-némene-o'o-Ø.*
         man-PL   3-sing-3PL-DIR
         'The men sang.'

         c. *Hetan-óho   é-némen-óho-Ø.*
         man-OBV   3-sing-OBV-DIR
         'The man/men (obv.) sang.'

Obviation is only present when there is more than one third person participant (which can be an individual or a group). In what follows, I will treat the proximate form as unmarked, referring to it simply as 'third person', in contrast with 'third person obviative', unless it is necessary to clarify.

A distinction is also made in the first person plural, between *exclusive* (excluding the hearer(s), glossed as 13) and *inclusive* (including the hearer(s), glossed as 12). The person prefix used for first person exclusive plural is the first person (*ná-*) while the prefix used for the first person inclusive plural is the second person prefix (*né-*). I thus take the prefix *né-* to to indicate that the argument 'is or includes second person'. This pattern is exemplified in (2.10); note that the first person plural suffixes (in (2.10)) are different from the third person plural suffixes (in (2.9b)).

(2.10)   a. *Ná-némené-me-Ø.*   (Leman 1980b; p.27)
         1-sing-13PL-DIR
         'We (excl.) sang.'

         b. *Né-némene-ma-Ø.*   (Leman 1980b; p.27)
         2-sing-12PL-DIR
         'We (incl.) sang.'

Each sentence in (2.9) and (2.10) is translated in the past tense. As mentioned above, the default, unmarked temporal information is present/recent past. Thus, they could also correctly be translated in the present tense, e.g., (2.9a) as 'the man is singing'. There are overt temporal prefixes (verbal slot II, see Table 2.1) which indicate distant past (*h-* and its allomorphs) and future (*hte-* and its allomorphs).[8] For example, (2.11a) contains the distant past marker and (2.11b) contains the future marker. In constructions with the future and third person, the allomorph is *tse-*, which is fused with the the person prefix *é-*.

(2.11) a. *Hetane   é-h-néméne-Ø.*
            man   3-PST-sing-DIR
            'The man sang (a while ago).'

     b. *Hetane   tse-néméne-Ø.*
            man   3+FUT-sing-DIR
            'The man will sing.'

Various other prefixes can also indicate temporal reference, such as *to'se-* 'going to' in *É-to'se-a'o'tséstove* 'There is going to be a Victory Dance' (Fisher et al. 2006). However, this prefix occurs in slot IV, not slot II.

The default, unmarked mode is the direct evidential. Other suffixes which can occur in the mode position (slot IX) are the three overtly marked evidentials (see §2.4), the polar question marker *-he* (see §2.6), the immediate imperative *-stse* , the delayed imperative *-o'o*, the optative *-ha*, and the dependent clause markers. The imperatives and the optative occur without a person prefix. See Section 2.4 for more details on evidentials and illocutionary mood in Cheyenne.

The final aspect of Cheyenne grammar that I will discuss in this section is the distinction between main and dependent clauses, which will play a significant role in the

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[8]Another prefix that appears to occur in slot II is the prefix *me'-* 'should'. In examples that I have seen where it co-occurs with a directional, this prefix occurs first (Fisher et al. 2006; entries for *me'-* and *-hó'xeeh*).

description of both evidentials and interrogatives in Cheyenne. Dependent clauses[9] (relative clauses, antecedents of conditionals, etc.) in Cheyenne are all marked in the same general way: with a specialized prefix and suffix. The dependent marking prefix, which takes over slot I, can be one of a closed set that differ only in mood. The dependent marking suffix, which occupies slot IX, can be one of a closed set that mark the argument(s) of the verb.[10]

Relative clauses are marked with the prefix *tsé-*; they can appear with or without a 'head' noun, as in (2.12a) and (2.12b), respectively.[11]

(2.12) a. *Hetane tsé-néméné-stse   é-káhaneotse-Ø.*
           man   DEP-sing-<u>DEP</u>.3SG.A   3-tired-DIR
           'The man who is singing is tired.'

        b. *Tsé-néméné-stse   é-káhaneotse-Ø.*
           DEP-sing-<u>DEP</u>.3SG.A   3-tired-DIR
           'The one who is singing is tired.'

Adding a temporal marker to the form in (2.12b) results in a 'when' clause, as in (2.13a); another 'when' cause is given in (2.13b).

(2.13) a. *Tsé-h-néméné-stse   é-káhaneotse-Ø.*
           DEP-PST-sing-<u>DEP</u>.3SG.A   3-tired-DIR
           'When he sang, he was tired.'

        b. *Tsé-h-néméné-stse   ná-h-vé'še-pėhéve-tanó-otse-Ø.*
           DEP-PST-sing-<u>DEP</u>.3SG.A   1-PST-by-good-feel–become-DIR
           'It made me happy when he sang.'/'His singing made me happy.'

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[9]In the typological literature on Algonquian languages, dependent clauses are referred to as clauses of the 'conjunct order', cf. 'independent order' for main clauses and 'imperative order' for commands (Leman 1980b; Mithun 1999).

[10]This suffix is required with all dependent clauses except for inanimate intransitive ones. However, these constructions may contain an unmarked default morpheme, since they cannot contain other suffixes in slot IX. See discussion below example (2.14).

[11]Other dependent marking prefixes can indicate a realized habit (*ho'-*), a series of events (*ȯh-*), a counterfactual past (*ve'-*), or an unrealized action, past or future (*mȧh-*). These last two can combine to indicate a conditional future (*mȧh-ve'-*).

Dependent clauses are compatible with negation, as in (2.14a), as well as other prefixes (slot IV), such as *he'še-* 'while', as in (2.14b).

(2.14)   a. *Tsé-s-sáa-hoo'kóhó-hane   ná-h-vé'še-péhéve-tanó-otse-Ø.*
             DEP-PST-neg-rain-MOD_B   1-PST-cause-good-feel-become-DIR
             'It made me happy when it didn't rain.'

    b. *Tsé-he'šė-sáa-hoo'kóhó-hane   nȧ-htȧ-hóó'-óhtse-Ø.*
             DEP-while-neg-rain-MOD_B   1-FUT+TRL-home-go-DIR
             'I'll go home before it rains.'

The examples in (2.14) also illustrate that inanimate intransitive predicates (e.g., 'rain') do not require argument marking dependent suffixes, or that this suffix is null. Support for the later hypothesis comes from the fact that all dependent verbs are incompatible with matrix illocutionary moods, including the evidentials. This holds both for negative forms, as in (2.14), as well as positive forms, e.g., *tsé-x-hoo'koho* 'when it rained'.

2.4   Evidentials and Illocutionary Mood

Evidentiality is the encoding of source of information (Aikhenvald 2004). Typically, it is the speaker's source of information in assertions and the addressee's in questions. In languages with grammatical evidentials, every sentence must be marked for this information, much like English sentences must be marked for tense. Evidentials can indicate whether the speaker's statement is based on direct evidence, usually visual, hearing, or touch, or else on indirect evidence, such as inference, reports, hearsay, or common knowledge.

Cheyenne has a rich system of grammaticalized evidential markers that have never been studied in detail before. There is a four-way evidential distinction in Cheyenne between the unmarked direct evidential (2.15a) and three overtly marked indirect

evidentials: the reportative (2.15b), a restricted reportative (2.15c) that I call the narrative[12], and the conjectural[13] (2.15d), which is morphologically complex.

(2.15)   a. *É-hoo'koho-Ø.*   (Leman 1980b; p.43)
             3-rain-DIR
             'It's raining, I'm sure.'

         b. *É-hoo'kóhó-**nése**.*   (Leman 1980b; p.51)
             3-rain-RPT.SG.B
             'It's raining, I hear.'

         c. *É-hoo'kó'hó-**neho**.*   (Leman 1980b; p.53)
             3-rain-NAR.SG.B
             'It rained, it is said.'

         d. ***Mó**-hoo'kóhó-**hané-he**.*   (Leman 1980b; p.50)
             CNJ-rain-MOD$_B$-Y/N
             'It's raining, I gather.'

Evidentials are difficult to translate into English. Throughout, I will translate them as either a parenthetical (e.g., *Annie won, I gather*), a sentential adverb (*Apparantly Annie won*), or as a main verb (*I think Annie won*) depending on which is most appropriate given the evidential and the context.

In Cheyenne, these evidentials are part of the inflectional mood system. As discussed in Section 2.3, verbs in Cheyenne have a templatic structure – a fixed number of affix slots in a fixed order – with the last slot reserved for a mood suffix[14]. In matrix verbs, the mood slot can be filled with an evidential, e.g., (a) and (b) in Table 2.2, or an illocutionary mood marker, including a polar interrogative marker (c), imperative (d), or an optative (e), among others. Cheyenne evidentials can also occur in interrogatives of a certain type, as in (a′) and (b′) in Table 2.2.

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[12]The narrative is also called the mediate and the preterite in the Cheyenne Grammar (Leman 1980b) and dictionary (Fisher et al. 2006). The reportative is also called the attributive.

[13]Also called the dubitative or inferential in the Cheyenne Grammar (Leman 1980b) and dictionary (Fisher et al. 2006).

[14]This has been called the 'mode' slot in literature on Algonquian languages.

a. <u>Direct evidential</u>
   É-néméne-Ø.
   3-sing-DIR
   'He sang, I'm sure.'

a′. <u>Direct evidential in a question</u>
   Mó=é-néméne-Ø?
   y/n=3-sing-DIR
   'Given what you know, did he sing?'

b. <u>Reportative evidential</u>
   *É-némene-**sėstse***.
   3-sing-RPT.3SG
   'He sang, I hear.'

b′. <u>Reportative evidential in a question</u>
   *Mó=é-némene-**sėstse**?*
   y/n=3-sing-RPT.3SG
   'Given what you heard, did he sing?'

c. <u>Interrogative</u>
   *Né-némene-**he**?*
   2-sing-Y/N
   'Did you (sg.) sing?'

d. <u>Imperative</u>
   *Néménė-**stse**!*
   sing-IMP.2SG
   '(You (sg.)) sing!'

e. <u>Optative</u>
   *Némene-**ha**!*
   sing-OPT.3SG
   'Let him sing!'

Table 2.2: Excerpt of Cheyenne Illocutionary Mood Paradigm

The presence of a default, unmarked evidential is common in languages with grammaticized evidentials (Aikhenvald 2004; Faller 2002). In such systems, unmarked sentences carry a commitment to having a certain kind of evidence and are thus treated as containing a default evidential. This is not true of languages without grammaticized evidentials, like English, which are evidentially unspecified. In English, unmarked sentences like *Annie won the contest* do not carry any evidential commitment – the speaker could have any kind of evidence. In Cheyenne, when no overt evidential is used the speaker is committed to having direct evidence for his or her claim.

Thus, Cheyenne sentences with a direct evidential, such as (a) in Table 2.2, are stronger than unmarked sentences in English. This default, unmarked evidential carries a commitment that the speaker has direct evidence for the proposition in the scope of the evidential, e.g., 'he sang' for (a) in Table 2.2. This evidential commitment can be expressed in English with a parenthetical, as in *He sang, I'm sure* or *He sang, I'm certain*. The best translation that I have encountered for the direct evidential is the parenthetical *I find*, as in *The Holland Tunnel is the quickest way to Manhattan, I find*. This indicates that the speaker has some direct evidence, probably

personal experience, for the tunnel being the fastest way into the city. However, this parenthetical is incompatible with episodic sentences[15]: *Annie won, I find.*

These parentheticals strengthen the assertion, unlike epistemic modals, which intuitively weaken it (despite contributing additional information). This strengthening effect occurs in other languages with grammatical evidentials, including Cuzco Quechua for both the unmarked default and the overtly marked direct evidential (Faller 2002).

The reportative evidential in Cheyenne conforms to well-attested, cross-linguistic patterns, behaving similarly to reportatives in other languages, e.g., Cuzco Quechua (Faller 2002), except that it is limited to secondhand reports. There are two other evidentials not represented in Table 2.2: the conjectural evidential and the narrative evidential. The conjectural evidential in Cheyenne behaves similarly to conjecturals in other languages, e.g., Cuzco Quechua (Faller 2002). One notable difference, however, is that in Cheyenne it can be used to indicate thirdhand reportative evidence. That is, if you are given information with the reportative evidential, you must use the conjectural to repeat it. Due to this use, the term 'conjectural' may seem somewhat inappropriate. However, this name accurately describes the majority of uses. Furthermore, the thirdhand usage may be conjecture based on reportative evidence.

The narrative evidential is typically only used in legends and folktales, co-occurring with the remote past tense. It also has a restricted mirative, or surprisal, use in the present tense.

In Cheyenne, evidentials agree with an argument of the verb. For example, there are several forms of the reportative evidential because the it agrees in animacy, person, number, and obviation with an argument of the verb. For intransitive predicates, the reportative evidential agrees with the subject, as in (2.16).

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[15]In the sense of Carlson (1995) – sentences that relate specific occurrences.

(2.16)   a. *Né-némené-**máse**.*   ([Leman 1980b](); p.38)
             2-sing-RPT.2SG
             'You sang, I hear.'

         b. *É-némené-**sesto**.*   ([Leman 1980b](); p.38)
             3-sing-RPT.3PL
             'They sang, I hear.'

         c. *É-hoo'kóhó-**nése**.*   ([Leman 1980b](); p.51)
             3-rain-RPT.B.SG
             'It's raining, I hear.'

In transitive clauses where both arguments are animate, the reportative agrees with whichever argument is higher on the person hierarchy given in Figure [2.2]() below.
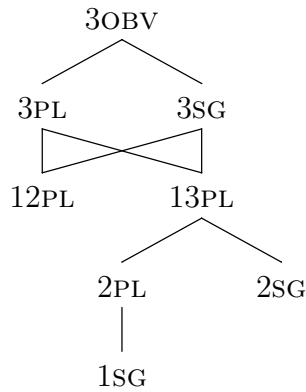
Figure 2.2: Reportative Agreement Person Hierarchy

It is worth noting that this hierarchy is *not* the same as the person prefix hierarchy given in Figure [2.1](). Thus, most of the time the reportative and the person prefix agree with different arguments of the verb, as in ([2.17]()a,b).

(2.17)   a. *Né-vóom-ó-**sesto**.*   ([Leman 1980b](); p.81)
             2-see$_A$-SO-RPT.3PL
             'You saw them, I hear.'

         b. *Né-vóom-ae-**sesto**.*   ([Leman 1980b](); p.81)
             2-see$_A$-OS-RPT.3PL
             'They saw you, I hear.'

However, for certain person combinations the reportative and the person prefix agree with the same argument. For example, when one argument is second person plural and the other is first person singular, both the person prefix and the reportative agree with the second person plural argument (see Appendix (D.6) for an example).

If the object of a transitive clause is inanimate (singular or plural), as in (2.18), the reportative agrees with the inanimate object.

(2.18) *Né-vóóht-á-**nȯse**.*   (Leman 1980b; p.96)
     2-see_B-OB-RPT.SG.B
     'You saw it, I hear.'

The hierarchy in Figure 2.2 predicts that this should also hold for an inanimate subject, e.g., *It fell on you, I hear*. However, I have not yet elicited any Cheyenne examples of this type.

Like the reportative, the conjectural evidential in Cheyenne agrees with an argument of the verb. However, unlike the reportative, the conjectural always agrees with the subject of the verb and agrees only in animacy. Thus, there are only two forms of the conjectural evidential: *mó- -hé -hé*, used with animate subjects, and *mó- -hane -hé*, used with inanimate subjects. Each form is composed of three affixes: the prefix CNJ- and two suffixes, *-hé/-hane*, and *-hé*. Examples of the conjectural with animate and inanimate subjects are given in (2.19a) and (2.19b), respectively.

(2.19) a. ***Mó**-né-némenė-**hé-he**.*   (Leman 1980b; p.37)
       CNJ-2-sing-MOD_A-Y/N
       'You sang, I gather.'

     b. ***Mó**-hoo'kȯhó-**hané-he**.*   (Leman 1980b; p.50)
       CNJ+3-rain-MOD_B-Y/N
       'It's raining, I gather.'

The conjectural prefix attaches to the beginning of the verb, before the person prefix. When combined with third person, it fuses with the prefix *é-*. I'll gloss this

marker CNJ-, as it only seems to occur in the conjectural evidential construction. However, this is somewhat of a puzzle, as there is no morphological slot before the person prefix in the verbal template, and no other morphemes that I know of can occupy this position. One possibility is that this prefix is a grammaticized form of the word *móhe* 'maybe'/'really?'. A related clitic is used in forming one type of polar question (see §2.6.1). However, the clitic and the prefix appear to be distinct morphemes because the clitic does not phonologically fuse with the third person prefix. The suffix -*hé*/-*hane* (glossed -MOD) is the only component of the conjectural which morphologically varies: -*he* appears with animate subjects and -*hane* appears with inanimate subjects. This suffix occurs in slot VIII as a type of modal agreement.[16] Given its identical allomorphy and placement, I believe that this is the same suffix which appears in negation together with the negative prefix *sáa*- (recall (2.8)). The final morphological component of the conjectural is the suffix -*hé* (glossed -Y/N), which appears in the mood slot of the verb. It is arguably the polar question marker, given its placement and (lack of) alternations (see discussion in §2.6.1).

There are four allomorphs of the Cheyenne narrative evidential: *hoo'o* and *hoono*, which agree with animate 3rd person singular and plural respectively, and *neho* and *néhoonótse*, which agree with inanimate 3rd person singular and plural respectively. There are no narrative forms for 1st or 2nd person.

2.5   Interpretations of Cheyenne Evidentials

In this section, I discuss some generalizations about the interpretation of evidentials in Cheyenne. In particular, evidentials contribute new information (e.g., 2.20), the evidence source can be unspecified (e.g., 2.20) or can be interpreted anaphorically

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[16]This suffix occurs before the agreement suffixes for the arguments.

(e.g., 2.24), evidentials do not shift indexicals (e.g., 2.24), inconsistent reports cannot be summed (e.g., 2.28), but consistent reports can be (e.g., 2.29).

2.5.1 Unspecified Evidence

As in other languages, Cheyenne reportative evidentials can mark hearsay or they can be used when the speaker has been directly told something (by one or more people), though it typically only marks secondhand information. The information that the speaker has reportative evidence for the scope of the evidential is typically, if not always, new information.

This is exemplified in (2.20), a simplified excerpt from a text called 'Turtle Moccasin' (Leman 1980a; p.56). Originally, the entire passage was part of a direct quote from a single speaker. Thus, it indicates how the reportative can be used in speech. The speaker is telling her son, who has just returned, about an upcoming visit to the village. Sentence (2.20ii), the middle sentence of this excerpt, appears with an unmarked direct evidential, indicating that the speaker has direct evidence that Turtle Moccasin is expected (specifically, the speaker herself is waiting for him).

(2.20) i. *É-to'se-amé-sóhpe-ohtse-**séstse***   *Ma'enóhkevo'eha.*
        3-going.to-by-through-go-RPT.3SG   Turtle.Moccasin
        'Turtle Moccasin, I hear, is going to pass by.'

     ii. *É-tonóom-e-**Ø**.*
        3-wait.for-PSV-DIR
        'He's expected.'

    iii. *É-mo'on-átamaahe-**séstse**.*
        3-handsome-appear-RPT.3SG
        'He's handsome, I hear.'

In this example, it is new information to the son that the speaker, his mother, has reportative evidence that Turtle Moccasin will pass by. He has just returned, and does not know that she heard anything about the visit or his being handsome. In

addition, who she heard this information from is left unspecified. She may have been told by a neighbor that Turtle Moccasin will pass by and that he is handsome. Alternatively, she may have been told this by several people, or heard each piece of information from different sources, or she may have simply overheard it. All of these interpretations of the reportative are possible because the source of the report – the reporter – is not specified: the reportative only indicates that the speaker has heard the specified content.

It is not clear in example (2.20) who exactly the source of the report can be[17] and whether or not consecutive reportatives must be interpreted as having the same source. The Cheyenne reportative allows the possibility that the information in (2.20a) and (2.20c) came from different sources.

However, contradictory information embedded under a reportative cannot occur consecutively without an intervening verb of saying, as shown by (2.21), an adaptation of an example from Faller (2002; p.247). Example (2.21) cannot be understood as reporting different winners of the same race (contradictory information) – it can only be understood as reporting winners of different races.

(2.21) *É-hó'táheva-**sėstse** Mókéé'e. (Naa oha) é-hó'táheva-**sėstse** Áméó'o.*
3-win-RPT.3SG Mókéé'e. (and CNTR) 3-win-RPT.3SG Áméó'o
'Mókéé'e won, I hear. (But,) Áméó'o won, I hear.'

The way to express reported conflicting information, here, different reported winners of the same race, is with an overt verb of saying.

This data is somewhat of a puzzle: as shown in (3.18), the speaker need not believe the scope of the reportative evidential. Presumably, if the speaker need not believe

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[17]Typically, there is a requirement with reportative evidentials that the source of the report is neither the speaker nor the hearer(s) (a 'third person' requirement, (Faller 2002; Bittner 2006, 2008)). This requirement also holds in Cheyenne, but might have more to do with the speaker's epistemic state instead of the actual facts of the situation. For example, the speaker of (2.20) is actually speaking to Turtle Moccasin, but she doesn't know it.

the scope of the evidential, any information can be reported, even contradictory information. However, that does not seem to be the case.

A potential explanation is if consecutive reportatives must be, or typically are, interpreted as having the same source: it would be odd to attribute conflicting information to the same person. One way that consecutive reports could be interpreted as having the same source is if the source of the report was interpreted anaphorically. An analysis along these lines has been proposed for the Kalaallisut reportative clitic =*guuq*: the source of the report by default is interpreted as the currently topical individual (Bittner 2005, 2008; Bittner and Trondhjem 2008).

Cheyenne conjectural evidentials can indicate a conjecture based on generally known facts, or specific, yet unspecified, evidence.[18] This is illustrated by example (2.22), a modification of an excerpt from a text called 'Turtle Moccasin' (Leman 1980a; p.56).

(2.22)   i.   ***Mó**-to'se-am-é-sóhpe-ohtse-**hé**-**he***   *Ma'enóhkevo'eha.*
             CNJ-going.to-by-EP-through-go-MOD$_A$-Y/N   Turtle.Moccasin
             'Turtle Moccasin, I gather, is going to pass by.'

        ii.   *É-tonóom-e-**∅**.*
             3-wait.for-PSV-DIR
             'He's expected.'

        iii. ***Mó**-mo'on-átamaahe-**hé**-**he**.*
             CNJ-handsome-appear-MOD$_A$-Y/N
             'He's handsome, I guess.'

In (2.22), the speaker may base her conjecture on a variety of different factors. Perhaps Turtle Moccasin comes by every year at the same time, or perhaps something happens right before he comes by. This would also be felicitous in a situation where

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[18]Cheyenne conjecturals may also be used when the speaker receives a second hand (or more) report. That is, it can mark information that the speaker received via report as long as the report wasn't firsthand. This may be related to the use of the conjectural in texts, a use similar to that of the reportative. However, this data is currently unclear.

Turtle Moccasin is looking for a wife, and the speaker says (2.22) as she sees all of the young women in the village getting ready. However, in each of these scenarios the evidence that the conjecture is based on is left unspecified. Sentence (2.22ii), the middle sentence of this excerpt, appears without an conjectural, indicating that the speaker has direct evidence that Turtle Moccasin is expected (e.g., the speaker herself is waiting for him). As with the reportative, it does not seem that consecutive conjecturals must be interpreted as being based on the same evidence.

2.5.2 Anaphoric Source

Besides the interpretation of consecutive reportatives, additional support for treating the reportative's source as anaphoric comes from their interpretation in discourse. While the source of the report can remain unspecified, it may also be interpreted anaphorically: that is, the source of the report can be taken to be someone mentioned in previous discourse. The Cuzco Quechua example in (2.23) comes from Faller (2002; p.69, slightly modified translation).

(2.23)   i. *Atuq-chá   wallpa-y-ta   apa-rqa-n.*   (=(57) in Faller 2002)
            fox=**chá**   hen-1-ACC   take-PST1-3.
            'I concluded a fox took my hen'

      ii. *Ichaqa   wasi   masi-y   riku-sqa,   puma-s   apa-n-man   ka-rqa-n.*
            but   house   friend-1   see-SQA,   puma=**si**   take-3-IRR   be-PST-3.
            'but my neighbor (lit. house-friend) saw it [happen], and [he says] a puma took it.'

The reportative evidential =*si* in (2.23ii) is interpreted anaphorically – the source of the report that a puma took the speaker's hen is taken to be the neighbor. As Faller (2002) does not discuss the anaphoric properties of this example (it is used to discuss the relative strengths of the conjectural =*chá* and reportative =*si*), it is not clear if this anaphoric interpretation is necessary. For example, could the source of the report to the speaker be the neighbor's wife, or the news reporting what the neighbor saw?

An example of the anaphoric interpretation of reportatives in Cheyenne is given in (2.24), based on a similar example in Bittner (2006). In (2.24), the speaker's mother called and told her that her father was sick all night.

(2.24) i. *Tsé-h-méo-vóona'o*   *ná-hko'éehe*   *é-ho'eééstse-Ø.*
        DEP-PST-early-morning   1-mother   3-incoming.call-DIR
        'Early this morning, my mother called.'

   ii. *Ného'éehe*   *é-vóon-omóhtàhe-**sèstse**.*
       1.father   3-all.night-be.sick-RPT.3SG
       '[She said] my father was sick all night.'

   ii′. # *Ného'éehe*   *é-vóon-omóhtahe-**Ø**.*
        1.father   3-all.night-be.sick-DIR
        'My father was sick all night.'

The source of the report in (2.24ii) is taken to be the mother from (2.24i). Since the speaker only has reportative evidence that her father was sick, not using the reportative evidential, as in (2.24ii′), is infelicitous. The use of (2.24ii′) is infelicitous in this context because sentences in Cheyenne without an overt evidential commit the speaker to having direct evidence for the evidential's scope (unlike in, e.g., English and Japanese (McCready and Ogata 2007)). Such examples are an argument for the existence of an unmarked 'direct' evidential.[19] Again, it is not clear whether or not this anaphoric interpretation is necessary or cancellable – this aspect must be explored in future fieldwork.

Example (2.24) also shows that reportatives do not shift indexicals. In (2.24ii), *ného'éehe* 'my father' is interpreted as the speaker's father, not the father of the source of the report (here, the speaker's mother).

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[19]Additional evidence is the grammatical paradigm. At this point, it is not clear if there is actually a 'null' evidential or if the absence of an overt evidential implicates direct evidence. As far as I know, there is presently no evidence in favor of one of these analyses over another, though these should be distinguishable.

Like the reportative, the conjectural can be anaphoric to previous discourse. For the reportative, it was the source of the report that was anaphoric. For the conjectural, it is the source of – or evidence for – the inference. An example of this is given in (2.25), which is a simplified version of an excerpt from the text 'The Snakebite' (Leman 1980a; p.69).

(2.25)   i. *É-s-sáa-hoé-he-Ø*   *šé'šenovȯtse.*
             3-PST-neg-be.at-MOD_A-DIR   snake
             'The snake was gone.'

         ii. **Mó**-*'-éše-ase-vonéhnė*-**hé-he**.
             CNJ+3-PST-already-away-crawl-MOD_A-Y/N
             'It must have crawled away.'

In (2.25), the speaker concludes from the fact that the snake is gone (2.25i) that it crawled away (2.25ii). I have glossed the conjectural in (2.25ii) with the epistemic modal 'must' since in similar contexts it means something akin to 'therefore' (Stone 1994, 1999). The speaker of (2.25) only has conjectural evidence that the snake crawled away. It is thus infelicitous to omit the conjectural in the second sentence, as shown in (2.26).

(2.26)   i. *É-s-sáa-hoé-he-Ø*   *šé'šenovȯtse.*
             3-PST-neg-be.at-MOD_A-DIR   snake
             'The snake was gone.'

         ii. # *é-'-éše-ase-vonéhne-Ø*.
             3-PST-already-away-crawl-DIR
             'It crawled away.'

The use of (2.26ii) is infelicitous in this situation since it commits the speaker to having direct evidence that the snake crawled away. However, it would be felicitous if, for example, the speaker had seen the snake crawl away.

Another example of an anaphorically interpreted conjectural is given in (2.27), which is a simplified version of an excerpt from the text 'The Brothers-in-Law' (Leman 1987; p.173).

(2.27)   i. *Ná-sáa-náhaxe-éva-vóom-ó-he-Ø*   *Aénóhenéstoohe.*
         1-neg-awhile-again-see-SO-MOD$_A$-DIR   Hawk.Howler
         'I had not seen Hawk Howler in a long time.'

         ii. *Nomá'heo'hé'e*   **mó**-*ta-tséhe'óhtsė*-**hé**-**he**.
         Kingfisher   CNJ+3-TRL-go.there-MOD$_A$-Y/N
         'He must have gone to Kingfisher.'

In (2.27) the speaker's conclusion that Hawk Howler went to Lame Deer (2.27ii) is
based both on previous discourse (2.27i) and his background knowledge. The speaker
of (2.27) has as background knowledge that he often sees Hawk Howler when he's in
town and that Hawk Howler is usually in town or in Lame Deer, a neighboring town.
This background information combined with (2.27i) is evidence for the conclusion in
(2.27ii). This is unlike (2.25), where the speaker's conclusion is based primarily on
previous discourse alone.

2.5.3   Summing Evidence

Conflicting information cannot be summed into one report. For example, the con-
flicting information that Mókéé'e and Ma'etomoná'e won the same race cannot be
reported with a single reportative evidential, as shown in (2.28), an adaptation of an
example from Faller (2002; p.247).

(2.28) *É-hó'tȧhevá*-**sesto**   *Mókéé'e   naa   Ma'etomoná'e.*
       3-win-RPT.3PL   Mókéé'e   and   Ma'etomoná'e
       'Mókéé'e and Ma'etomoná'e won, I hear.'

Like (2.21), this example can mean that both Mókéé'e and Ma'etomoná'e won
different races (or perhaps that they tied, or were on the same team). It cannot,
however, mean that it is reported that Mókéé'e won a specific race and it is reported
that Ma'etomoná'e won that same race. The infelicity of (2.28) may be due to the
fact that conflicting information is being attributed to a single reporter, as in (2.21).

In general, reports can be combined, as long as their content is consistent, as in example (2.29).

(2.29) *Méave'ho'eno   é-héstáhé-**sesto***   *Mókéé'e   naa   Ma'etomoná'e.*
Lame Deer   3-be.from-RPT.3PL   Mókéé'e   and   Ma'etomoná'e
'Mókéé'e and Ma'etomoná'e are from Lame Deer, I hear.'

As always, this report can correspond to the speaker having heard the proposition that Mókéé'e and Ma'etomoná'e are from Lame Deer. However, it can also correspond to the speaker having heard – on separate occasions and from distinct people – the propositions that Mókéé'e is from Lame Deer and that Ma'etomoná'e is from Lame Deer. These two consistent propositions can be summed together and expressed by the sentence in (2.29). Thus, the speaker need not have ever heard the proposition that is literally in the evidential's scope. To my knowledge, this is a property of evidentials that holds crosslinguistically, but currently is not accounted for.

2.6   Interrogatives

Cheyenne has several ways of forming polar and content interrogatives. In Section (2.6.1), I discuss two types of polar interrogatives in Cheyenne: with the interrogative mood and with an interrogative clitic. In Section (2.6.2), I discuss the various types of content interrogatives in Cheyenne.

2.6.1   Polar Interrogatives

There are two ways to form polar interrogatives in Cheyenne: with the interrogative mood suffix -*he*, as in (2.30), or with the interrogative clitic *mó*=, a cliticized form of the particle *móhe*, as in (2.31).

(2.30) a. *Né-háeana-**he**?*   (Fisher et al. 2006)
        2-hungry-Y/N
        'Are you hungry?'

    b. *É-hoo'kóho-**he**?*   (Leman 1980b; p.47)
        3-rain-Y/N
        'Is it raining?'

(2.31) a. *Mó=né-háéána-**Ø**?*
        y/n=2-hungry-DIR
        'Are you hungry?'

    b. *Mó='-é-hoo'koho-**Ø**?*   (Leman 1980b; p.182)
        y/n=EP-3-rain-DIR
        'Is it raining?'

There is a subtle meaning difference between these two types of polar interrogatives. For example, (2.30a) is felicitous to ask someone who just entered your home (though socially a bit odd), while (2.31a) is infelicitous. However, (2.31a) would be felicitous in a situation where the addressee is eating extremely quickly. This difference in meaning is most likely due to the fact that polar interrogatives formed with the interrogative clitic contain evidentials (see Section 2.6.3, below).

Additionally, *móhe?* by itself can be a question, loosely translated as 'Really?'. Some of my consultants even consider the examples in (2.31) to be two words: *móhe?* followed by a statement, e.g., 'it's raining' for (2.31b). This is supported by the difference in pitch between the two interrogatives: the verb in the interrogatives with *mó=* has the same pitch as the declarative, contrasting with *-he* interrogatives, which have a distinct pitch profile. However, the pitch alternation may be purely phonological, as suffixes often affect the pitch of the stem they attach to.

There is also a difference in distribution: both the clitic *mó=* and the mood suffix *-he* can attach to verbs, as shown in (2.31) and (2.30). However, the clitic *mó=* can also attach to demonstratives and nouns, as shown in (2.32). This is not possible for the mood suffix *-he*.

(2.32) a. *Mó=tsé'tóhe?*
    y/n=this.one
    'Do you mean this one?'/'This one?'

   b. *Mó=tsé'tóhe naa mó=tsé'tóhe?*
    y/n=this.one and *y/n*=this.one
    'Do you mean this one, or this one?' (demonstrating two different objects)

   c. *Mó-hetané-ka'éškóne?*
    y/n=man-child
    'Do you mean the boy?'

Polar interrogatives can also contain negation, resulting in a negative question, as in (2.33). This form is very similar morphologically to the conjectural evidential.

(2.33) *É-sáa-hoo'kóhó-hané-he?*   (Leman 1980b; p.49)
    3-neg-rain-MOD_B-Y/N
    'Isn't it raining?'

2.6.2 Content Interrogatives

There are two general ways to form content question in Cheyenne, both of which are morphologically unrelated to polar interrogatives: with an interrogative noun and with an *interrogative verb* – a complex verb stem, possibly formed with an questioning prefix. (See Appendix E for a list of interrogative verbs.)

Interrogative nouns can be further subdivided into two categories: ones that take a dependent clause and ones that take an independent clause. 'Who', 'which', 'what', and 'why' interrogatives are formed with a interrogative noun and a dependent clause. Examples of each type of question, and corresponding answers, are given in (2.34 - 2.37), respectively. These interrogative nouns have different forms (i.e., plural, obviative, etc.); the complete paradigm is given in Appendix E.

(2.34) a. *Névááhe tsé-néméné-stse?*   (Fisher et al. 2006)
    who   DEP-sing-<u>DEP</u>.3SG.A
    'Who's singing?'

b. *Ná-néméne-∅.* (Leman 1980b; p.27)
1-sing-DIR
'I'm singing.'

(2.35) a. *Taasévoone   tsé-oom-ata'óse   ka'éškóne-ho?*   (Leman 1980b; p.184)
which_A.PL   DEP-hit_A-DEP.3PL:2   child-PL
'Which children hit you?'

b. *He'é-ka'éškóne-ho   ná-oom-aa'e.*
female-child-PL   1-hit_A-3PL:1
'The girls hit me.'

Both 'what' and 'why' interrogatives are formed with the interrogative word *hénová'e* 'what', as in (2.36) and (2.37), respectively. 'Why' interrogatives require an additional verbal prefix, *hése-*, meaning something like 'reason' or 'because', which can occur in all verb forms, not just interrogatives. Correspondingly, the question in (2.37) might be translated literally as 'for what reason is he crying?' or 'what reason does he have to cry?'.

(2.36) a. *Hénová'e   tsé-més-e-to?* (Leman 1980b; p.185)
what   DEP-eat_B-OB-DEP.2.A
'What did you eat?'

b. *Ho'évohkótse   ná-més-e-∅.*
meat_B   1-eat_B-OB-DIR
'I ate meat.'

(2.37) *Hénová'e   tsé-hésė-a'xaame-tse?*
what   DEP-reason-cry-DEP.3.A
'Why is he crying?'

Unlike with the interrogative nouns discussed above, 'when' and 'where' interrogatives in Cheyenne are formed with an interrogative noun and an independent clause (one that can be an independent sentence). Examples of each are given in (2.38) and (2.39), respectively.

(2.38) a. *Tóne'še   é-ho'eóhtse-Ø?* (Leman 1980b; p.186)
       when   3-arrive-DIR
       'When did he arrive?'

   b. *Hetóéva   é-ho'eóhtse-Ø.*
       last.eve   3-arrive-DIR
       'He arrived yesterday evening.'

(2.39) a. *Tósa'e   né-vo'éstanéheve-Ø?* (Leman 1980b; p.186)
       where   2-live-DIR
       'Where do you live?'

   b. *Méave'ho'eno   ná-vo'éstanéheve-Ø.*
       Lame Deer   1-live-DIR
       'I live in Lame Deer.'

In both (2.38) and (2.39), the verb in the question is identical to the verb in the answer. These verbs could also appear on their own, e.g., 'he arrived'; this, however, would not be a felicitous answer to the question in (2.38a).

The second strategy for forming content interrogatives in Cheyenne is with certain verbs that are inherently questions – they take normal verbal inflection but have the force of a question. I'll call these verbs 'interrogative verbs', adapting Sadock and Zwicky (1985), who call these 'WH-verbs' and note that this type of question is typologically rare. For example, consider the examples in (2.40).

(2.40) a. *É-tónėšéve-Ø?* (Fisher et al. 2006)
       3-what.do-DIR
       'What is he doing?'

   b. *É-néevá'eve-Ø?* (Fisher et al. 2006)
       3-who.be-DIR
       'Who is he?'

Certain prefixes can also be added to certain verbs to form interrogative verbs. Consider the following example:

(2.41)   a. *Né-óxȯ-heve-∅?*   (Leman 1980b; p.183)
             2-what.say-say-DIR
             'What did you say?'

         b. *Ná-heve-∅   "é-néméne-∅".*
             1-say-DIR   3-sing-DIR
             'I said "he sang"'

The prefix *óxȯ-* illustrated in (2.41a) can only attach to verbs related to saying.

The two strategies for forming content interrogatives may also be combined: interrogative verbs can occur with interrogative nouns, as illustrated in (2.42b), where the interrogative noun modifies the question posed by the interrogative verb.

(2.42)   a. *É-tónetȯhoo'e-∅?*
             3-how.swim-DIR
             'How is he swimming?'

         b. *Tósa'e é-tónetȯhoo'e-∅?*   (Fisher et al. 2006)
             where   3-how.swim-DIR
             'Which way (direction) is he swimming?'

Unlike with polar questions, when interrogative verbs are negated the result is not a negative question (e.g., (2.43b) ≠ 'What isn't he doing'). Instead, the force of the direct question is lost and the result is a negative statement with the interrogative interpreted like a negative polarity item, as in (2.43) and (2.44).

(2.43)   a. *É-tónėšéve-∅?*   (Fisher et al. 2006)
             3-what.do-DIR
             'What is he doing?'

         b. *É-sáa-tónėšévé-he-∅.*
             3-neg-what.do-MOD$_A$-DIR
             'He isn't doing anything'

(2.44)   a. *Né-oxȯ-heve-∅?*   (Leman 1980b; p.183)
             2-what.say-say-DIR
             'What did you say?'

    b. *Ná-sáa'-óxȯ-hé-he-∅.*   (Fisher et al. 2006)
       1-NEG-what.say-say-MOD$_A$-DIR
       'I didn't say anything'

Similarly, when interrogative verbs occur with modals the force of the direct question is lost and there is an existential interpretation, as illustrated in (2.45).

(2.45)   a. *É-tónėstáotse-∅?*   (Fisher et al. 2006)
         3-what.become-DIR
         'What did he become?'/ 'What happened to him?'

         b. *Héá'e   é-tónėstáotse-∅.*
         Maybe   3-what.become-DIR
         'Maybe something happened to him'

Though examples (2.43) - (2.45) all involve interrogative verbs, questions with interrogative nouns have the same range of interpretations. This behavior is similar to what have been called 'indeterminate pronouns': "depending on the operator they appear with, [they] take on existential, universal, negative polarity, free choice or interrogative interpretations" (Kratzer and Shimoyama 2002; p.6).

2.6.3 Evidentials and Questions

Evidentials can occur in polar interrogatives formed with the clitic *mó=* and in content interrogatives. For polar interrogatives, there is only one interpretation: the evidential indicates the type of evidence that the speaker expects the addressee to have for the requested answer.

Consider the example in (2.46) with the reportative. Question (2.46) is felicitous in a context where it is clear the addressee will have reportative evidence for her answer. For example, imagine a context where Annie overhears Dale on the telephone. Dale asks the person on the telephone "Did Andy win?" Annie hears this question, but not the answer. However, she expects that Dale will have reportative evidence for

the answer, whatever it is (e.g., yes, he sang, or no, he didnt sing). When Dale gets off the phone, she can ask him (2.46).

(2.46) *Mó=é-hó'táheva-**sėstse*** *Andy?*
        y/n=3-win-RPT.3SG   Andy
        'Given what you heard, did Andy win?'

(2.47) ✓ A_1: *Héehe'e* *é-hó'táheva-**sėstse***.   #A_2: *Héehe'e* *é-hó'táhéva-**Ø***.
              Yes   3-win-RPT.3SG   Yes   3-win-DIR
              'Yes, he won, I hear.'   'Yes, he won, I'm sure.'

The evidential that occurs in the question constrains the possible answers, as in (2.47). Example (2.47A_1), which contains a reportative evidential, is a felicitous answer to (2.46) while (2.47A_2), which contains a direct evidential, is not a felicitous answer.

The same interpretation is available in content interrogatives with evidentials. Consider the following situation. Andy and Dale are walking along, and see some people in the distance. They can see them clearly, but can't tell what they're doing. A man comes along, and Dale asks him (2.48).

(2.48) *É-tónėšéve-o'o-**Ø***?   (Fisher et al. 2006)
        3-what.do-PL-DIR
        'What are they doing?'

Andy hears Dale's question, and sees the man answering, but doesn't hear the answer. When the man leaves, Andy can ask Dale (2.49).

(2.49) *É-tónėšévė-sesto?*   (Fisher et al. 2006)
        3-what.do-RPT.3PL
        'Given what you heard, what are they doing?'

A felicitous answer to Andy must contain a reportative evidential. In this example, the combination of a reportative and a question retains the force of a question.

In content interrogatives that contain evidentials, there is an additional interpretation that is not a direct question, but a statement of uncertainty. This interpretation

is available with all of the evidentials, though they each contribute a different type of uncertainty. For example, the reportative contributes an attitude of wondering, as illustrated in the second interpretation of example (2.50).

(2.50) *Tóne'še   é-ho'eohtse-séstse*
      when   3-arrive-RPT.3SG
      i. 'Given what you heard, when did he arrive?'
      ii. 'He arrived sometime, I wonder when.'

Similarly, in appropriate contexts, such as one where there is no addressee, or the addressee is not expected to know the answer, (2.49) can be interpreted as 'They are doing something, I wonder what'. I call this ambiguity in Cheyenne content questions containing evidentials *illocutionary variability*: the illocutionary force of the sentence can vary. The ambiguity occurs with all content questions in Cheyenne. In questions formed with interrogative nouns, since the verb is a dependent clause, the evidential can occur on the noun (see Appendix D). As far as I have observed, there is no intonation difference that corresponds to the different interpretations.

2.7   Summary

This chapter has given a general introduction to Cheyenne grammar as well as a detailed description of Cheyenne evidentials and the illocutionary mood system. In Cheyenne, evidentials and illocutionary mood markers occur in the same morphological slot – they are a morphosyntactic natural class. In Chapter 4, I propose an analysis that treats them as a semantic natural class as well.

In the next chapter, Chapter 3, I discuss several diagnostics that distinguish various semantic properties of evidentials crosslinguistically and apply these diagnostics to evidentials in Cheyenne. The goal of this next chapter is to show that there is a core set of properties that all evidential systems share, pointing to the need for a unified crosslinguistic analysis.

Chapter 3

Two Types of Evidentials

Contents

3.1   Introduction

A semantic classification of evidentials has begun to emerge. So far, two types of evidentials have been identified: there are ILLOCUTIONARY EVIDENTIALS and EPISTEMIC EVIDENTIALS. Illocutionary evidentials are similar to certain English parentheticals, e.g., *That's the postman, I take it*, while epistemic evidentials behave more

like epistemic modals, as in *That must be the postman.* This classification is based on several diagnostics which test, for instance, the projection properties of evidentials and the speaker's commitment to the truth of the evidential's scope (Faller 2002, 2006a,b; a.o.).

These two types of evidentials have inspired analyses that differ not only in their details but in their basic approach. Illocutionary evidentials have been analyzed as speech act operators (e.g., Faller 2002), which do not contribute to the propositional content of a sentence. Epistemic evidentials, on the other hand, are argued to contribute to the propositional content and have been analyzed as epistemic modals with an evidential presupposition (e.g., Izvorski 1997; Matthewson et al. 2007).

These two types of analyses aim to capture the different properties of the two types of evidentials. However, while the diagnostics certainly identify points of variation crosslinguistically, they also identify a core set of properties that all evidentials share. For instance, it has been observed that sentences with evidentials, in any language, make both an 'evidential' and a 'propositional' contribution (Faller 2002, 2006a; Matthewson et al. 2007). The evidential contribution is not directly challengeable or up for negotiation – it is not the main point of the sentence (Papafragou 2006; Simons 2007). In contrast, the propositional contribution, which is the main point of the sentence, is directly challengeable and up for negotiation.

In this chapter, I discuss the properties that evidential systems share crosslinguistically and the properties which vary crosslinguistically. In Section 3.2, I introduce the basic differences between the two recognized types of evidential systems. The remainder of the chapter is an in-depth discussion of the various diagnostics, how they do or do not differentiate illocutionary and epistemic evidentials, and their application to Cheyenne evidentials. Challengeability tests are discussed in Section 3.3, projection tests in Section 3.4, and the interaction of evidentials and questions in Section 3.5. Section 3.6 is a discussion of the various tests and a summary of the

findings. I conclude that Cheyenne evidentials are a sub-class of illocutionary evidentials. However, I also argue that there is sufficient crosslinguistic similarity in the types of evidential systems that evidentiality should be considered a semantic natural class crosslinguistically. Thus, there is a need for a unified analysis which can capture the properties that all evidentials share but that leaves room to accommodate the crosslinguistic variation. In Section 3.7, I discuss the relationship between the kind of meaning expressed by evidentials and other kinds of meanings, including presuppositions and conventional implicatures. Section 3.8 is a summary.

3.2 Illocutionary and Epistemic Evidentials

In this dissertation, I adopt the following definition of EVIDENTIAL: a grammatical element which encodes source of information as its primary meaning (Aikhenvald 2004; Faller 2002, 2006a). This definition covers languages where evidentials are obligatory, e.g., part of the inflectional system, as in Tariana (Aikhenvald 2004) and Cheyenne (see Chapter 2), but also where they are not obligatory, as in German (Faller 2006a) and Kalaallisut (Bittner 2008). This definition does not include items that encode reliability, necessity, possibility, or degree of certainty in the truth of the scope proposition as their primary meaning. However, such items, e.g., English epistemic modals like *must*, certainly can contribute an evidential value as a secondary meaning, and I suspect this component of their meaning can be analyzed in much the same way as grammatical evidentials. This definition also does not include elements that do not form grammatical paradigms, such as English adverbs and parentheticals, which belong to open classes. However, this is not to say that languages without grammatical evidentials, like English, cannot express evidentiality. Such languages do have elements that encode source of information as their primary meaning. Thus, I use the term EVIDENTIALITY more generally as the encoding of information source,

independent of how it is encoded in a language. I take it to be an interesting open question what the relationship is between grammatical evidentials and other elements that express evidentiality. They clearly play a different role in the grammar, and thus one might expect interesting differences.

In this chapter, and in the dissertation more generally, I focus on grammatical elements that express evidentiality, what I am calling evidentials. However, extensions to other phenomena, including other elements which express evidentiality, are briefly discussed throughout.

Evidentials can be divided into two general classes: direct evidentials, which indicate, e.g., visual or other sensory evidence, and indirect evidentials, which indicate, e.g., reportative or conjectural evidence. Crosslinguistically, evidential systems can vary along several dimensions, including number of evidential distinctions, grammatical category, and whether or not evidentials are obligatory. The evidential system of a language may contain only a single evidential marker or it may contain several, possibly including an unmarked default.

In this chapter, my primary interest is the semantics of evidentials: how does the interpretation of evidentials vary from language to language, where do they converge, and where do they diverge?

In discussing the properties of sentences with evidentials, I make a distinction between the evidential itself and its SCOPE. For example, in Cheyenne (3.1), the scope of the evidential is the proposition that Sandy sang, while the evidential contributes the proposition that the speaker heard that Sandy sang.

(3.1) *É-némene-**séstse*** *Sandy.*
      3-sing-RPT.3SG
      'Sandy sang, I hear.'

Following Faller (2002, 2003) and Aikhenvald (2004), I think of the evidential itself semantically as a predicate that indicate a specific type of evidential relationship

between a person and a proposition. The scope of the evidential is the propositional argument of this predicate. Others have called the scope of an evidential the 'proposition embedded under' it. However, I find this term semantically and syntactically misleading, especially given the varied morphosyntactic status of grammatical evidentials.

Two semantic types of evidentials have so far been recognized: illocutionary evidentials and epistemic evidentials[1] (see, e.g., Faller 2006a). In general, illocutionary evidentials display parenthetical-like behavior: they can be roughly compared to certain English parentheticals like *..., they say, ..., it's said, ..., I find, ..., I hear, ..., I take it, ..., it seems,* and *..., I gather,* which we might call evidential parentheticals. Evidentials of this type are found in Quechua (Faller 2002), Kalaallisut (Bittner 2008), and, as I argue in this chapter, Cheyenne.

Epistemic evidentials behave more like English modals, certain adverbs, and certain embedding verbs, such as *..., must, ..., definitely, ..., reportedly, ..., apparently, it's certain that,* and *is rumored to.* Evidentials of this type are found in Turkish and Bulgarian (Izvorski 1997), St'át'imcets (Matthewson et al. 2007), Tibetan (Garrett 2001), German (Faller 2006a), and Japanese (McCready and Ogata 2007).

Illocutionary Evidentials	Epistemic Evidentials
Cuzco Quechua	German *sollen*
Kalaallisut =*guuq*	St'át'imcets
Cheyenne	Japanese

Table 3.1: Types of Evidentials by Language

The classification in Table 3.1 is a simplification. These languages are each different grammatical systems and there is sure to be a certain amount of individual

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[1]This type of evidential has been called 'propositional evidentials'. However, I find this name misleading as it implies that one dimension on which the evidential types vary is whether or not they affect the proposition expressed, involve propositions or affect the truth conditions.

variation, and perhaps patterning into sub-types. However, the general classification into these two types tracks certain important differences between evidential systems, as will be discussed below.

Key differences between the two types of evidential systems can be seen in their behavior on a set of semantic diagnostics. These diagnostics test, for example, whether evidentials can be embedded in a variety of environments and what their projection properties are, how sentences with evidentials can be challenged, and how evidentials interact with questions. While certain of these diagnostics do distinguish two classes of evidentials, the two classes of evidentials pattern together on many of them. That is, these diagnostics actually show a considerable overlap between the types of evidentials. The next several sections focus on these semantic diagnostics: I describe the tests, how they do or do not distinguish the two types of evidentials, and apply them to Cheyenne. Cheyenne evidentials are shown to behave like illocutionary evidentials except for their interaction with questions. In Section 3.3 I discuss a family of challengeability tests. A family of projection tests are discussed in 3.4. In Section 3.5, I discuss the interaction of evidentials and questions. Section 3.6 is a summary of the findings and a discussion of the implications for a theory of evidentials. In Section 3.7 I discuss how evidentials do and do not fit into existing categories of meaning. Section 3.8 is a summary.

3.3 Challengeability/Deniability Tests

Various semantic diagnostics in the literature are used to distinguish the at-issue content, the main point, or the proffered content, of a sentence from the rest of it – the not-at-issue content. These diagnostics test, for example, which components of a sentence are directly challengeable and which are not, and what the speaker is committed to.

These diagnostics have been applied to sentences with evidentials by various researchers (e.g., Faller 2006b). The consensus is that there is a basic distinction between the contribution of the evidential and the contribution of the scope of the evidential, the later of which is the main point of the sentence. The scope is directly challengeable, while the evidential contribution is not. The speaker's level of commitment to the scope can vary. However, the speaker is invariably committed to the evidential contribution.

In this section, I discuss four diagnostics in turn, grouped by tests on which all evidentials agree (Section 3.3.1) and tests which distinguish illocutionary and epistemic evidentials (Section 3.3.2). In fact, illocutionary and epistemic evidentials differ only on one test: the level of speaker commitment to the scope of the reportative evidential.

3.3.1   All Evidentials

Evidence for the basic distinction between the contribution of the evidential and the contribution of the scope of the evidential comes from the challengeability test, also called the assent/dissent test (Papafragou 2006; Faller 2006a). Consider the Quechua examples in (3.2) from Faller (2006a; p.11).

(3.2) Cuzco Quechua (Illocutionary)

    a. *Ines-qa*   *qaynunchay*   *ñaña-n-ta=s*   *watuku-sqa.*
       Inés-TOP   yesterday   sister-ACC=BPG   visit-PST2
       p='Inés visited her sister yesterday.'
       $EV=$ speaker was told that p

    b. *Chiqaq-chu.*
       true-QUEST
       'Is that true?'

    c. *Mana=n*   *chiqaq-chu.*   *Manta-n-ta-lla=n*   *watuku-rqa-n.*
       not=BPG   true-NEG   mother-3-ACC-LIM=BPG   visit-PST1-3
       'That's not true. She only visited her mother.'

d. *Mana=n chiqaq-chu. # Mana=n chay-ta willa-rqa-sunki-chu.*
   not=BPG true-NEG   not=BPG this-ACC tell-PST1-3S2O-NEG
   'That's not true. You were not told this.'

The question in (3.2b) can only target the scope of (3.2a), that Inés visited her sister – it cannot question the evidential contribution. That is, the question is akin to *Is it true that she visited her sister yesterday?* and not *Is it true that you heard that she visited her sister yesterday?*. Similarly, following up with *That's not true* can only challenge the scope of the evidential, as in (3.2c), and not the evidential itself, as shown by (3.2d).

Strikingly, the same facts hold for languages with epistemic evidentials, e.g., German (Faller 2006a) and St'át'imcets (Matthewson et al. 2007). For example, consider (3.3) from German (Faller 2006a; p.12).

(3.3) German (Epistemic)

a. *Inés soll gestern ihre Schwester besucht haben.*
   'Inés is said to have visited her sister yesterday.'

b. *Nein, das stimmt nicht. #Das hat Dir niemand erzählt.*
   'No, that's not true. # Nobody has told you that.'

Though the judgments are the same for (3.2) and (3.3), according to Faller (2006b), the explanations are different. Faller (2006b) argues that German *sollen* is not directly challengeable because it is inscrutable (see Papafragou 2006), maintaining that *sollen* still contributes to the propositional content of the sentence. As evidence, a case where the reportative evidence is open for scrutiny is given, repeated below in (3.4) from Faller (2006a; p.12).

(3.4) German (Epistemic)

a. *Laut Polizei soll die Gärtnerin die Juwelen gestohlen haben.*
   'According to the police, the gardener is said to have stolen the jewels.'

b. *Nein, das stimmt nicht. Das ist die Presse, die das behauptet.*
   'No, that's not true. It is the press who is claiming this.'

However, to me, example (3.4) is challenging the source of the report, and not the fact that there was a report. Thus, it seems the evidential contribution itself is not directly challengeable in either type of language. It is important to note, however, that the modal force of epistemic evidentials is directly challengeable (Faller 2002; Matthewson et al. 2007).

The same pattern holds in Cheyenne: the evidential is not directly challengeable, but the scope of the evidential is. Consider the example in (3.5), adapted from Faller (2002, 2006a), where the verb in (3.5b′) has been modified from 'tell' to 'hear' to account for the fact that the speaker need not be directly told the scope proposition.

(3.5) Cheyenne (Illocutionary)

    a. *Méave'ho'eno   é-héstȧhe-**sėstse**   Mókéé'e.*
        Lame Deer   3-be.from-RPT.3SG   Mókéé'e
        'Mókéé'e is from Lame Deer, I hear.'

    b. *É-sáa-hetómėstovė-hane-**Ø**.   É-sáa-héstȧhe-he-**Ø**   Méave'ho'eno.*
        3-neg-be.true-MOD$_B$-DIR   3-neg-be.from-MOD$_A$-DIR   Lame Deer
        'That's not true. She's not from Lame Deer.'

   b′. # *É-sáa-hetómėstovė-hane-**Ø**.   Né-sáa-néstomóné-he-**Ø**.*
          3-neg-be.true-MOD$_B$-DIR   3-neg-hear$_B$-MOD$_A$-DIR
        # 'That's not true. You didn't hear that.'

   b″. # *É-sáa-hetómėstovė-hane-**Ø**.   Hovánee'e   é-sáa-nė-hé-he-**Ø**.*
          3-neg-be.true-MOD$_B$-DIR   nobody   3-neg-an-say-MOD$_A$-DIR
        # 'That's not true. Nobody said that.'

One can directly challenge and deny (3.5a) with (3.5b), but not with (3.5b′) or (3.5b″). That is, the scope of the evidential – that Mókéé'e is from Lame Deer – can be challenged and denied. However, the evidential contribution – that the speaker heard that Mókéé'e is from Lame Deer – can be neither directly challenged nor denied. The propositional anaphor in 'That's not true' cannot pick out the evidential contribution. As in other languages, these challengeability facts hold not only for the reportative, but for all kinds of evidentials, e.g., the direct and the conjectural as well.

While the evidential contribution cannot be challenged, it can be indirectly challenged, or questioned. For example, consider Cheyenne (3.6).

(3.6) Cheyenne (Illocutionary)

    a. *Noma'héohe'e   é-héstáhe-**séstse**   Mókéé'e.*
       Kingfisher   3-be.from-RPT.3SG   Mókéé'e
       'Mókéé'e is from Kingfisher, I hear.'

    b. *Névááhe   tsé-né-he-estse?*
       who   DEP-an-say-<u>DEP</u>.3SG.A
       'Who said that?'

In (3.6b), the speaker is questioning who the source of the report in (3.6a) is. This pattern hold for all of the evidentials in Cheyenne. As far as I know, this pattern extends crosslinguistically to both types of evidentials. However, it is important to note that the propositional anaphor in (3.6b) picks up the scope of the evidential – not the evidential contribution itself.

To briefly summarize, the direct challengeability test shows that the scope of the evidential is directly challengeable but that the evidential contribution itself is not. The indirect challengeability test shows that the evidential contribution can be indirectly challenged. These results hold both for illocutionary and epistemic evidentials.

In the remainder of this section, I discuss two further diagnostics. They show that, for most evidentials, the speaker is committed both to the (possibility of the) evidential's scope and to the evidential contribution itself.

In sentences with evidentials, to what extent is the speaker committed to the scope of the evidential? Must she believe it? Think that it is at least possible? Is she asserting the evidential's scope? Compare English (3.7) and (3.8).

(3.7) Dale likes his coffee black.

(3.8) Dale likes his coffee black, I hear.

In (3.8), the speaker is not asserting the scope of the parenthetical. The speaker makes less of a commitment to the proposition that Dale likes his coffee black in (3.8) than in (3.7). Perhaps the speaker is not committed at all to the truth or possibility of that proposition. What about the level of commitment in example (3.9)? To what extent is the speaker committed to the proposition that Dale likes his coffee black?

(3.9) Dale likes his coffee black, I gather.

With evidentials, as with the English parentheticals above, the level of speaker commitment to the scope proposition can vary depending on the kind of evidential and the language. There is crosslinguistic variation with the reportative, which will be discussed below in Section 3.3.2. However, with other kinds of evidentials, there is consensus crosslinguistically. The direct evidential commits the speaker to the truth of the scope proposition while inferential/conjectural evidentials commit the speaker to at least its possibility. This holds for both illocutionary and epistemic evidentials.

For example, consider the Quechua examples in (3.10): the first conjunct of (3.10a) contains a direct evidential and the first conjunct of (3.10b) contains the conjectural evidential.

(3.10) Cuzco Quechua (Illocutionary)

    a. # *Para-sha-n=mi, ichaqa mana crei-ni-chu.*   (Faller 2002; p.163)
        rain-PROG-3=mi but not believe-1-NEG
      # '[I see that] it is raining, but I don't believe it.'

    b. # *Llave-qa muchila-y-pi=chá ka-sha-n, ichaqa mana-n*
        key-TOP backpack-1-LOC=chá be-PROG-3 but not-mi
      aqhay-pi-chu.
      there-LOC-NEG
      # The keys may be/are possibly/probably in my backpack, but they are
      not there.   (Faller 2002; p.178)

Both of these examples show that the speaker is committed at some level to the proposition in the scope of the evidential. That is, the speaker cannot deny the scope

proposition, or that they believe it. The same is true of St'át'imcets (Matthewson et al. 2007) evidentials. Consider St'át'imcets (3.11), which contains a conjectural evidential.

(3.11) St'át'imcets (Epistemic)

> \# *wá7-as-an'*   *kwis,*   *t'u7*   *aoz*   *t'u7*   *k-wa-s*   *kwis*
>   IMPF-3CONJ-PERC.EVID rain   but   neg   just   DET-IMPF-3POSS rain
> \# 'It's apparently raining, but it's not raining.' (Matthewson et al. 2007; (26))

The direct and conjectural evidentials in Cheyenne also follow this pattern – they commit the speaker to at least the possibility of the evidential's scope. For example, consider (3.12) with the direct evidential and (3.13) for the conjectural. In (3.12a) and (3.13a), the speaker indicates that she has direct evidence to the contrary of the first conjunct, which is infelicitous. In (3.12b) and (3.13b), the speaker indicates that she does not believe the scope of the direct evidential from the first conjunct – this too is infelicitous.

(3.12) Cheyenne (Illocutionary)

> a. $\#_\perp$ *É-hó'táhéva-Ø*   *Floyd*   *naa*   *oha*   *é-sáa-hó'táhévá-he-Ø.*
>   3-win-DIR   Floyd   and   CNTR   3-neg-win-MOD$_A$-DIR
> $\#_\perp$ 'Floyd won, I'm sure, but I'm certain he didn't.'

> b. \# *É-hoo'koho-Ø*   *naa*   *oha*   *ná-sáa-oné'seómátséstó-he-Ø.*
>   3-rain-DIR   and   CNTR   1-neg-believe$_B$-MOD$_A$-DIR
>   \# 'It's raining, but I don't believe it.'

(3.13) Cheyenne (Illocutionary)

> a. \# **Mó**-*hoo'kóhó*-**hané-he**   *naa*   *oha*   *é-sáa-hoo'kóhó-háne-Ø.*
>   CNJ-rain-MOD$_B$-Y/N   and   CNTR   1-neg-rain-MOD$_B$-DIR
>   \# 'It's raining, I gather, but I'm certain it isn't.'

> b. \# **Mó**-*hoo'kóhó*-**hané-he**   *naa*   *oha*   *ná-sáa-oné'seómátséstó-he-Ø.*
>   CNJ-rain-MOD$_B$-Y/N   and   CNTR   1-neg-believe$_B$-MOD$_A$-DIR
>   \# 'It's raining, I gather, but I don't believe it.'

The above few examples have shown that direct and conjectural evidentials commit the speaker to at least the possibility of the evidential's scope. This holds for both illocutionary and epistemic evidentials. However, in the next section I discuss the level of commitment with the reportative evidential, which varies crosslinguistically.

The previous few examples have shown that crosslinguistically both conjectural and direct evidentials commit the speaker to at least the possibility of the evidential's scope. It is also crosslinguistically true that the speaker is committed to having the type of evidence specified by the evidential. That is, the speaker cannot deny that she has the stated type of evidence.

For example, in Quechua (3.14), the speaker cannot deny the fact that there was a reporting event where she received the information in the evidential's scope.

(3.14) Cuzco Quechua (Illocutionary)

   # *Para-sha-n=si,   ichaqa   mana-n   willa-wa-rqa-n-chu.*
      rain-PROG-3=si,   but   not-mi   tell-1O-PST1-3-NEG
   # 'It is raining, but I was not told this.'
   EV= speaker was told that it is raining.   (Faller 2002; p.200)

The same holds for Cheyenne, as shown in (3.15). In (3.15) I have change the verb in the 'but' clause from 'tell' to 'hear' to account for the fact that the reportative does not require a direct report to the speaker – the information could have been overheard, generally known, read in a newspaper, etc.

(3.15) Cheyenne (Illocutionary)

   a. $\#_\perp$ *É-hó'táheva-**séstse** Floyd   naa   oha   ná-sáa-néstomóne-he-**Ø**.*
         3-win-RPT.3SG   Floyd   and   CNTR   1-neg-hear$_B$-MOD$_A$-DIR
       $\#_\perp$ 'Floyd won, I hear, but I didn't hear that.'

   b. $\#_\perp$ *É-hó'táheva-**séstse** Floyd   naa   oha   hovánee'e é-sáa-né-hé-he-**Ø**.*
         3-win-RPT.3SG.A   Floyd   and   CNTR nobody   3-neg-an-say-MOD$_B$-DIR
       $\#_\perp$ ' Floyd won, I hear, but nobody said that.'

In (3.15), it is infelicitous for the speaker to deny that she heard that it is raining: the use of the reportative evidential in the first conjunct commits the speaker to exactly

that. Related sentences such as 'Floyd won, I hear, but it wasn't Louise who told me that' can be felicitous. However, in such examples, the reportative evidence is not be denied – only the source of the report. The speaker is still committed to having heard that Floyd won.

Cheyenne (3.15) is not merely infelicitous – it is intuitively contradictory ($\#_\perp$), like the English gloss. The generalization exemplified by (3.15), that the report is not deniable, holds crosslinguistically for all kinds of evidentials (direct, indirect) in languages with both illocutionary and epistemic evidentials.

As a slight aside, Faller (2002; 200) calls examples like (3.15) an "evidential version of Moore's paradox" (see Moore 1942). This is a misnomer, and that it is important to clarify why. In standard Moore's paradox sentences, e.g., *It's raining but I don't believe it*, the second conjunct conflicts with something which is not properly part of the first conjunct, e.g., a norm of assertion (see, e.g., Williamson 1996). However, in sentences like (3.15), the second conjunct conflicts with a morpheme in the first conjunct: the evidential. Moore's paradox sentences can be true, but not be felicitously asserted – they are pragmatically odd, but not contradictions. Sentences like (3.15) can never be true. A closer English parallel with (3.15) would be *It's raining, I believe, but I don't believe it*, which is clearly a contradiction and not merely Moore's paradoxical.

It is also worth noting that the analysis argued for in given in Faller (2002) does not actually rule this sentence out, or the original example it was based on. The original example is *It is raining[, they say], but I wasn't told this*. I have change the verb in the 'but' clause from 'tell' to 'hear' to account for the fact that the reportative does not require a direct report to the speaker – the information could have been overheard, generally known, read in a newspaper, etc. The analysis in in Faller (2002) does not rule out (3.15) because the sincerity conditions for the (Cuzco Quechua counterpart of the) first conjunct of (3.15) only require that there

was someone else who asserted the embedded proposition – the conditions do not actually require that speaker was a recipient of this report. More importantly, even if the sincerity conditions were modified to include this condition, Faller (2002) would predict (3.15) to be odd because of a conflict of the sincerity conditions of the first conjunct with the asserted propositional content of the second conjunct. According to Faller (2002), the propositional content of the first conjunct of (3.15) (that Floyd won) is compatible with the propositional content of the second conjunct (that the speaker did not hear that Floyd won). In fact, for Faller (2002), the only thing asserted by (3.15) is the propositional content of the second conjunct. However, it is my impression that (3.15) is more than just *insincere* – it is a contradiction ($\#_\perp$). One can judge (3.15) as unacceptable without access to the speaker's mental state, even independent of a speaker, and thus the notion of insincerity does not apply. Examples like this suggest that the evidential contribution affects the truth conditions of a sentence – a hypothesis supported by other data, to be discussed below.

3.3.2 Illocutionary vs. Epistemic Evidentials

While both direct and conjectural evidentials crosslinguistically commit the speaker to at least the possibility of the evidential's scope, languages vary with respect to reportative evidentials. In fact, a hallmark of illocutionary evidentials crosslinguistically is that the reportative does not commit the speaker to the truth, or possibility, of the proposition in its scope (see, e.g., Faller 2002). In other words, the speaker need not believe the reportative's scope and in fact can assert its negation. Thus, sentences parallel to the following are felicitous: *Annie won the contest, I hear, but I don't believe it*; *Annie won the contest, they say, but I'm certain she didn't*; and *I hear Annie won the contest, but I'm sure she didn't*.

For example, consider the Quechua examples in (3.16).

(3.16) Cuzco Quechua (Illocutionary)

    a. *Para-sha-n=si,   ichaqa   mana   crei-ni-chu.*   (Faller 2002; p.194)
       rain-PROG-3=si but   not   believe-1-NEG
       'It is raining, but I dont believe it.'
       EV= speaker is/was told that it is raining

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

Like illocutionary evidentials, the reportative in Cheyenne does not commit the speaker to the truth (or falsity) of the proposition in its scope, as exemplified by Cheyenne (3.17), where the speaker has direct evidence to the contrary of what has been reported.Example (3.18) is further evidence in support of the fact that the speaker is not committed to the scope of the reportative – she can explicitly deny that she believes it.

(3.17) Cheyenne (Illocutionary)

    a. *É-hó'táheva-**séstse** Floyd naa oha   é-sáa-hó'táhévá-he-Ø.*
       3-win-RPT.3SG   Floyd and CNTR 3-neg-win-MOD$_A$-DIR
       'Floyd won, I hear, but I'm certain he didn't.'

    b. *É-hoo'kóhó-**nése** naa oha   é-sáa-hoo'kóhó-háne-Ø.*
       3-rain-RPT.B.SG and CNTR 1-neg-rain-MOD$_B$-DIR
       'It's raining, they say, but I'm sure it isn't.'

(3.18) Cheyenne (Illocutionary)

  *É-hoo'kóhó-**nése** naa oha   ná-sáa-oné'seómátséstó-he-Ø.*
  3-rain-RPT.B.SG and CNTR 1-neg-believe$_B$-MOD$_A$-DIR
  'It's raining, they say, but I don't believe it.'

This property of illocutionary reportatives contrasts with the use of other evidentials, such as the direct evidential, where the speaker is committed to the truth or the possibility of the scope, as in (3.12).

The generalization exemplified by (3.17) is not true of reportatives in all languages. In languages with epistemic evidentials, the reportative evidential commits the speaker at least to the possibility that the scope proposition is true. For example, the following t'át'imcets example is infelicitous (Matthewson et al. 2007; (28)).

(3.19) St'át'imcets (Epistemic)

> \# *um-en-tsal-itás*   *ku7*   *i*   *nwas-a*   *xetspqqenkst*
> give-DIR-1SG.OBJ-3PL.ERG REPORT DET.PL two-EXIS hundred
> *tola,*   *t'u7* *aoz*   *kw*   *s-7um'-en-tsl-itas*   *ku*   *stam*
> dollar but   NEG DET NOW-give-DIR-1S.OBJ-3PL.ERG DET what
> '[reportedly] They gave me \$200, but they didnt give me anything.'

In summary, with respect to the challengeability and deniability tests, the only diagnostic which distinguishes illocutionary and epistemic evidentials is the level of commitment to the reportatives scope. In languages will illocutionary evidentials, the speaker is not committed to the truth or even the possibility of the reportative's scope. In languages will epistemic evidentials, the speaker is committed at least to the possibility of the reportative's scope.

These two types of evidentials agree on all of the other challengeability and deniability tests. The speaker is committed to at least the possibility of the scope of the other evidentials (e.g., direct, conjectural). The scope of all evidentials is directly challengeable. All evidentials themselves are not directly challengeable, but they are indirectly challengeable. In all languages, the speaker cannot deny the evidential contribution – she cannot deny that she has the kind of evidence specified by the evidential.

3.4 Projection Tests

Another family of semantic diagnostics have been used to determine whether or not one element can take scope under another, including negation, tense, modals, conditionals, and embedding verbs (Karttunen 1973; Lyons 1977). I call these the projection tests. Questions have traditionally been included in the family of sentences test (as in Chierchia and McConnell-Ginet 1990). However, evidentials show a wide variety of interactions with questions, and other illocutionary moods. I have thus factored the interaction of evidentials and questions into a separate category, which is discussed in Section 3.5.

Typically, these projection tests have been associated with presupposition. However, what these tests identify is backgrounding, or that the content which projects is not-at-issue. For example, non-restrictive relative clauses project, but they are not presuppositions because they are not taken for granted – they contribute new information (Chierchia and McConnell-Ginet 1990; Potts 2005). In recent work it has been argued that, in addition to presupposition, several other types of meaning project, forming sub-classes of projective meanings (Roberts et al. 2009).

These diagnostics have been applied to varying extents in recent work on evidentials and related phenomena (Papafragou 2000; Faller 2002, 2006b,a; Matthewson et al. 2007). In this section, I discuss each of these projection environments in turn, grouped by tests on which all evidentials agree (Section 3.4.1) and tests which distinguish illocutionary and epistemic evidentials (Section 3.4.2).

3.4.1 All Evidentials

A widely attested, crosslinguistic pattern is that the evidential contribution cannot scope under negation (Faller 2002, 2006b; Aikhenvald 2004; Matthewson et al. 2007;

a.o.).[2] This holds for epistemic evidentials, as in German (3.20) and St'át'imcets

(3.21), as well as illocutionary evidentials, as in Cuzco Quechua (3.22).

(3.20) German (Epistemic)

> *Das Buffet im Burj Al Arab soll nicht soo schlecht sein, hab ich mir sagen lassen.*
> 'The buffet in Burj Al Arab is said to not be too bad, I have been told.'
> (i) s has reportative evidence that the buffet at Burj Al Arab is not too bad.
> (ii) # s does not have reportative evidence that the buffet at Burj Al Arab is too bad. (Faller 2006a; p. 15)

(3.21) St'át'imcets (Epistemic)

> *aoz   ka   k-wa-s   Sylvia   ku   xlh-tali*
> neg   INF   DET-IMPF-3POSS   Sylvia   DET   do(CAUS)-TOP
> 'It is necessarily not Sylvia who did it.'
> ≠ 'It is not necessarily Sylvia who did it.'
> ≠ 'It is not the case that I have indirect evidence that it was necessarily Sylvia who did it.' (Matthewson et al. 2007; p. 29)

(3.22) Cuzco Quechua (Illocutionary)

> *Ines-qa   mana=s   qaynunchaw   ñaña-n-ta-chu   watuku-sqa*
> Inés-TOP   not=REP   yesterday   sister-3-ACC-NEG   visit-PST2
> p= 'Inés didnt visit her sister yesterday.'
> EV: (i) s has reportative evidence that Inés did not visit her sister
> (ii) # s does not have reportative evidence that Inés visited her sister
> yesterday (Faller 2006a; p. 15)

Cheyenne also follows this pattern, as shown in examples (3.23a) for the direct

evidential and (3.23b) for the reportative.

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[2] de Haan (1999) claims that evidentials take wide scope over negation crosslinguistically. However, evidentials in Ahka and Warlpiri are claimed to be able to scope under negation (Aikhenvald 2004; p.96-7). Crucially, this does not seem to distinguish illocutionary and epistemic evidentials.

(3.23) Cheyenne (Illocutionary)

    a. *É-sáa-némené-he-Ø   Floyd.*
       3-neg-sing-MOD$_A$-DIR Floyd
       'Floyd didn't sing, I'm sure.'
       #'I'm not sure that Floyd sang.' /# 'Floyd sang, I'm not sure.'

    b. *É-sáa-némené-he-**sėstse**   Floyd.*
       3-neg-sing-MOD$_A$-RPT.3SG Floyd
       'Floyd didn't sing, they say.'
       # 'I didn't hear that Floyd sang.' /# 'Floyd sang, they didn't say.'

While evidentials project out of negation, it is important to note that the properties of this projection are not identical to the projection of presuppositions. First, consider a standard example of presupposition projection. English (3.24a) presupposes q, that Dale used to drink coffee. When English (3.24a) is negated, this presupposition is unaffected. In (3.24b), q it projects through the negation, unchanged.

(3.24) Projection of the presupposition of English *stop*

    a. *Dale stopped drinking coffee*, q = Dale used to drink coffee

    b. *Dale hasn't stopped drinking coffee*, q = Dale used to drink coffee

Now consider the Cheyenne sentence in (3.25a) and its negated counterpart (3.25b).

(3.25) Cheyenne (Illocutionary)

    a. *É-némene-**sėstse** Floyd.*
       3-sing-RPT.3SG   Floyd
       'Floyd sang, they say.'
       r = the speaker heard that Floyd sang

    b. *É-sáa-némené-he-**sėstse**   Floyd*
       3-neg-sing-MOD$_A$-RPT.3SG Floyd.
       'Floyd didn't sing, they say.'
       r' = the speaker heard that Floyd **didn't** sing

The proposition which projects in (3.25a), r, is not the same as the proposition that projects in (3.25b), r'. What projects is the evidential contribution, and the

evidential contribution in (3.25a), r, is different than the evidential contribution of (3.25b), r'. The reason for this is that the evidential contribution is dependent on the at-issue proposition, the scope of the evidential. The at-issue proposition in (3.25b), the proposition that that Floyd did not sing, contains negation while the at-issue proposition in (3.25a), that Floyd sang, does not. Thus, the evidential contribution of these two sentences will differ.

Both illocutionary and epistemic evidentials take wide scope with respect to negation. However, the facts about the relative scope of evidentials and tenses, modals, conditionals, and embedding verbs are more complicated. These other projection tests distinguish between the two types of evidentials, as discussed in the following section.

3.4.2 Illocutionary vs. Epistemic Evidentials

The facts about the interaction of evidentials and negation do not vary for illocutionary and epistemic evidentials: evidentials take wide scope. However, the relative scope of evidentials with tenses and modals, and their properties when embedded in subordinate clauses, do vary. Various combinations have been attested in various languages. Like with negation, illocutionary evidentials project out of tenses and modals. That is, the evidential cannot take its time reference from tense or be in the scope of a modal. For example, consider the Quechua examples in (3.26) and (3.27).

(3.26) Cuzco Quechua (Illocutionary)

Ines-qa   *qaynunchay*   *ñaña-n-ta=s*   *watuku-sqa.*
Inés-TOP   yesterday   sister-ACC=REP   visit-PST2
p = 'Inés visited her sister yesterday.'
EV= speaker was told that p   (Faller 2006a; p.16)

(3.27) Cuzco Quechua (Illocutionary)

> *Pilar-qa*   *t'anta-ta-puni=s*   *irqi-ta-qa*   *qu-rqa-n.*
> Pilar-TOP   bread-ACC-puni=REP   child-ACC-TOP   give-PST1-3
> q = 'It was bread that Pilar gave to the child.
> p = 'It was certainly/definitely bread that Pilar gave to the child.
> ev= speaker was told that *p* or speaker was told that *q*   (Faller 2002; p.249)

In (3.26), the time when the speaker heard that Inés visited her sister is not specified. That is, the evidential does not take its time reference from the past tense. With the modal example in (3.27), what is most important is that the evidential does not fall within the scope of the modal (*-puni*). The evidential can either take wide scope over the modal (i.e., the speaker was told that p) or there can be no scope interaction between the evidential and the modal (i.e., the speaker was told that q).

The same facts hold for Cheyenne for both tense, as in (3.28), and modals, as in (3.29), supporting its classification as an illocutionary evidential.

(3.28) Cheyenne (Illocutionary)

> *É-h-némene-**sėstse**   Floyd.*
> 3-PST-sing-RPT.3SG   Floyd
> 'Floyd sang long ago, they say.'
> # 'They long ago said that Floyd sang' /# 'Floyd sang, they said long ago'

(3.29) Cheyenne (Illocutionary)

> *Hévámóhe   é-némene-**sėstse**   Floyd.*
> apparently   3-sing-RPT.3SG   Floyd
> 'Apparently Floyd sang, they say.'
> # 'They apparently say that Floyd sang' /# 'Floyd sang, they apparently say'

Unlike in Quechua and Cheyenne, epistemic evidentials can scopally interact with tense and modals. For example, consider the pair of German examples in (3.30) and (3.31), both from Faller (2006a; p.17).

(3.30) German (Epistemic)
> *Blair-sohn sollte angeblich entfhrt werden.*
> 'Blair-son allegedly was to be kidnapped.'

(3.31) German (Epistemic)

Übermäßiger Kartoffelgenuss sollte angeblich zu Schwindsucht, Rachitis, Bauchgrimmen oder gar Syphilis führen.
'The consumption of too many potatoes was said to allegedly cause consumption, rachitis, stomach ache or even syphilis.'

In (3.30), the time reference of the evidential is indeterminate, as with the illocutionary evidentials. However, in (3.31), the time reference of the evidential comes from the past tense morphology: "it was alleged in the past that eating too many potatoes had negative effects on health. The other interpretation, that it is alleged that eating too many potatoes had these effects in the past is very difficult, if not impossible, to get" (Faller 2006a). In addition to German, other languages with epistemic evidentials also show that evidentials can scopally interact with ordinary modals, e.g., Japanese (see McCready and Ogata 2007).

In the examples discussed above, evidentials occur in the same clause as negation, tense, and modals. Other projection tests look at cases where evidentials are syntactically embedded – in a different, subordinate clause than the operator they are intended to interact with. Illocutionary evidentials are typically not embeddable, either syntactically or semantically, while epistemic evidentials are.

Embedding Quechua evidentials in the antecedent of a conditional is ungrammatical, as exemplified by example (3.32) with the reportative *=si*.

(3.32) Cuzco Quechua (Illocutionary)

(Sichus)	*Pidru-cha*	*ña*	*iskay*	*tanta-ta-ña(*=s)*	*mikhu-rqa-n*
if	Pedro-DIM	already	two	roll-ACC-DISC=REP	eat-PST1-3
chayqa	*ama*	*huq-ta*	*qu-y-chu.*		(Faller 2002; p.221)
then	don't	other-ACC	give-IMP-NEG		

'If Pedro already ate two rolls, dont give him another one.'

However, evidentials in Quechua can occur in the consequent of conditionals, as with the conjectural in (3.33) and the reportative in (3.34). However, in these

examples, the evidential is no longer embedded: the scope of the evidential is the main clause.

(3.33) Cuzco Quechua (Illocutionary)

> *Wayna-pura-taq*   *ka-sha-nchis*   *chay-qa,*   *lluku-lla-taq=**chá***
> young-only-CONTR   be-PROG-1PL.INCL   this-TOP   fast-LIM-CONTR=chá
> *puri-ra-mu-sunchis*   (Faller 2002; p.268)
> walk-HORT-CIS-1PL.INCL.FUT
> 'Since we both are young, we can move along fast.'

(3.34) Cuzco Quechua (Illocutionary)

> *Sichus*   *ni-wa-rqa-n*   *Juan*   *hamu-na-n-ta*   *chay-qa,*   *Juan-qa*
> if   say-1O-PST1-3   Juan   come-NMLZ-3-ACC   this-TOP,   Juan-TOP
> *hamu-nqa=**s**.*   (Faller 2002; p.118)
> come-3FUT=si
> p = 'If I was told that Juan will come, then Juan will come.'
> EV = speaker was told that Juan will come

Example (3.34) is used to illustrate that the evidential requirement can not be blocked. The entire sentence in (3.34) requires that the speaker was told that Juan will come, though it is pragmatically odd. Crucially, in both (3.33) and (3.34), the evidential takes scope over the entire conditional: "Initial data indicates that the evidential indicates the source of information for the conditional relation and the consequent" (Faller 2002; p.268).

In Cheyenne, evidentials cannot occur in the antecedent of a conditional. This is due to morphosyntactic restrictions – all dependent clauses in Cheyenne are marked with a dependent mood, which fills the illocutionary mood slot (see Section 2.3). Thus, this dependent clause marker morphologically alternates with evidential suffixes, and blocks them from occurring in dependent clauses. Evidentials can occur in the consequent, as in (3.35), but this is not surprising, as the consequent is the main clause, and all main verbs are marked for illocutionary mood.

(3.35) Cheyenne (Illocutionary)

    a. *Andy*   *tsé-h-néméné-stse*   *é-kȧhan-eotse-**séstse**.*
        Andy   DEP-PST-sing-<u>DEP</u>.3SG.A   3-tired-become-RPT.3SG
        'When Andy sang, he got tired, I hear.'

    b. *Andy*   *mȧh-néméné-stse*   *tse-é-kȧhan-eotse-**séstse**.*
        Andy   DEP-sing-<u>DEP</u>.3SG.A   3+FUT-tired-become-RPT.3SG
        'If Andy sings, he will get tired, I hear.'

In (3.35), the evidentials have scope over the entire conditional. In (3.35a), the speaker heard that Andy got tired when he sang. In (3.35a), the speaker heard that Andy will get tired if he sings.

    Unlike illocutionary evidentials, epistemic evidentials can occur in the antecedents of conditionals in, e.g., German, as in (3.36) from Faller (2006a; p.9). In such examples, the evidential can be semantically embedded – that is, it can be interpreted within the conditional, and it may be interpreted as anchored to someone other than the current speaker.

(3.36) German (Epistemic)

    a. *Bei uns soll es heute schneien!!*
        'It is said to snow near us today.'

    b. *Also wenn es bei dir schneien soll, dann schneit es bei mir auch.*
        'If it is said to snow near you, then it will snow near me as well.'

According to Faller (2006a), the reportative *soll* in (3.36b) is interpreted with respect to the addressee of (b) – it is the addressee (b), not the speaker of (b), who has reportative evidence that it will snow near the addressee. However, it seems like the speaker of (b) *also* has reportative evidence after she hears (a). Given this ambiguity, the scope of the evidential is not clear. Is it truly semantically embedded in the conditional? Or is there no scopal relationship between the reportative and the conditional? I do not know the answers to these questions, but it seems like they need to be answered before we can conclude that evidentials in German can

be semantically embedded in antecedents of conditionals. In St'át'imcets, which also has epistemic evidentials, evidentials cannot take scope inside the antecedents of conditionals. There is no morphosyntactic restriction – they are grammatical, but the evidential takes scope outside of the antecedent (see discussion in Matthewson et al. 2007; p.230-1).

This difference in semantic embeddability between illocutionary and epistemic evidentials shows up with embedding verbs as well. Epistemic evidentials can semantically embed and be interpreted in the scope of the embedding verb. That is, the evidentials can be interpreted with respect to someone other than the speaker. This holds at least for St'át'imcets and Tibetan (Matthewson et al. 2007; Garrett 2001). For example, consider the St'át'imcets example in (3.37), where a reportative evidentials is embedded under 'say'.

(3.37) St'át'imcets (Epistemic)

> *tsut kw s-Lémya7 kw s-melyíh ku7 ta*
> say DET NOM-Lémya7 DET NOM-marry REPORT DET
> *í7mats-s-a s-Rose*
> grandchild-3POSS-EXIS NOM-Rose
> 'Lémya7 said that [she was told that] Rose's grandchild got married.'
> [Lémya7 was told; Lmya7 did not witness it; ku7 relates to the report given to
> Lémya7] (Matthewson et al. 2007; (62a.))

In (3.37), the reportative in the embedded clause is anchored to the matrix subject – it was Lémya7 who was told that Rose's grandchild got married.

However, in languages with illocutionary evidentials, embedded evidentials tend to remain semantically unembedded, even if they are morphosyntactically embedded. In Quechua when evidentials embed in subordinate clauses, they remain speaker oriented and take scope over the entire sentence or are construed with the main verb. For example, in (3.38) where an evidential is embedded under 'know', and (3.39) where the reportative is embedded under 'say'.

(3.38) Cuzco Quechua (Illocutionary)

> *Pilar-qa*   *yacha-sha-n*   *Marya-q*   *hamu-sqa-n-ta=(n/s/chá)*
> Pilar-TOP   know-PROG-3   Marya-GEN   come-PP-3-ACC=(mi/s/chá)
> 'Pilar knows that Marya came'
> EV: (i) speaker has best possible grounds/reportative evidence/conjectures
> that Pilar knows that Marya will come
> (ii) # Pilar knows from direct/reportative/conjectural evidence that Marya
> will come   (p.223 Faller 2002)

(3.39) Cuzco Quechua (Illocutionary)

> *Wakin*   *ni-n-ku*   *Marya=si*   *llalli-sqa-ta,*   *wakin-taq*   *Pilar-si*
> some   say-3-PL   Marya=**si**   win-PST2-ACC   some-CONTR   Pilar-**si**
> 'Some say that Marya won, others Pilar'   (Faller 2002; p. 248)

In (3.38), the evidential takes scope over the entire sentence. In (3.39), the reportative on Marya, which is embedded under the verb 'say', seems to be anaphoric to the main verb – neither element takes scope over the other (see also Bittner and Trondhjem 2008; example 69 for Kalaallisut).

Cheyenne evidentials are not permitted in subordinate clauses, as discussed above for the antecedents of conditionals. However, this can be explained in terms of morphosyntactic constraints. All subordinate clauses, e.g., antecedents of conditionals, complements of verbs, and relative clauses, have dependent marking. This dependent marking goes in the illocutionary mood slot on the verb and thus cannot co-occur with the evidential affixes (see Chapter 2).

However, in certain cases, one independent sentence can be interpreted as semantically subordinate to another even though it is morphosyntactically independent. For example, verbs like 'say' and 'know' in Cheyenne can take independent verbs as complements. However, it is unclear whether the second sentence syntactically embedded in such cases. Consider Cheyenne (3.40), from a text from Leman (1980a), with the conjectural evidential on the second verb. As a bit of context for (3.40), badgers are supposed to help Cheyennes hunt. One day, the storyteller went out

hunting and came upon a deer. He took his finding the deer as evidence that the badger was helping him hunt.

(3.40) Cheyenne (Illocutionary)

    Ná-tá-héne'éna-Ø   *ma'háhko'e*   ***mó**-ná-vé'óhtsém-ae-**hé-he**.*
    1-TRL-know$_B$-DIR   badger   CNJ-1-accompany-OS-MOD$_A$-Y/N
    'I knew that the badger must be with me.'

Example (3.40) might also be translated as 'I knew it: The badger was with me, I assume', with propositional anaphora connecting the two sentences.

Even in examples such as (3.40), where the second sentence is arguably subordinated, evidentials do not scopally interact with the main verb ('know' in (3.40)) – the evidential projects out. That is, the evidential in the second clause, the conjectural in (3.40), is not in the scope of the first verb (*know*) and the first verb is not in the scope of the evidential. That is, what the speaker knew is that the badger was with him, and he conjectured from some evidence that the badger was with him. This again supports the classification of Cheyenne as an illocutionary evidential.

In summary, both illocutionary and epistemic evidentials take wide scope with respect to negation. However, it seems like epistemic evidentials, but not illocutionary evidentials, can scopally interact with tense, modality, conditionals, and certain embedding verbs. However, the extent and effect of this scopal interaction appears to vary from language to language.

3.5   Interaction with Questions

Another diagnostic, which is typically classed with the projections tests, is the behavior of an element when it occurs in a question. However, the interaction of questions and evidentials crosslinguistically is quite varied and rich. The range of possible interpretations varies not only between types of evidentials – illocutionary and epistemic

– but from language to language. This variation can even be within a language – in Cheyenne, different interpretations are available for polar and content questions.

In this section, I discuss each of documented interpretations of questions containing evidentials, grouped by interpretations which all evidentials seem to get (Section 3.5.1) and interpretations which distinguish illocutionary and epistemic evidentials, and even vary from language to language (Section 3.5.2).

3.5.1   All Evidentials

There appears to be only one interpretation that questions containing evidentials share crosslinguistically: the evidential is a presupposition about the evidence the addressee has for the requested answer. In this interpretation, the evidential is no longer anchored to the speaker, but to the addressee. This property this interpretation can be called 'interrogative flip' – the anchor of the evidential flips in interrogatives from the speaker to the addressee (Speas and Tenny 2003). These holds for both polar questions and content questions, though languages vary as to what types of questions evidentials can occur in. For example, Cuzco Quechua only allows evidentials in content questions, as in (3.41). Regardless of the restriction on the type of questions evidentials can occur in, the interrogative flip still takes place.

(3.41) Cuzco Quechua (Illocutionary)

> *May-manta=s*   *chay*   *runa*   *ka-n-man*
> where-ABL=REP   this   man   be-3-COND
> 'Where could this man be from?'   (Faller 2006a; p. 13)

(3.42) German (Epistemic)

> *Wer soll denn meine Tänzerin gewesen sein?*
> 'Who is said to have been my dance partner?'   (Faller 2006a; p. 14)

(3.43) St'át'imcets (Epistemic)

> *swat* *ku7* *k-wa* *táns-ts-an*
> who REPORT DET-IMPF dance-CAUS-1SG.ERG
> 'Who did they say I was dancing with?' (Matthewson et al. 2007; p. 231)

The same interpretation is available in languages with epistemic evidentials, such as German, as in (3.42), and St'át'imcets, as in (3.43).

In Cheyenne, evidentials can occur in both polar and content questions. For polar questions with evidentials, the only interpretation available is the one where the evidential is anchored to the addressee, as in (3.44).

(3.44) Cheyenne (Illocutionary)

> *Mó=é-némene-**séstse*** *Floyd?*
> *y/n*=3-sing-RPT.3SG Floyd
> 'Given what you heard, did Floyd sing?'

Content questions with evidentials can also be interpreted this way, but they have an additional interpretation, discussed below in Section 3.5.2.

Before moving on to discuss variation in the interpretation of evidentials in questions crosslinguistically, I'd like to discuss an interesting property of interrogative flip. In declaratives, evidentials are typically anchored to the speaker. This is true of all languages for unembedded evidentials and true of some languages for all evidentials. It is the speaker's evidence for the scope proposition, and it could be said that the evidentially is an indexical, that it indexically refers to the speaker. However, a distinction must be made between this type of non-overt indexical and overt, pronominal indexicals, such as *I*. Crucially, overt indexicals do not participate in interrogative flip. For example, compare the Cheyenne declarative (3.45a) with the interrogative (3.45b).

(3.45) Cheyenne (Illocutionary)

    a. *Ná-hó'táhevá-**máse**.*
       1-win-RPT.1SG
       'I won, they say'

    b. *Mó=ná-hó'táhevá-**máse**?*
       y/n-1-win-RPT.1SG
       'Given what you heard, did I win?'

In (3.45a) both the subject and the evidential refer to the speaker – it is the speaker's evidence and the speaker's winning. However, in (3.45b), the evidential is anchored to the addressee, but the subject still refers to the speaker.

The same phenomenon is present in English. For example, consider the English examples in (3.46), (3.47), and (3.48). Each example contains an item that arguably is anchored to the speaker: *reportedly*, *might*, and *seriously*.

(3.46)   a. I reportedly am the murderer.

      b. Am I reportedly the murderer?

(3.47)   a. I might be the murderer.

      b. Might I be the murderer?

(3.48)   a. Seriously, I am the murderer.

      b. Seriously, am I the murderer?

Like with evidentials, in declaratives, these adverbs and modals are anchored to the speaker. However, they flip in questions to be anchored to the addressee. The pronoun, *I*, however, does not undergo this flip.

Besides the interpretation of questions with evidentials discussed above, several other interpretations are available in a variety of languages. This crosslinguistic variation in the interpretation of questions with evidentials is discussed below.

3.5.2 Illocutionary vs. Epistemic Evidentials

One type of ambiguity of questions with evidentials is that the evidential can scope over the question, resulting in, e.g., for the reportative, a reported question. This type of ambiguity is present in Cuzco Quechua. For example, consider the two interpretations of (3.49).

(3.49) Cuzco Quechua (Illocutionary)

> *Pi-ta=s*   *Inés-qa*   *watuku-sqa?*   (Faller 2002; p.230)
> who-ACC=RPT Inés-TOP   visit-PST
> (i) 'Who did Inéz reportedly visit?'
> (ii) 'Who did Inéz visit?, it's asked/[she] asked'

The question in (3.49) can be a direct question, as in (i), that indicates that the speaker expects the hearer to have reportative evidence for his or her answer. Alternatively, it can not be a direct question, as in (ii), where the speaker indicates that somebody else is asking. In the later case, the speaker is merely relaying or repeating the question. Examples like (3.49) are one of the main arguments for an illocutionary modifier analysis of illocutionary evidentials in Faller (2002, 2006a): illocutionary evidentials can interact with illocutionary modifier, such as questions, but not with propositional operators, so they must too be illocutionary modifiers.

Cheyenne evidentials pattern with Quechua on all of the other diagnostics, supporting the analysis of Cheyenne evidentials as illocutionary evidentials. However, one of the most striking, and typologically distinct, aspects of the Cheyenne evidentials system is its interaction with questions. Content questions with evidentials in Cheyenne receive only of the interpretations available in Quechua, and they have an additional interpretation that is not available for Quechua. This additional interpretation is not available for polar questions.

(3.50) Cheyenne (Illocutionary)

> *Tóne'še   é-ho'eohtse-**séstse***
> when   3-arrive-RPT.3SG
> i. 'Given what you heard, when did he arrive?'
> ii. 'He arrived sometime, I wonder when.'

The interpretation in (3.50i) is the interpretation that all questions with evidentials have crosslinguistically, including Cheyenne polar questions: a direct question with a presupposition about the addressee's kind of evidence for the requested answer. The interpretation in (3.50ii) does not have the force of a direct question in that it does not request an answer, or indicate that the speaker expects an answer. Crucially, there is no 'reported question' interpretation of (3.50), where the reportative would scope over the question, is not available. However, the interpretation in (3.50ii) is somewhat similar, since neither are direct questions, and arguably the reportative takes something like wide scope in both cases. I call the phenomenon illustrated in (3.50) illocutionary variability: the illocutionary force of the sentence can vary from a direct question to a statement of uncertainty. This property holds for all evidentials in Cheyenne, but different evidentials make slightly different contributions.

In Cheyenne, a sentence can vary in its illocutionary force, depending on the context of utterance. This property of the Cheyenne evidential system, taken along with the fact that evidentials are part of the illocutionary mood system, point to a more integrated, fine-grained theory of speech acts. Evidence for this comes from other languages as well. As noted by Faller (2002), (illocutionary) evidentials have something to do with speech acts. In some languages, the interactions of evidentials and illocutionary mood are even more pronounced. For example, in Kalaallisut, the reportative evidential clitic can co-occur with all of the illocutionary moods (Bittner 2008). Consider the examples in (3.51), (3.52), and (3.53), from Bittner (2008).

(3.51) Kalaallisut (Illocutionary), interrogative mood

> *Kinaguuq* *ajugaava?*
> *kina=guuq* *ajugaa-pi-a*
> who=RPT win-QUE-3SG
> i. '[He]s asking, who has won?'
> ii. 'According to [him], who has won?'
> iii. 'Ask who has won?'

(3.52) Kalaallisut (Illocutionary), declarative mood

> *Olegooq* *anivoq.*
> *Ole=guuq* *ani-pu-q*
> Ole=RPT go.out-DEC.IV-3SG
> i. 'Ole is out, [I] hear.'
> ii. 'Say that Ole is out.'

(3.53) Kalaallisut (Illocutionary), optative mood

> *Olegooq* *isirli.*
> *Ole=guuq* *isir-li*
> Ole=RPT come.in-OPT.3SG
> i. Let Ole come in, [they] say.
> ii. Tell Ole to come in.

The examples in (3.51), (3.52), and (3.53) each have multiple interpretations. Data such as this show that there can be extensive interactions between evidentials and illocutionary mood, and point toward a unified analysis.

At the present time, the range of interpretations of content questions with epistemic evidentials, such as German and St'át'imcets, is not known. In Faller (2006a), it is indicated that German does not get the reported question interpretation that is present in Quechua. However, it is not known whether there are other possible interpretations. The results for St'át'imcets are not yet known either. According to Matthewson et al. (2007), "There is further work to be done on evidentials in St'át'imcets questions. Consistent judgments are difficult to obtain, and evidentials in questions often appear to be simply treated as vacuous, a fact for which we have no explanation at this time" (note 32).

3.6 Discussion of Diagnostics

Above in Sections 3.3, 3.4, and 3.5 I have discussed various semantic diagnostics and their application to various evidential systems. It has been shown that Cheyenne patterns with illocutionary evidentials. However, the interaction of questions and evidentials in Cheyenne is importantly different from Quechua. Thus, I propose that Cheyenne forms a new subclass of illocutionary evidentials. A summary of the findings is given below in Table 3.6.

	Illocutionary		Epistemic	
	Cheyenne	Cuzco Quechua	St'át'imcets	German
Challengeability				
Is the evidential's scope directly challengeable? (§3.3.1)	Yes	Yes	Yes	Yes
Is the evidential commitment directly challengeable? (§3.3.1)	No	No	No	No
Is the evidential commitment indirectly challengeable? (§3.3.1)	Yes	Yes	Yes	Yes
Is the evidential commitment deniable? (§3.3.1)	No	No	*	*
Some evidentials commit the speaker to (at least) the scope's possibility? (§3.3.1)	Yes	Yes	Yes	Yes
All evidentials commit the speaker to (at least) the scope's possibility? (§3.3.2)	No	No	Yes	*
Projection				
Must the evidentials take wide scope with respect to negation? (§3.4.1)	Yes	Yes	Yes	Yes
Do the evidentials scopally interact with tenses, modals? (§3.4.2)	No	No	*	Yes
Can the evidential semantically embed? (§3.4.2)	No	No	Yes	Yes
Interaction with Questions				
Do questions with evidentials have the 'interrogative flip' interpretation? (§3.5.1)	Yes	Yes	Yes	Yes
Is there ambiguity with content questions? (§3.5.2)	Yes	Yes	*	*
Is there a reported question interpretation? (§3.5.2)	No	Yes	*	No
Is there a statement of uncertainty interpretation? (§3.5.2)	Yes	No	*	*

Table 3.2: Generalizations about Illocutionary and Epistemic Evidentials (* := no known published data)

Many of these test have been used in the literature to determine whether or not an element is truth conditional, or contributes to the propositional content of a sentence. However, one must be cautious in drawing such conclusions, especially since all evidentials pattern together on several tests.

For example, the direct challengeability test (Lyons 1977) has been used to determine whether or not an element contributes to the propositional content (Faller 2002, 2006b,a; Papafragou 2006; von Fintel and Gillies 2008; Matthewson et al. 2007). However, recently this conclusion has come under scrutiny (Papafragou 2006; Matthewson et al. 2007; a.o.) and can have several alternate explanations (see Chapter 7 for mine). When discussing this test as applied to epistemic modals, Papafragou (2006) points out that it does not necessarily show that an element does not contribute to the truth conditions of a sentence. Furthermore, illocutionary and epistemic evidentials behave the same on this diagnostic, so it cannot be used to argue that one contributes to the truth conditions while the other does not. While this test does show that there are two separable contributions of sentences with evidentials, it does not show that one or the other does not affect the truth conditions of the sentence.

The scopal properties of illocutionary evidentials, in Cheyenne and other languages, are striking – they always take scope over (predicate) negation, tense, and modals. They also tend not to appear in embedded clauses or antecedents of conditionals, but, when they do, they tend to scope out. Such examples are often taken as evidence that evidentials are not propositional operators, as they do not interact scopally with tense, negation, and modality, which are taken to be propositional operators. However, even propositional evidentials – which are claimed to be propositional operators – do not interact scopally with at least negation (Matthewson et al. 2007).

However, these projection tests do not necessarily show anything about whether an element is a propositional or illocutionary operator or if it contributes to the truth

conditions of a sentence. Faller (2006b) has argued that Quechua evidentials do not embed, but admits these tests only show whether or not an element can be used m-performatively[3] or descriptively. Papafragou (2006) has also argued elements that do not embed are not necessarily outside of the propositional content of a sentence. Similarly, Asher (2000) has proposed that parentheticals embedded in a conditional antecedent may contribute to the truth conditional content of the entire sentence while falling outside of the scope of the conditional itself. The same interpretation could be given to the evidential data described above, and would coincide with the observations about evidentials embedded under verbs like 'say' and 'know' (see also Section 3.4).

Like English parentheticals, illocutionary evidentials cannot take scope under certain operators, e.g., modals or negation. For example, English *Dale may be alive, I hear* cannot be interpreted as *It is possible that I have heard that Dale is alive.* That is, the parenthetical cannot be interpreted in the scope of the modal. They also cannot be embedded in the antecedent of a conditional **If Dale is coming for breakfast, I hear, we better get more coffee*, or in a verb phrase without scoping over the entire sentence. For example, English # *I believe that Dale is coming for breakfast, I hear* cannot mean that the speaker believes that Dale is coming for breakfast and (or perhaps because) the speaker heard that Dale is coming to breakfast. The only possible interpretation is for the parenthetical to take the entire sentence in its scope. However, with this example, this yields the interpretation that the speaker heard that the speaker believes that Dale is coming for breakfast, which is marginal at best.

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[3]M-performativity is a term introduced by Faller (2002, 2006b) which contrasts with performativity. 'Performativity' refers "to the fact that a speech act "only exists by virtue of the utterance: it is through the utterance that the speech act is performed" (Nuyts 2000; p. 40)" (e.g., 'I baptize you John') while 'm-performativity' is "*mental* act of performing an evaluation of a situation or proposition" (Faller 2006b).

Epistemic evidentials, on the other hand, can be embedded in certain contexts, just like English modals, e.g., *If Dale might come for breakfast, I better get more coffee.* This English sentence means that if there is a possibility that Dale is coming to breakfast, then the speaker should get additional coffee. It does not mean that there is a possibility that if Dale comes for breakfast, the speaker should get more coffee. Since Dale has a voracious appetite for coffee, if there is even the possibility of his being at breakfast, the speaker should be prepared with plenty of coffee.

However, this test again is less than conclusive. Consider the following quote from Asher (2000): "Crucially, what is wrong with the [embedding] test for non-truth conditional meaning is that it overlooks the obvious possibility that the content of the apparently non-truth conditional item may simply fall outside the scope of the conditional but nevertheless contribute to the truth conditions of the discourse."

The arguments that Asher (2000) gives can be extended to illocutionary evidentials. There are no tests, or data, which conclusively show that evidentials do not make a truth-conditional contribution. In fact, there is evidence to believe that (even illocutionary) evidentials *do* contribute to the truth conditions. One piece of support for this comes from the fact that the evidential contribution cannot be denied, cancelled, or challenged. The speaker is committed to having the specified type of evidence.

Another piece of support comes from basic evidential sentences themselves. An evidential of a given type commits the speaker to having evidence of that type (see, e.g., (3.15)), and can affect judgments about the truth or falsity of sentences in a context. Consider example (3.54), an adaptation of a diagnostic given in Papafragou (2006) to argue that epistemic modals contribute to the truth conditions of a sentence.

(3.54) Cheyenne (Illocutionary)

    a. *É-néméne-∅* *Otséóhtsé'e.*
       3-sing-DIR   Otséóhtsé'e
       'Otséóhtsé'e sang, I'm sure.'

b. *É-némene-**sėstse*** *Otséóhtsé'e.*
3-sing-RPT.3SG   Otséóhtsé'e
'Otséóhtsé'e sang, I hear.'

c. ***Mó**-némenė-**hé-he*** *Otséóhtsé'e.*
CNJ-sing-MOD$_A$-Y/N   Otséóhtsé'e
'Otséóhtsé'e sang, I gather.'

Sentences (3.54a-c) are not true in all and only the same situations – this minimal variance is sufficient to have a truth-conditional effect. For example, in a situation where the speaker infers from some evidence that Otséóhtsé'e sang, and she did indeed sing, but the speaker didn't hear that she sang, only (3.54c) is true. Both (3.54a) and (3.54b) are unacceptable – either false or undefined, depending on the given theory of evidentials. Additionally, if Otséóhtsé'e did not sing, (3.54a) can not be true while (3.54b) might still be true. This is due to the fact that the commitment of the speaker to the truth of the scope is different for each evidential, e.g., the reportative does not commit the speaker to the truth, or even possibility, of the reportative's scope.

3.7   Evidentials and Kinds of Meanings

It has often been observed that sentences with evidentials make two contributions: a propositional contribution, which is directly challengeable, deniable, up for negotiation, and an evidential contribution, which is not directly challengeable, deniable, or up for negotiation. These two contributions have different statuses, they are somewhat separate, but yet dependent on each other. The evidential contribution does not fit neatly into any established category of meaning. In this section, I will look at a few established kinds of meaning and show how evidentials do not quite fit into any of these categories. In the next chapter, I propose a new classification of a kind of meaning: not-at-issue assertion. This new category draws on properties of

the existing categories discussed in this section, but cuts the logical space somewhat differently.

Perhaps it is most clear that the kind of meaning contributed by an evidential is not a conversational implicature (Grice 1989). The evidential contribution is not cancellable, and the meaning contributed by an evidential does not arise from any general principles of conversation. The evidential contribution is part of the encoded meaning of a sentence, contributed by the evidential morpheme.

The evidential contribution also cannot be a conventional implicature, neither for Grice (1975, 1989) nor for Potts (2005). Like conventional implicatures, the evidential contribution is part of the linguistic meaning of a sentence and is not cancellable. However, the contribution of an evidential is speaker-meant, it is entailed, and it affects the truth conditions of the sentence containing the evidential. This rules out an analysis of evidentials as contributing a conventional implicature a la Grice (1975, 1989), though this category may already be ruled out for independent reasons (Bach 1999). Bach (1999) proposes that some elements traditionally analyzed as conventional implicatures actually do contribute to the truth-conditional meaning, but are secondary. The analysis proposed in the next chapter has these properties: the evidential contribution is part of the truth-conditional meaning, but it is secondary – not part of the at-issue content.

An analysis of the evidential contribution as a conventional implicature a la Potts (2005) is also ruled out (see definition (2.10) and Section 2.5 in Potts 2005). Evidentials are not logically nor compositionally independent of the at-issue content – the evidential contribution is dependent on the at-issue contribution, and the evidential contribution can affect the level of commitment to the at-issue content (see Sections 3.3 and 3.4). This is crucial in understanding contradictions that arise with evidentials (e.g., (3.15)) and anaphoric connections in sentences with evidentials. Furthermore, the contribution of an evidential is not always scopeless and is not always

speaker-oriented, e.g., in questions and in languages where they can be embedded (see Sections 3.4 and 3.5).[4] Some aspects of the definition of conventional implicature given in Potts (2005) have been debated in more recent literature. However, any definition with any of the three aforementioned properties would not apply to evidentials.

The evidential contribution does not fit neatly into the category of presupposition either. The contribution of an evidential projects, but its projection profile is different from that of presuppositions, as discussed in Section 3.4.1. The evidential contribution also cannot be blocked in the ways that presuppositions can (see Faller (2002) for examples).

Evidentials in declarative sentences contribute new information. As noted by Faller (2002), if the evidential contribution was presupposed, accommodation would no longer be an exception, but would be necessary for every sentence in languages with obligatorily evidentials. While presuppositions can be informative in certain contexts, contributing new information, this is a context-dependent effect, and not well suited to analyze the primary effect of an entire class of morphemes. I take the view that presupposed information should be present in the common ground prior to an utterance. It can be discourse old information, or information that is taken for granted or that we pretend is taken for granted, or temporarily assumed for whatever purpose. In any case, it should be present in the input context. When a presupposition is false, it is generous to say that anything at all has been said. When the evidential contribution is false, part of what is said, albeit a secondary part, is false.

A further argument that the evidential contribution is not a presupposition in

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[4]It should be said that evidentials do, in spirit, share many of the properties of the constructions analyzed in Potts (2005) as conventional implicatures. Evidentials do tend to be scopeless, especially in languages with illocutionary evidentials, and they also tend to be speaker-oriented, especially in assertions. The issue is whether or not the definition therein applies to evidentials, and it does not.

declaratives is that it *is* a presupposition in interrogatives, and the data behave quite differently. In interrogatives, the evidential content is presupposed: the speaker expects the addressee's evidence to be of a certain type given previously introduced information. However, here it is clear that the contribution of the evidential must be in the common ground before the question, otherwise the question is infelicitous (see examples in Section 2.6.1).

Faller (2002) also argues that the evidential contribution is not a conversational implicature or a presupposition. The proposal in Faller (2002) is that evidentials contribute an illocutionary meaning. For Faller (2002), illocutionary meanings are not propositional: not truth-conditional and not part of the proposition expressed. However, I have given arguments in this chapter that evidentials do affect truth conditions. Furthermore, examples like (3.15) suggest that the contribution of the evidential is very different from, say, the sincerity condition on assertions that the speaker believe the asserted proposition. However, like illocutionary meanings, the contribution of an evidential is somewhat separate from the main point of the sentence. The challenge is to give an analysis where the evidential contribution is separate from the at-issue content, but dependent on it, not a presupposition, but still truth-conditional.

On the view proposed in this dissertation, evidentials contribute not-at-issue content. I see a binary distinction between content that is at-issue and content that is not. These two categories may then be further subdivided or cross-cut by other categories, such as assertion. In the next chapter, I argue that there are two components of assertion; there are at-issue assertions and not-at-issue assertions. At-issue assertions are what is typically thought of as the main point of a sentence, the proffered content. Not-at-issue assertions are just that: content that is asserted, added to the common ground, but that is not at-issue. The evidential contribution of a declarative sentences is analyzed as a not-at-issue assertion. Like the analysis of parentheticals in Asher (2000), evidentials will contribute to the truth conditional content of a sen-

tence, but they will fall outside of the scope of various elements that operate on the at-issue content.

3.8   Summary

While there are several dimensions of variation crosslinguistically in the behavior of evidentials, there are also striking cross-linguistic generalizations. Evidentials crosslinguistically seem to share several key properties: they are not-at-issue, they contribute new information, they make truth-conditional contributions, they interact with illocutionary mood and the force of sentence. This points to the need for a unified analysis that can capture these shared properties, treating evidentials crosslinguistically as a natural semantic class, while being fine-grained enough to account for the variation.

In the next chapter, I propose an analysis of evidentials as not-at-issue content that can account for these shared properties as well as the nuances of the Cheyenne evidential system. In addition, it has the potential to be extended to evidentials in other languages, including epistemic evidentials, as well as other phenomena, such as certain parentheticals, modals, and adverbs in English.

Chapter 4

The Structure of Speech Acts

Contents

4.1   Introduction

Semantic diagnostics identify a core set of properties that all evidentials share, as discussed in Chapter 3, above. In particular, it has been observed that sentences with evidentials, in any language, make both an 'evidential' and a 'propositional' contribution (Faller 2002, 2006a; Matthewson et al. 2007).[1] The evidential contribution is not directly challengeable or up for negotiation – it is not at-issue, not the main

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[1]This terminology incorrectly implies that the evidential contribution is not propositional. I believe that the intended meaning is that this main point of the sentence is what has been called the proposition expressed.

point of the sentence (Papafragou 2006; Simons 2007). In contrast, the propositional contribution, the at-issue, main point of the sentence, is directly challengeable and up for negotiation.

In this chapter, I analyze evidentials as contributing not-at-issue content. I propose an analysis of sentences with evidentials that distinguishes at-issue content from not-at-issue content, and treat these two types of content as affecting the common ground in different ways. Not-at-issue content is added directly to the common ground. At-issue content is treated as a proposal to update the common ground.

The proposed analysis of evidentials implies a more articulated theory of speech acts in general. In particular, I argue for speech acts being composed of three components: the presentation of the at-issue proposition, a non-negotiable update that directly restricts the common ground, and a negotiable update that imposes structure on the common ground. In assertions, for example, the structure imposed on the restricted common ground is an ordering relation that represents the proposal to update the common ground in a certain way. Supporting data comes from Cheyenne, a language with evidentials that are part of the illocutionary mood paradigm. Under the proposed analysis, Cheyenne evidentials and illocutionary mood markers form a natural semantic class. However, the proposed analysis of evidentials can be extended to other types of evidentials and other linguistic phenomena, even in languages without grammaticized evidentials or illocutionary mood.

This chapter is organized as follows. Section 4.2 is an introduction to two views of assertion: that assertion directly updates the common ground and that assertion is a proposal to update the common ground. I propose to merge these two views to account for the distinction between at-issue and not-at-issue content. In Section 4.3, I propose a new analysis of evidentials, which I argue grammaticize the distinction between at-issue and not-at-issue content. Evidentials contribute a not-at-issue restriction of the common ground. In assertions, this reduces the common ground – it

is a not-at-issue assertion. Sentences with evidentials are analyzed as having three components: the presentation of the at-issue proposition, a non-negotiable update that directly restricts the common ground, and a negotiable update that imposes structure on the common ground. This analysis implies a more articulated theory of speech acts in general. In Section 4.4 I extend the proposed analysis to questions. Questions are also analyzed in terms of these three components: the presentation of the at-issue proposition, a non-negotiable restriction of the common ground, and a negotiable structuring of the common ground. I propose an analysis both for Cheyenne interrogative mood, which morphologically alternates with the evidentials, and questions that contain evidentials. In questions, evidentials still contribute not-at-issue content – a not-at-issue restriction. However, instead of contributing a not-at-issue assertion, the are presuppositional. Section 4.5 is a summary.

4.2   Two Views of Assertion

Conversational participants depend on a shared body of information – a common ground. As the participants in the conversation speak, what they say affects their common ground. But how exactly is the common ground affected by what they assert? On one view, an assertion updates the common ground (Karttunen 1974; Stalnaker 1975, 1978). A second view is that an assertion is a proposal to update the common ground. This is the view taken in recent work on Inquisitive Semantics (e.g., Groenendijk and Roelofsen 2009; Groenendijk 2009) and inspired by earlier work on the information structure of discourse (Ginzburg 1996; Roberts 1996; Gunlogson 2001).

I take the common ground to be the information that the conversational participants take for granted (or act as though they do) for the sake of the conversation, regardless of what they actually believe (following, e.g., Stalnaker 1978). Here, the

common ground is treated as the intersection of a set of propositions – a set of worlds – by some terminologies the 'context set'. An assertion has the potential to change the common ground.

Stalnaker (1975; Appendix) treats (the essential effect of) an assertion as the intersection of two sets of worlds: the proposition expressed and the input common ground. The rejection of an assertion is treated as blocking this effect, leaving the input common ground unchanged (Stalnaker 1975, 1978). On another view, an assertion is a proposal to update the common ground (Groenendijk and Roelofsen 2009; Groenendijk 2009)[2]. If the proposal is accepted, i.e., if nobody objects, then the proposition expressed is added to the common ground.

For example, consider the following English example (4.1).

(4.1) Floyd won.

The two views of assertion are illustrated in Figures 4.1 and 4.2. In Figure 4.1, the proposition p, that Floyd won, is added directly to the common ground by intersecting the proposition p with the initial common ground c_0 Stalnaker (1975; Appendix).
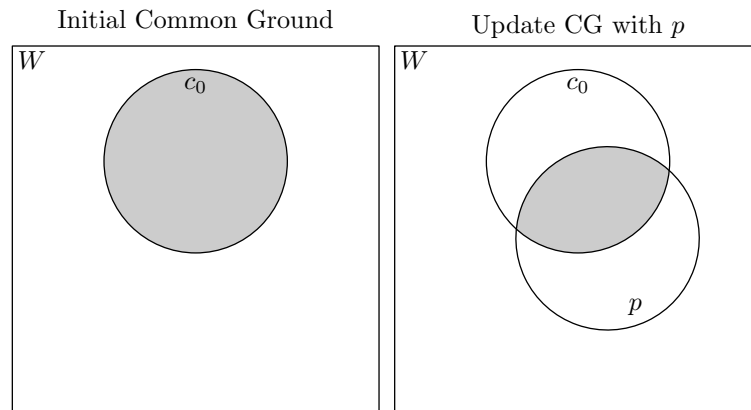
Figure 4.1: Update the Common Ground with (4.1): Floyd won

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[2]See also work on the structure of discourse (Ginzburg 1996; Roberts 1996; Gunlogson 2001).

Initial Common Ground   Propose to Update CG with p
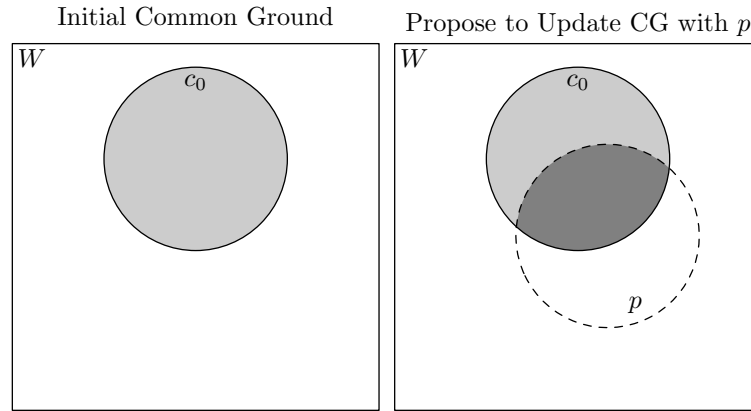
Figure 4.2: Proposing to Update the Common Ground with (4.1): Floyd won

In Figure 4.2, the proposition p, that Floyd won, is not added directly to the common ground. Instead, it is proposed to be added the common ground. In Figure 4.2, the worlds that are proposed to be added are indicated with a darker shade of gray. These worlds, the worlds where p is true, can be thought of as the preferred worlds – the worlds that the speaker is endorsing, the information that the speaker wants to add to the common ground. However, the common ground remains unchanged until the proposal is accepted.

I propose to merge these two views of assertion: information can be added directly to the common ground or it can be proposed to be added to the common ground. I use this distinction to model the difference between at-issue and not-at-issue content, as in the analysis of evidentials (see Section 4.3, below). At-issue content is analyzed as a proposal to update the common ground while not-at-issue content is analyzed as updating the common ground simpliciter.

To illustrate this, consider Figure 4.3, which shows a schematized version of the different contributions of at-issue and not-at-issue content.
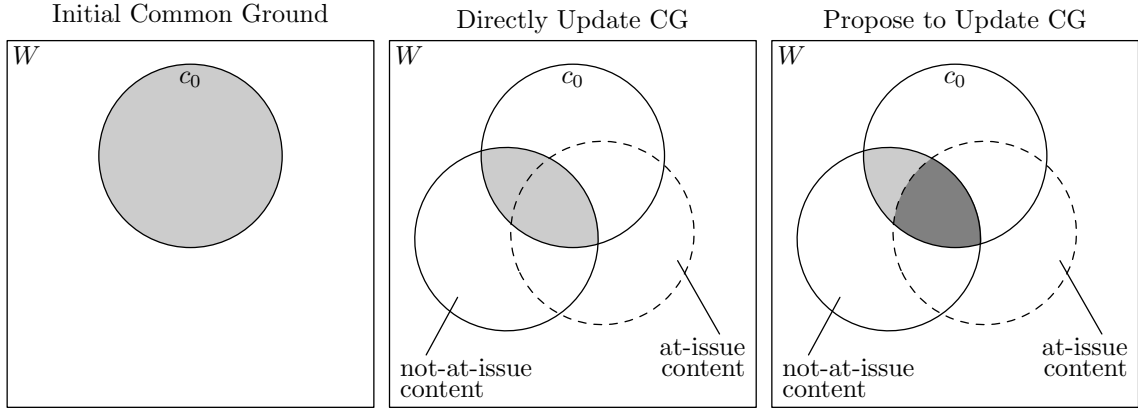
Figure 4.3: Modeling At-issue and Not-at-issue content

The proposed analysis of the not-at-issue content has an effect similar to what Stalnaker (1978) calls the secondary effect of assertion, or the commonplace effect: the automatic addition of certain new information to the common ground (e.g., who is speaking, what language she is using). This information updates the common ground, but it is not negotiable and cannot be directly challenged or denied. It is added to the common ground even if the essential effect is denied. However, the commonplace effect is pragmatic. It does not reflect the contribution of part of the sentence itself, a morpheme or phrase, as is the case with evidentials. The proposal for not-at-issue content is just that – it is part of the semantic content expressed by the sentence.

I formalize the notion of a proposal to update the common ground as imposing a relation over the common ground, structuring it. For assertions, the relation is an ordering relation which ranks worlds where the at-issue proposition is true over worlds where it is false. If the proposal is accepted, the set of top-ranked worlds becomes the new common ground. This new common ground contains only worlds that were members of the common ground where the at-issue proposition, the proposition expressed, is true. This analysis can be extended to questions, which can be analyzed as imposing an equivalence relation over the common ground. Thus, different types of speech acts can be modeled with different types of relations.

Evidentials in Cheyenne, which are part of the illocutionary mood paradigm, grammaticize this distinction between at-issue and not-at-issue content. In the next section, I present an analysis of Cheyenne evidentials that makes use of this distinction in assertion. The proposed analysis of evidentials implies a more articulated theory of speech acts. In particular, I argue that speech acts are composed of three components: the presentation of the at-issue proposition, a non-negotiable update about the not-at-issue content, and a negotiable update about the at-issue content. The non-negotiable update directly restricts the common ground, while the negotiable update imposes structure on the common ground.

4.3   Evidentials as Not-at-Issue Assertion

Semantic diagnostics identify a core set of properties that all evidentials share. In particular, it has been observed that sentences with evidentials, in any language, make both an 'evidential', or not-at-issue, and a 'propositional', or at-issue, contribution (Faller 2002, 2006a; Matthewson et al. 2007). The not-at-issue contribution is not directly challengeable or up for negotiation – it is not the main point of the sentence (Papafragou 2006; Simons 2007). In contrast, the propositional contribution, the at-issue contribution, which is the main point of the sentence, is directly challengeable and up for negotiation.

In this section, I analyze sentences with evidentials as having three components: the presentation of the at-issue proposition, a non-negotiable update that directly restricts the common ground, and a negotiable update that imposes structure on the common ground. The not-at-issue contribution of sentences with evidentials is analyzed as the non-negotiable update, information which is directly added to the common ground. The at-issue contribution affects the negotiable update, the relation that imposes structure on the common ground.

In Section 4.3.1, I analyze the direct evidential. The restriction contributes the information that the speaker is certain, based on personal experience, of the at-issue proposition. The structuring update represents the proposal to update the common ground with the at-issue proposition. In Section 4.3.2, I analyze the reportative evidential. The restriction for the reportative contributes the information that the speaker heard the at-issue proposition. For the reportative, there is no structuring update, or there is a trivial one. In Section 4.3.3, I analyze the conjectural evidential. The restriction for the conjectural contributes the information that the speaker has inferred, or has reason to believe, the at-issue proposition. The structuring update for the conjectural represents the proposal to update the common ground with possibility of the at-issue proposition. In Section 4.3.4, I discuss the the analysis of a few conjunctions, in particular some of the challengeability tests from Chapter 3. I treat conjunction as sequential update: felicitous conjunctions are analyzed as a compatible sequence of updates while infelicitous and contradictory conjunctions are analyzed as an incompatible sequence of updates.

4.3.1   The Direct Evidential

Sentences with evidentials contain both at-issue and a not-at-issue content. However, these two types of content need to be distinguished (Faller 2002; Matthewson et al. 2007, see also Chapter 3, above). For example, in Cheyenne (4.2), which contains the direct evidential, the at-issue content is that Floyd won and the not-at-issue content is that the speaker is sure, based on personal experience, that Floyd won.

(4.2) *É-hó'táhéva-∅*   *Floyd.*
       3-win-DIR   Floyd
       'Floyd won, I'm sure.'

The at-issue content of (4.2) is the utterance's main point – that Floyd won. It is comparable to the contribution of unmarked English sentences, such as (4.1). In

(4.2), the proposition that Floyd won is the negotiable contribution of the sentence. When a speaker utters (4.2), she proposes to add the information that Floyd won to the common ground. However, her interlocutors may felicitously object: *No he didn't!* or *That's not true! Floyd didn't win, it was Albert!*

The evidential contribution of (4.2) indicates that the speaker is certain based on personal experience that the proposition in the evidential's scope is true. It entails that the speaker is certain based on personal experience of the scope proposition. This evidential contribution is not up for negotiation. It cannot be directly challenged or denied. For example, it is infelicitous to reply to (4.2) with *No you aren't!*, *No you don't!*, or *That's not true! You're not certain that he won!* However, the evidential contribution is new information that reduces the common ground, not information which is presupposed, or cancellable.

I propose to analyze Cheyenne sentences with evidentials as having three components: the presentation of the at-issue proposition, a non-negotiable update that directly restricts the common ground, and a negotiable update that imposes structure on the common ground. The non-negotiable update reflects the contribution of the not-at-issue content. For sentences with evidentials, this is the type of evidence the speaker has for the at-issue proposition. I call this contribution the EVIDENTIAL RESTRICTION.

The negotiable update is a proposal about what to do with the at-issue content. This proposal imposes structure on the common ground. I call this contribution the ILLOCUTIONARY RELATION[3].

As an example, consider Figure 4.4, which illustrates the three contributions of (4.2). The first component is the presentation of the at-issue proposition; for (4.2),

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[3]The choice of evidential has an effect on the content of the proposal, so I might have called this contribution the EVIDENTIAL RELATION. However, Cheyenne evidentials are part of the illocutionary mood paradigm and in related work I argue that other mood markers also contribute a type of proposal, formalized as a different sort of relation (see Section 4.4 and Murray 2010a).

this is the proposition that Floyd won. For (4.2), the evidential restriction reduces the input common ground c_0 to the worlds where the speaker i is certain (based on personal experience) of the proposition p that Floyd won (written as $CRT(i, p)$, shown in Figure 4.4, below). The new restricted common ground is c_1, the intersection of the initial common ground c_0 and $CRT(i, p)$.
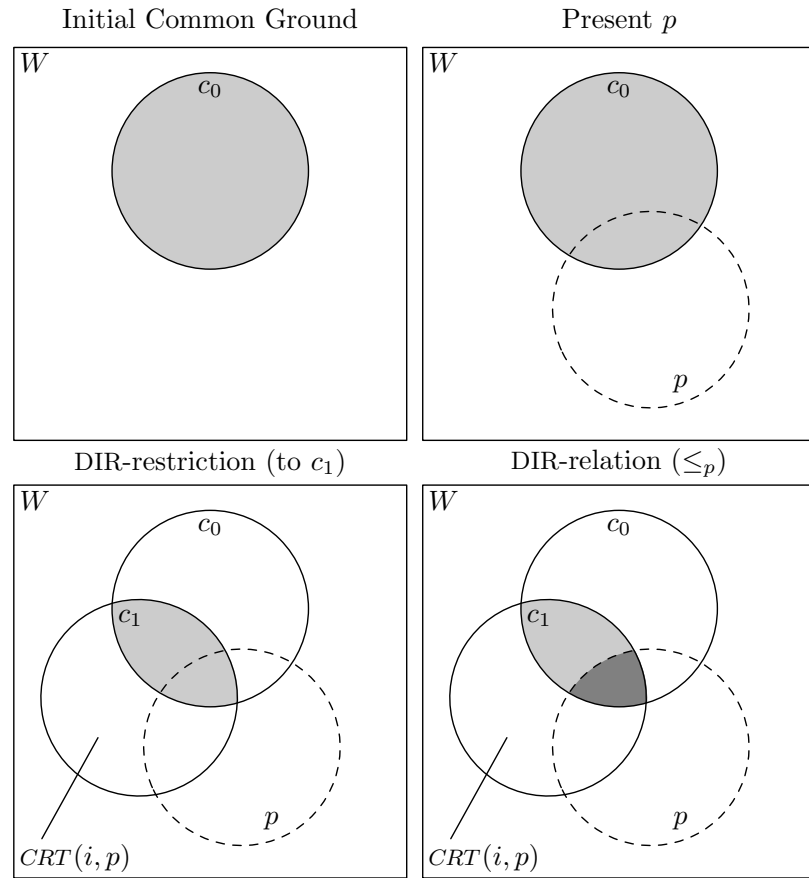
Figure 4.4: The contributions of (4.2): 3-win-DIR Floyd

The illocutionary relation contributed by the direct evidential in (4.2) represents the proposal to add to the restricted common ground the at-issue proposition p, the proposition that Floyd won. I propose to model this illocutionary relation as an ordering relation on the current context c_1 which orders the p-worlds in c_1 over the $\neg p$-worlds in c_1: $\langle c_1, \leq_p \rangle$. The output is a common ground that is restricted (by the evidential restriction) and structured (by the illocutionary relation). If the proposal

to add p to the common ground is accepted, the set of the top-ranked c_1 worlds (darker gray) will become the new common ground, eliminating all $\neg p$-worlds.

4.3.2   The Reportative Evidential

Sentences with a reportative evidential are analyzed in parallel to sentences with a direct evidential. They also have three components: the presentation of the at-issue proposition, a non-negotiable update that directly restricts the common ground, and a negotiable update that imposes structure on the common ground. For example, consider Cheyenne (4.3), which may be used in a variety of situations, like the English translation, but is limited to second hand reports. A speaker would use (4.3) if they were told (4.2), read it in a newspaper, overheard it, and so on. However, it would not be felicitous for one speaker to repeat (4.3) if she had heard (4.3) from someone else, read it, et cetera. In this case she would use a different indirect evidential.

(4.3)   *É-hó'táheva-**séstse**   Floyd.*
      3-win-RPT.3SG   Floyd
      'Floyd won, I hear.'

These three contributions of (4.3) are illustrated in Figure 4.5. The at-issue proposition in (4.3) is the same as the at-issue proposition in (4.2): p, that Floyd won. However, both the evidential restriction and the illocutionary relation differ. The evidential restriction of (4.3) reduces the input common ground c_0 to worlds where the speaker heard the at-issue proposition p (written $HRD(i, p)$, in Figure 4.5). As with the direct evidential, this contribution is not-at-issue and non-negotiable.

Initial Common Ground	Present p	RPT-restriction (to c_1)
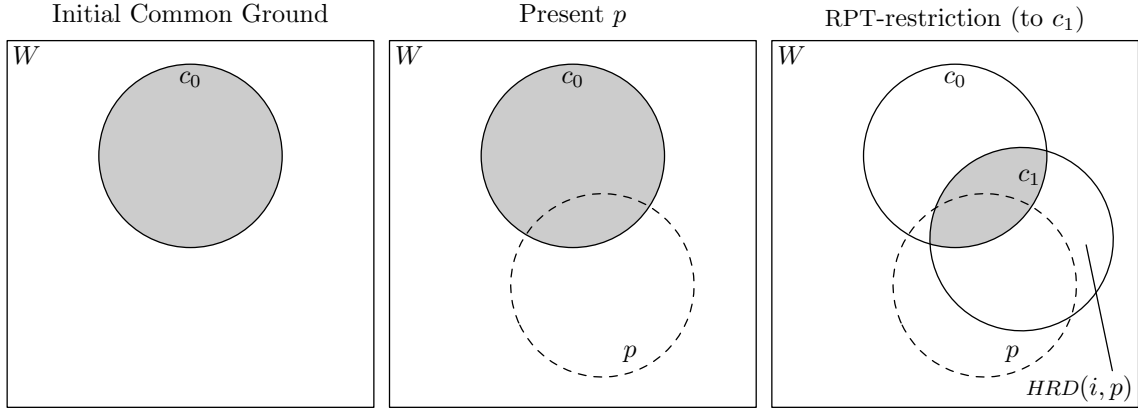
Figure 4.5: The contributions of (4.3): 3-win-RPT.3SG Floyd

In contrast to the direct evidential, the illocutionary relation contributed by a reportative is not the proposal to add the at-issue proposition to the common ground. Instead, the proposal is to take note of the at-issue proposition, here, p, that Floyd won, but for the common ground to remain unchanged. As observed in Faller (2002; a.o.), the reportative in languages with illocutionary evidentials merely presents the at-issue proposition – it does not commit the speaker to the truth, or possibility, of the at-issue proposition. This difference in the force of the evidentials can be accounted for as a difference in their illocutionary relations. Since the presentation of the at-issue proposition is part of all speech acts, it is part of the reportative. Therefore, it is not necessary to explicitly state an additional illocutionary relation. If the proposal is accepted, the new common ground will become the common ground that was reduced by the evidential restriction, c_1 in Figure 4.5.

An alternative approach to the reportative's illocutionary relation would be to state it as a trivial relation. For example, it could be represented as an equivalence relation that ranks all input common ground worlds on a par: $\langle c_1, \equiv_{c_1} \rangle$. In particular, p-worlds and $\neg p$-worlds are equally preferred. If the proposal is accepted, the new common ground will become the set of top-ranked worlds. However, since all of the worlds are top-ranked, the current common ground (c_1) will remain unchanged. This analysis of the reportative is intended to capture the intuition that a proposition in

the scope of a reportative evidential is 'presented' by the speaker (Faller 2002) and is not proposed to be added to the common ground. However, the present analysis need not appeal to a new type of speech act to account for this (see Section 5.4). In addition, it can capture the felicity of conjunctions like (4.5), as is discussed in the Section 4.3.4, below.

4.3.3 The Conjectural Evidential

As with the other evidentials, sentences with the conjectural are analyzed as making three contributions. For example, consider Cheyenne (4.4)[4], which may be used in a variety of situations. The most common is one where the speaker conjectures that the at-issue proposition is true based oncertain evidence, similar to the English translation. For example, a speaker would use (4.4) if she saw that Floyd was very happy after a race and was wearing a medal. However, it would not be felicitous for the speaker to use (4.4) if she saw Floyd win or if she had heard (4.2) from someone else. The speaker is conjecturing based on the facts that Floyd is happy and wearing a medal that he won.

(4.4) **Mó**-*hó'táheva*-**he-he**   *Floyd.*
CNJ+3-win-MOD$_A$-Y/N   Floyd
'Floyd won, I take it.'/'Floyd must have won'

As another example, consider a situation where you are walking along through a pasture when you see several cows on the wrong side of a fence. In such a situation, you could say that the gate is open using the conjectural evidential, parallel to the English sentences *The gate is open, I take it the gate must be open.*

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[4]The conjectural itself appears to be morphologically composed of one of the prefix *mo-*, the suffix that occurs with negation, *-h(an)e*, and the polar question mood suffix *-he* (see 2). It is at present unknown whether the indirect evidential meaning can be accounted for compositionally from these parts. It poses an interesting challenge, and perhaps an insight into the meaning of the evidential.

With the conjectural evidential, the speaker is not committed to the truth of the at-issue proposition, though she believes it to be a good possibility (see also Faller (2007)). In a way the conjectural contrasts with the direct evidential. However, in contrast to the reportative, the speaker cannot straightforwardly negate the at-issue proposition, or claim that she doesn't believe it; like the direct evidential, the conjectural is not defeasible. It cannot be used if the at-issue proposition is known to be false. However, there is less commitment to the truth of the at-issue proposition than with the direct evidential. This is similar to the weakening that occurs with epistemic modals in English: intuitively, the sentence *the gate must be open* is weaker than *the gate is open.*

To account for these facts, I analyze sentences with the conjectural evidential in parallel to ones with other evidentials. They present the at-issue proposition, contribute a not-at-issue evidential restriction, and propose to do something with the at-issue proposition, as illustrated in Figure 4.6. The at-issue proposition for (4.4) is the same as for (4.2) and (4.3): p, that Floyd won. Crucially, the content of the the evidential restriction and the illocutionary relation differ from those contributed by the direct and the reportative evidentials. The evidential restriction of (4.4) has two (sub)components. It reduces the input common ground c_0 to worlds where the speaker has conjectural evidence for the at-issue proposition p (written $CNJ(i, p)$, in Figure 4.6). However, it also contributes the presupposition that the speaker is not certain, based on personal experience, of $\neg p$, that Floyd didn't win. That is, the conjectural presupposes that the speaker does not have direct evidence to the contrary of what she concludes from the available evidence. How could one posit that Floyd won if they were certain, based on their own personal experience, that Floyd won? This presupposition rules out discourses like 'p-CNJ but $\neg p$-DIR', which are infelicitous (see Chapter 3). To simplify Figure 4.6), I have left out this presupposition from the diagram of the evidential restriction.
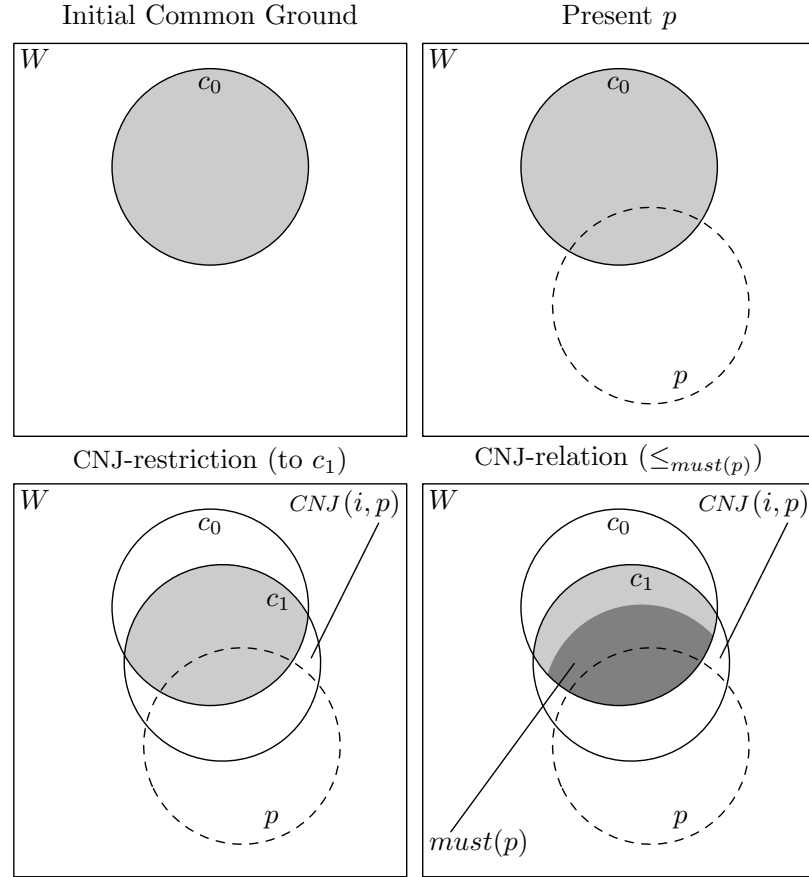
Figure 4.6: The contributions of (4.4): 3-win-INF Floyd

The illocutionary relation contributed by the conjectural is the proposal is to add to $must(p)$ the common ground. Intuitively, $must$ weakens the proposition, so the proposal to update with $must(p)$ will include a few $\neg p$ worlds, as in the diagram for the illocutionary relation in Figure 4.6. A semantics that captures this weakening effect of $must$ could be given along the lines of ordering semantics for modals[5] (Stalnaker 1968; Lewis 1973, 1981; Kratzer 1981).

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[5]The restricted common ground c_1 would be the domain of the modal. The facts that the conjecture were based on (e.g., that the cows were on the wrong side of the fence for 'the gate must be open') might be good candidates for inducing the order on the worlds.

Like with the direct evidential, I model the illocutionary relation as an ordering relation on the restricted context c_1. For the conjectural, this relation ranks the worlds in c_1 where $must(p)$ is true over worlds in c_1 where p is not true: $\langle c_1, \leq_{must(p)} \rangle$. The proposal component of the speech act is to add the top-ranked worlds to the (restricted) common ground. In Figure 4.6, the top-ranked worlds, the worlds where $must(p)$ is true, are shaded in a darker gray. This proposed common ground still contains a few $\neg p$ worlds. Thus, the speaker is not wholly committed to p.

The result is a common ground that is restricted (by the evidential restriction) and structured (by the illocutionary relation). If the proposal to add $must(p)$ to the common ground is accepted, the set of the top-ranked c_1 worlds (darker grey) will become the new common ground, eliminating all worlds where $must(p)$ is not true. This new common ground may contain a few $\neg p$ worlds. This analysis of the illocutionary relation of the conjectural achieves the desired contrast in force with the direct evidential (as well as the reportative).

One interesting property of the analysis of the conjectural evidential is that there are two not-at-issue contributions: the not-at-issue assertion that the speaker conjectures that p is true and the presupposition that the speaker is not certain, based on direct evidence, that $\neg p$. Compositionally, this may be related to the fact that the conjectural evidential in morphologically complex: it is morphologically composed of three morphemes, arguably a grammaticized form of the interrogative question clitic, modal agreement that occurs with negation, and the interrogative mood suffix. This might point towards an explanation of why the evidential restriction of the conjectural contains both a not-at-issue assertion and a presupposition. In Section 4.4, I analyze the evidential restriction of questions as a presupposition, which is still generally not-at-issue content.

Like conjectural and inferential evidentials in other languages, the Cheyenne conjectural has a modal component (see, e.g., Faller 2007). However, under the proposed

analysis, it still forms a natural class with the other evidentials – the modal component is just part of the illocutionary relation.

In Cheyenne, different evidentials contribute different levels of commitment to the at-issue proposition – while they are all assertions, they each have a different force, so to speak. The conjectural commits the speaker less than the direct evidential, and the reportative doesn't commit the speaker at all. By varying the content of the illocutionary relation, these different levels of commitment can be accounted for in a systematic way.

4.3.4 Conjunctions as Sequential Update

The declarative use of the Cheyenne evidentials conforms to well-known, cross-linguistic patterns, behaving similarly to illocutionary evidentials in other languages, such as Cuzco Quechua (Faller 2002) (see Chapter 3). This similarity in behavior is based on a set of semantic diagnostics which distinguishes parenthetical-like evidentials from modal-like, epistemic evidentials. In languages with illocutionary evidentials, the scope of the reportative can be false (see Chapter 3). Thus, sentences like (4.5), repeated from (3.17), are felicitous.

(4.5) i. *É-hó'táheva-**séstse** Floyd naa oha*   *ii. é-sáa-hó'táheva-he-**Ø**.*
3-win-RPT.3SG   Floyd and CRST   3-NEG-win-MOD$_A$-DIR
'Floyd won, I hear, but I'm certain he didn't.'

Each conjunct of (4.5) contains its own evidential. Following the standard assumptions in dynamic semantics, I interpret conjunctions as sequential update: the second conjunct is interpreted not in the original context but in the output of the first conjunct (as in Groenendijk and Stokhof 1991; Veltman 1996; Muskens 1996; a.o.). The analysis of (4.5i) was given above (Figure 4.5, Section 4.3.2). The output is a common ground restricted to worlds where the speaker heard the proposition p, that

Floyd won, and structured into one cell containing all c_1 worlds, both p-worlds and $\neg p$-worlds, either via a null illocutionary relation, or a trivial one, e.g., $\langle c_1, \equiv_{c_1} \rangle$.

The second conjunct (4.5ii) is interpreted in the output of (4.5i), as depicted in Figure 4.7. The second conjunct (4.5ii) contains a direct evidential and makes its own three contributions. The at-issue proposition in (4.5ii) is the proposition that Floyd did not win. It is the negation of the at-issue proposition in (4.5i). I have not explicitly represented it in Figure 4.7), but it can be seen as the complement of p. The evidential restriction reduces the common ground c_1 to the set of worlds where the speaker is certain, based on personal experience, that $\neg p$, that Floyd did not win (written $CRT(i, \neg p)$ in Figure 4.7).
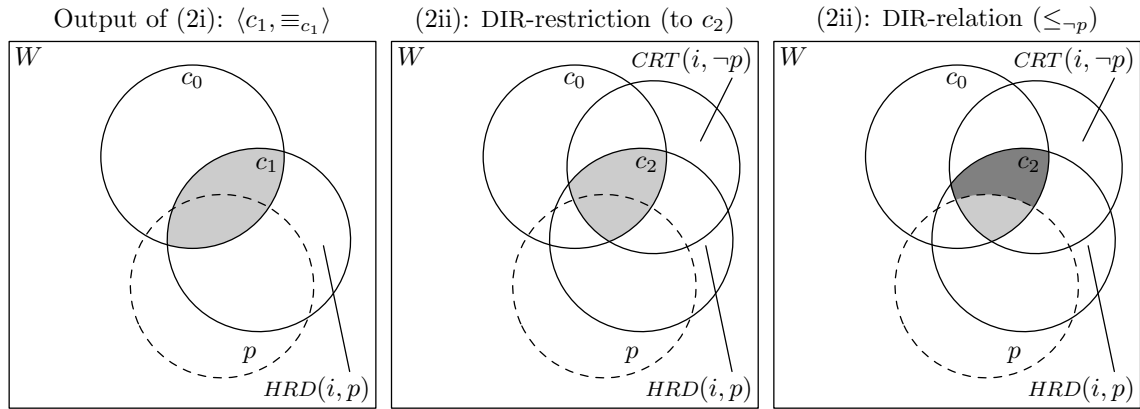
Figure 4.7: Felicitous conjunction of (4.5i) and (4.5ii)

The illocutionary relation for (4.5ii) is the proposal to add to the common ground the at-issue proposition, here, $\neg p$, that Floyd did not win. I represent this as an ordering relation on the current context, c_2, where $\neg p$-worlds are preferred over p-worlds: $\langle c_2, \leq_{\neg p} \rangle$. If the proposal is accepted, the resulting common ground will consist of c_0 worlds where the speaker heard that p (c_1), is certain that $\neg p$ (c_2), and where $\neg p$ is true (top-ranked c_2 worlds under $\leq_{\neg p}$). Normally, that sequence of updates yields a non-empty common ground, so the conjunction is felicitous.

Infelicitous conjunctions involve incompatible updates, resulting in an output common ground that is necessarily empty – the absurd state. An example of such a

conjunction is Cheyenne (4.6), which shows that, unlike in (4.5) with the reportative evidential, the speaker is committed to the direct evidential's scope.

(4.6) $\#_\perp$ (i) *É-hó'táhéva-Ø*   *Floyd* *naa* *oha*   (ii) *é-sáa-hó'táheva-he-Ø.*
            3-win-DIR   Floyd and   CNTR   3-NEG-won-MOD$_A$-DIR
            $\#_\perp$ 'Floyd won, I'm sure, but I'm sure he didn't.'

Cheyenne (4.6) is a contradiction: the speaker denies in the second conjunct what she asserts in the first. Both conjuncts contain a direct evidential. The output of (4.6i) is a common ground c_1 restricted to worlds where the speaker is certain that Floyd won and structured by a relation that ranks p-worlds over $\neg p$-worlds, written $\langle c_1, \leq_p \rangle$ (see Figure 4.4, Section 4.3.1).

The second conjunct (4.6ii) is interpreted in the output of (4.6i), as depicted in Figure 4.8. It is important to note that the proposal of (4.6i) has not yet been accepted. The second conjunct (4.6ii) contains a direct evidential and makes its own three contributions. The at-issue proposition in (4.6ii) is the proposition that Floyd did not win. It is the negation of the at-issue proposition in (4.6i). I have not explicitly represented it in Figure 4.8), but it can be seen as the complement of p.

The evidential restriction of (4.6ii) reduces the common ground c_1 to the set of worlds where the speaker is certain that $\neg p$, that Floyd did not win (written $CRT(i, \neg p)$ in Figure 4.8). The resulting common ground c_2 is one where the speaker is certain, based on personal experience, that Floyd won and is also certain, based on personal experience, that he did not win. This is probably already an empty set of worlds. In the unlikely case that any worlds remain in the common ground c_2, as in Figure 4.8, the contribution of the illocutionary relation will rule them out.
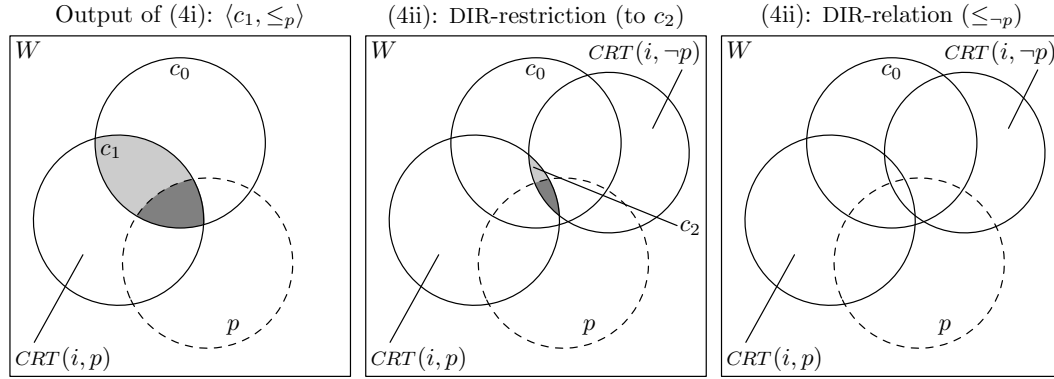
Figure 4.8: Infelicitous denial in (4.6ii) of (4.6i)

The illocutionary relation of (4.6ii) is the proposal to add to the common ground the at-issue proposition, here, $\neg p$, that Floyd did not win. This is represented as an ordering relation on the current context, c_2, where $\neg p$-worlds in c_2 are preferred over p-worlds in c_2. However, this is incompatible with the relation contributed by (4.6i), which ordered p-worlds over $\neg p$-worlds, and combining them would result in the empty set. The proposals of the two conjuncts contradict each other. In short, any context which supports (4.6i) cannot support (4.6ii).

In this section, I have proposed an analysis of evidentials where they have three components: the presentation of the at-issue proposition, a non-negotiable update that directly restricts the common ground, and a negotiable update that imposes structure on the common ground. This analysis of evidentials implies a more articulated analysis of speech acts – it assumes a certain structure, which should therefore be present in other speech acts. In the next section, I apply this general theory of the structure of speech acts to Cheyenne questions, focusing in particular on questions that contain evidentials and questions formed with the interrogative mood.

4.4 Questions, Evidentials, and Not-at-Issue Content

In the above section, I presented an analysis of Cheyenne evidentials that implies a more articulated theory of speech acts. In this section, I show that this more articulated theory can be directly extended to other speech acts. As an illustration, I extend the analysis to questions in Cheyenne and their interaction with evidentials.

Like the evidentials analyzed above, questions are analyzed as presenting the at-issue proposition. I propose that the distinction between what is at-issue and what is not is also present in questions, and that it can be modeled in the same way. Specifically, both declarative and interrogative sentences make three contributions: they present the at-issue proposition, restrict and structure the common ground. The restriction is based on the not-at-issue component while the structuring relation is based on the at-issue proposition. In questions, the not-at-issue restriction is a classical presupposition, required to be entailed by the input common ground, as depicted in Figure 4.10. It does not add new information – the context must be one where the speaker has evidence for one of the answers. The illocutionary relation divides the common ground into the possible answers, but does not further reduce it. Thus, unlike assertions, in questions no new information is added to the common ground. Each of the three contributions are still present, but they do not reduce the common ground, corresponding to intuitions about the effect of asking a question.

In Section 4.4.1, I analyze one type of Cheyenne polar question, which can contain evidentials: questions formed with an interrogative clitic. For questions, the presentation of the at-issue proposition is the presentation of the possible answers. In questions, the evidential restriction is a presupposition about the type of evidence the addressee has for the requested answer. The structuring update partitions the common ground into the possible answers, representing asking a question by present-

ing the answers. In Section 4.4.2, I analyze the interrogative mood, which alternates with evidentials. This type of question is also analyzed in terms of the three components of a speech act, treating it and evidentials as a semantic natural class. The restriction for the interrogative mood is a presupposition that the addressee has some type of evidence for the requested answer. Like polar questions formed with the interrogative clitic, the structuring update for the interrogative mood partitions the common ground into the possible answers, representing asking a question as presenting the space of possible answers. In Section 4.4.3, I discuss content questions, some of which can contain evidentials. Content questions containing evidentials have a special property that I call illocutionary variability: they can have two interpretations, which vary in their illocutionary force. One interpretation is parallel to polar questions containing evidentials: a direct question that presupposes what type of evidence the addressee has. The other interpretation is a statement of uncertainty.

4.4.1 Polar Questions with the Interrogative Clitic

One type of polar question in Cheyenne can contain evidentials: questions formed with the interrogative clitic *mó=*. Consider the example in (4.7) with the reportative. Question (4.7) is felicitous in a context where it is clear the addressee will have reportative evidence for her answer. For example, imagine a context where Annie overhears Dale on the telephone. Dale asks the person on the telephone "Did Andy win?" Annie hears this question, but not the answer. However, she expects that Dale will have reportative evidence for the answer, whatever it is (e.g., yes, he won, or no, he didnt win). When Dale gets off the phone, she can ask him (4.7).

(4.7) *Mó=é-hó'táheva-**sėstse*** *Andy?*
    y/n=3-win-RPT.3SG   Andy
    'Given what you heard, did Andy win?'

(4.8) ✓A_1: *Héehe'e* *é-hó'tȧheva-**sėstse**.*   #A_2: *Héehe'e* *é-hó'tȧhéva-**Ø**.*
      Yes   3-win-RPT.3SG   Yes   3-win-DIR
      'Yes, he won, I hear.'   'Yes, he won, I'm sure.'

The evidential that occurs in the question constrains the possible answers, as in (4.8). Example (4.8A_1), which contains a reportative evidential, is a felicitous answer to (4.7) while (4.8A_2), which contains a direct evidential, is not a felicitous answer.

Evidentials in questions, like evidentials in declaratives, contribute to the not-at-issue component, which is a presupposition in questions. I propose an analysis of *mó=* questions parallel to the analysis of declarative sentences with evidentials given in Section 4.3. That is, (4.7) presents the at-issue proposition(s), the possible answers, and contributes both an evidential restriction and an illocutionary relation, as in Figure 4.9. For (4.7), the possible semantic answers, corresponding to the at-issue proposition in declarative sentences, are p, that Andy won, and $\neg p$, that Andy did not win. Each answer can be paired with any evidential, but only responses with the reportative are felicitous. The evidential restriction reduces the input common ground c_0 to the worlds where either the addressee u heard the proposition p that Andy won (written $HRD(u, p)$, in Figure 4.9, below) or the addressee u heard that $\neg p$ (written as $HRD(u, \neg p)$). Question (4.7) is only felicitous in such a context – one where it is clear the addressee has reportative evidence for her answer, whatever her answer is. That is, the evidential restriction of (4.7) must be entailed by the input common ground – it is a presupposition in the sense of Stalnaker (1973) and the common ground c_0 remains unchanged.
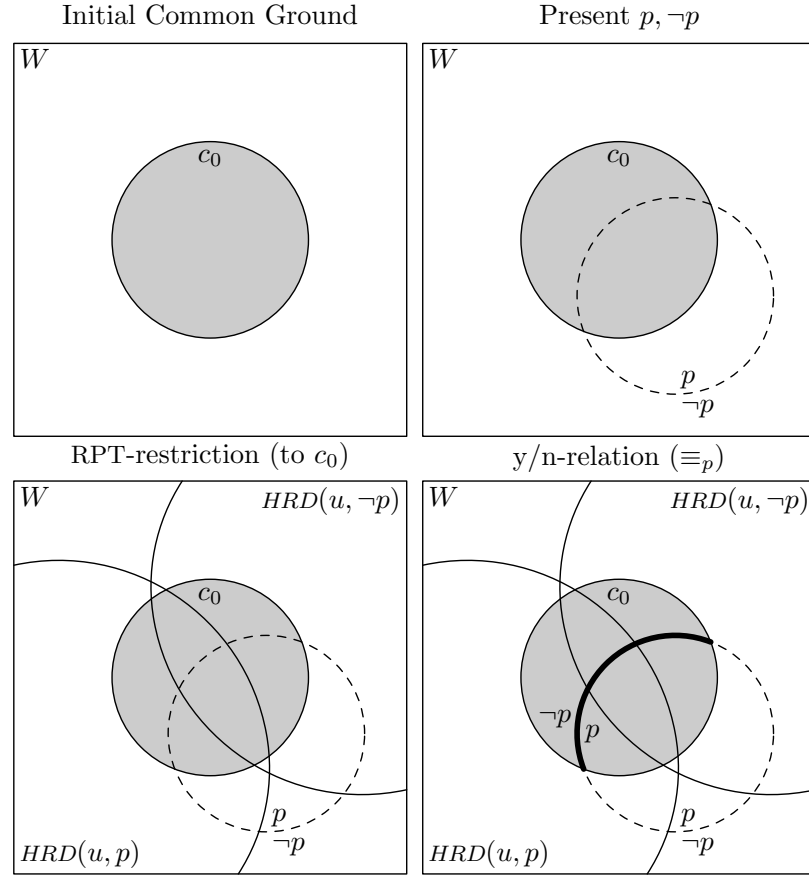
Figure 4.9: The Contributions Polar Question with Interrogative Mood

The illocutionary relation contributed by (4.7) partitions the common ground, representing a question by presenting the possible answers, fusing Hamblin (1973) and Groenendijk and Stokhof (1984b). Alternatively, it can be thought of as the proposal to either add p, the proposition that Andy won, or $\neg p$ to the common ground (as in Groenendijk 2009). Following the analysis of polar questions in Groenendijk and Stokhof (1984b), I propose to model this illocutionary relation as an equivalence relation on the current common ground c_0: $\langle c_0, \equiv_p \rangle$. The output is a common ground that is (vacuously) restricted (it entails the evidential restriction) and structured (by the illocutionary relation). Possible answers to this question are either p or $\neg p$ with the reportative evidential, e.g., (6.3A$_1$) *'Yes, he won, I hear'* but not (6.3A$_2$) *'Yes, he won, I'm sure'*.

4.4.2 Polar Questions with Interrogative Mood

The other strategy for forming polar questions in Cheyenne involves the illocutionary mood suffix -*he*. As discussed in Chapter 2, evidentials in Cheyenne morphologically alternate with the illocutionary mood markers, such as -*he*. Consider the example in (4.9). Because the interrogative suffix occurs in the same morphological slot as the evidentials, evidentials cannot occur in this type of question. This type of question is evidentially unspecified, and can be answered with any evidential. Two possible answers to (4.9) are given in (4.10).

(4.9) *É-hó'táheva-**he*** *Andy?*
     3-win-Y/N   Andy
     'Given your evidence, did Andy win?'

(4.10) ✓ A_1: *Héehe'e* *é-hó'táheva-**séstse**.*   ✓ A_2: *Héehe'e* *é-hó'táhéva-**∅**.*
          Yes   3-win-RPT.3SG   Yes   3-win-DIR
          'Yes, he won, I hear.'   'Yes, he won, I'm sure.'

I propose that Cheyenne questions formed with the interrogative mood suffix -*he* also be analyzed as having three components: the presentation of the at-issue proposition, a non-negotiable update that directly restricts the common ground, and a negotiable update that imposes structure on the common ground. This analysis of the interrogative mood is directly parallel to declarative sentences with evidentials. Thus, under this analysis, the evidentials and the y/n interrogative mood, which morphologically alternate, form a natural semantic class.

As in (4.7), the presentation of the at-issue proposition in (4.9) is the presentation of the possible answers: that Andy won and that Andy did not win (see Figure 4.10). The evidential restriction in (4.9) reduces the input common ground c_0 to worlds where the addressee u has some type of evidence for the proposition p or for $\neg p$ (written as $R_{EVI}(u, p)$ and $R_{EVI}(u, \neg p)$, respectively). However, question (4.9) is only felicitous in such a context – one where it is clear the addressee has some type of

evidence for their answer, whatever the answer is. That is, the evidential restriction of (4.9) must be entailed by the input common ground c_0 – it is a presupposition in the sense of Stalnaker (1973) and the common ground c_0 remains unchanged.
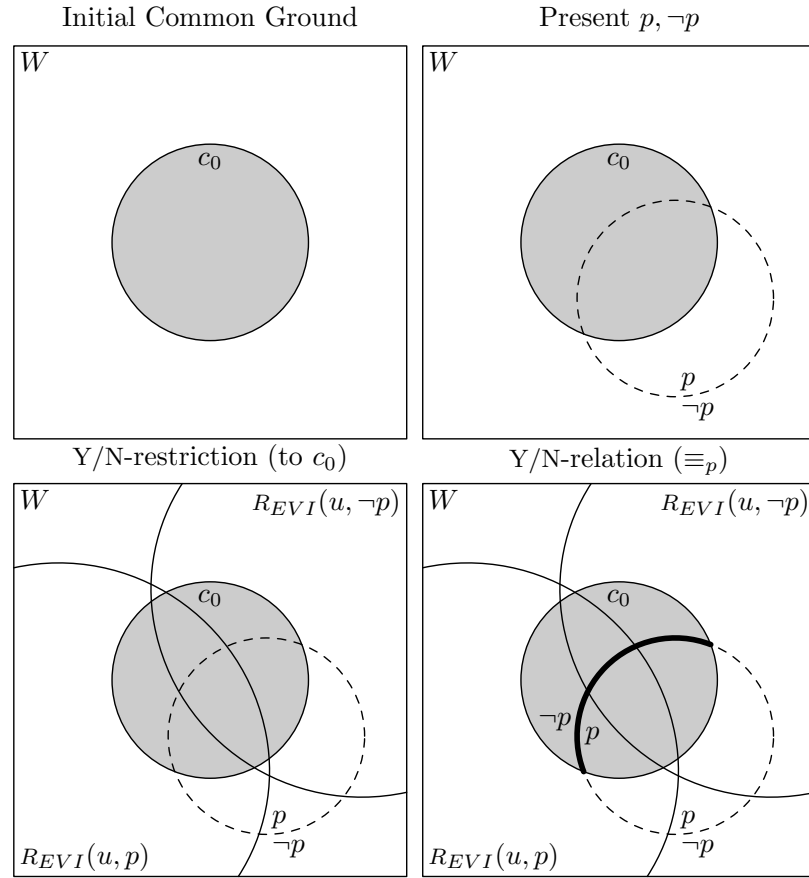
Figure 4.10: The Contributions Polar Question with Interrogative Mood

The illocutionary relation contributed by (4.9) represents a question, which, like the Cheyenne question formed with *mó=* in (4.7), can be thought of as the presentation of the possible answers, p and $\neg p$. I propose to model the illocutionary relation contributed by (4.9) as an equivalence relation on the current context c_0: $\langle c_0, \equiv_p \rangle$. The output is a common ground that is trivially restricted (it entails the evidential restriction) and structured (by the illocutionary relation). Possible answers to this question are either p or $\neg p$ with any evidential, including (4.9A$_1$) *'Yes, he sang, I hear'* or (4.9A$_1$) *'Yes, he sang, I'm sure'*.

4.4.3 Evidentials and Content Questions: Illocutionary Variability

Content questions with evidentials in Cheyenne, such as (4.11), display a property I call illocutionary variability. That is, they can have two interpretations which vary in their illocutionary force. The first interpretation, illustrated in (4.11i), is a direct question that restricts the possible answers to the evidential specified in the question, as with polar questions. The second interpretation, given in (4.11ii), is not a direct question – it is a statement of uncertainty.

(4.11) *Tósa'e   é-hoo'e-**séstse**   Andy*
      where   3-live-RPT.3SG   Andy
    (i) 'Given what you heard, where does Andy live?'
    (ii) 'Andy lives somewhere, I wonder where.'

The first interpretation, (8.9i), It is parallel to the polar question containing a reportative evidential: there is a presupposition that the addressee has a certain kind of evidence. The analysis of the second interpretation of (4.11) is less clear. Generally speaking, the interpretation (4.11ii) seems to be part question and part assertion: it asserts that there is somewhere that Andy lives, but leaves open the question of where this is, without directly asking. However, there is a puzzle: the evidential requirement of reportative evidence for the at-issue proposition does not seem to be present. That is, the requirement that someone has reportative evidence for something is missing.

The phenomenon of illocutionary variability exists with other evidentials, as in (4.12) with the conjectural. However, the different evidential contributes a different type of uncertainty.

(4.12) *Tósa'e   **mó**-hoo'e-**he-he***
      where   CNJ+3-live-MOD$_A$-Y/N
    (i) 'Given what you guess, where does he live?' /'Where must he live?'
    (ii) 'He lives somewhere but I don't know where.

In general, question words in Cheyenne, as in (4.13) and (4.14), behave similar to what have been called indeterminate pronouns Japanese (see Kratzer and Shimoyama 2002). Interpretation (4.11ii) is most likely related to this phenomenon, since the ambiguity in (4.11) is not present in polar questions.

(4.13) *Tósa'e   é-hoo'e-**he**   Andy?*
      where   3-live-Y/N   Andy
   'Given your evidence, does Andy live somewhere?'

(4.14) *Tósa'e   é-sáa-hoo'e-he-**Ø**   Andy.*
      where   3-neg-live-MOD$_A$-DIR   Andy
   'Andy doesn't live anywhere, I'm sure'

In (4.13), the content question word *Tósa'e* 'where' co-occurs with the polar interrogative mood suffix *-he*. The result is a polar question containing an indefinite 'somewhere'. In (4.14), the content question word *Tósa'e* 'where' occurs with negation, and the result is a negative sentence where the question word functions like a negative polarity item.

4.5   Summary

Evidentials in Cheyenne, which are part of the illocutionary mood paradigm, grammaticize a distinction between at-issue and not-at-issue content. I propose that sentences with evidentials have three components: the presentation of the at-issue proposition, a non-negotiable update that directly restricts the common ground, and a negotiable update that imposes structure on the common ground.

The presentation of the at-issue proposition expresses the main point of the sentence. It puts forward the proposition that is under discussion. The speaker can say some non-negotiable things about it and the conversational participants negotiate what to do with it. This presentation aspect of the analysis of evidentials is crucial. It plays an essential role in the analysis of the reportative. However, it also affects

what can be referred to in subsequent discourse, a key property in the analysis of all evidentials, and supplies the propositional argument of the evidential predicate (e.g., $HRD(u, p)$). Furthermore, analyzing the presentation of the at-issue presentation as a separate component of the speech act accounts for the intuition that sentences that vary only in the evidential in some sense express the same proposition: the presented at-issue proposition is the same for such sentences.

The evidential restriction in declarative sentences amounts to an assertion about the type of evidence the speaker has for the scope proposition. This new information is not-at-issue, non-negotiable, and is added directly to the common ground. However, the content of this relation can vary, depending on the type of evidential. This is one dimension on which the semantics of sentences with evidentials can vary.

The other dimension on which the semantics of sentences with evidentials can vary is the content of the illocutionary relation. Different evidentials contribute different levels of commitment to the at-issue proposition – while they are all assertions, they each have a different force, so to speak. The conjectural commits the speaker less than the direct evidential, and the reportative doesn't commit the speaker at all. By varying the content of the illocutionary relation, these different levels of commitment can be accounted for in a systematic way.

This analysis of evidentials implies a more articulated view of the structure of speech acts. In particular, all speech acts can be analyzed as having three components: the presentation of the at-issue proposition, not-at-issue information, which is added directly to the common ground, and at-issue information, which affects the structuring of the common ground. I apply this analysis to questions in Cheyenne, accounting for polar questions formed with the interrogative mood as well as questions that contain evidentials.

For questions, I propose that the presentation of the at-issue proposition is the presentation of the space of possible answers. Questions also involve both at-issue and

not-at-issue content – non-negotiable information imposed on the common ground and and negotiable information the structures the common ground. The non-negotiable restriction in interrogative sentences with evidentials amounts to a presupposition about the type of evidence the addressee of the question has for her answer. This not-at-issue information must be entailed by the input common ground. The restriction accounts for the difference in felicitous answers for the two types of yes/no interrogatives: *-he* questions, which can be answered with any evidential, and *mó=* questions, which restrict answers to ones containing the same evidential as the question.

The content of the illocutionary relation for questions, the negotiable update, differs from the declaratives. Instead of proposing to add certain information to the common ground, the speaker is making a request for information, asking what information to add to the common ground. For polar questions, these updates impose an equivalence relation on the information state, partitioning it into possible answers, effectively implementing (Groenendijk and Stokhof 1984b). More generally, a cover is imposed over the common ground representing the set of the possible answers.

In Cheyenne, evidentials and the yes/no interrogative mood marker belong to the same illocutionary mood paradigm. The presented analysis treats the morphemes in this paradigm as a natural semantic class. They are analyzed as grammatically encoding a distinction between what is at-issue and what is not. More generally, different types of speech acts can be analyzed as a natural class within the proposed analysis of structured speech acts.

Part II

Formal Implementation

Chapter 5

A Hamblin Semantics for Evidentials in Declaratives

Contents

5.1   Introduction

In Chapter 4, I proposed a general analysis of speech acts that has three components: the presentation of the at-issue proposition, a non-negotiable update, which directly restricts the common ground, and a negotiable update, which represents a proposal to update the common ground. This analysis distinguishes at-issue and not-at-issue content. The at-issue content, which is negotiable, is treated as a proposal to update the common ground. Not-at-issue content, which is not negotiable, is added directly to the common ground.

This proposal combines two previous views on assertion. On one view, an assertion updates the common ground (Karttunen 1974; Stalnaker 1975, 1978). A second view is that an assertion is a proposal to update the common ground. This is the view taken in recent work on Inquisitive Semantics (e.g., Groenendijk and Roelofsen 2009; Groenendijk 2009) and inspired by earlier work on the information structure of discourse (Ginzburg 1996; Roberts 1996; Gunlogson 2001).

Evidence for this analysis comes from evidentials, which I argue grammaticize this distinction in assertion. It has been observed that sentences with evidentials make both an 'evidential' and a 'propositional' contribution (Faller 2002, 2006a; Matthewson et al. 2007). The evidential contribution is not directly challengeable or up for negotiation. In contrast, the propositional contribution, the 'main point' of the sentence, is directly challengeable and up for negotiation. I analyze these two contributions of evidentials as the not-at-issue component of assertion and the at-issue component of assertion, respectively.

In this chapter, I propose a way of formally implementing this idea. This implementation captures two of the three components of a speech act that were proposed in Chapter 4: the non-negotiable update (imposed on the common ground) and the negotiable update (proposed to the common ground). The chapter is structured as follows. In Section 5.2, I review the analysis of evidentials as contributing to the not-at-issue component of assertion. The information contributed by evidentials is new, not presupposed (contra Matthewson et al. 2007). In addition, evidentials are truth-conditional and there is no appeal to a separate level of illocutionary meaning (contra Faller 2002, 2006a). In Section 5.3, I formalize this analysis, modeling declarative sentences as sets of propositions, after Hamblin (1973). In Section 5.4, I compare this approach with some influential alternatives (Faller 2002; Matthewson et al. 2007; Potts 2005).

5.2 Evidentials as Not-at-Issue Assertion

An assertion has the potential to change the common ground[1]. Stalnaker (1975; Appendix) treats (the essential effect of) an assertion as the intersection of two sets of worlds: the proposition expressed and the input common ground. The rejection of an assertion is treated as blocking this effect, leaving the input common ground unchanged (Stalnaker 1975, 1978). On another view, an assertion is a proposal to update the common ground (Groenendijk 2009)[2]. If the proposal is accepted, i.e., if nobody objects, then the proposition expressed is added to the common ground.

I treat assertion as having two components, the at-issue and the not-at-issue, each with its own effect on the common ground. The at-issue component of assertion is treated as a proposal to update the common ground while the not-at-issue component is treated as updating the common ground simpliciter[3]. I formalize the notion of a proposal as a structured set of worlds: the pair of a common ground and an ordering relation on that set (cf. Groenendijk 2009). If the proposal is accepted, the set of top-ranked worlds becomes the new common ground. This new common ground contains only worlds that were members of the initial common ground where the proposition expressed is true. As an example, consider English (5.1).

(5.1) Floyd won.

The proposition expressed by an (assertive utterance of) (5.1) is the proposition that

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[1]I take the common ground to be the information that the conversational participants take for granted (or act as though they do) for the sake of the conversation, regardless of what they actually believe (following, e.g., Stalnaker 1978). Here, the common ground is treated as the intersection of a set of propositions – a set of worlds – by some terminologies the 'context set'.

[2]See also work on the structure of discourse (Ginzburg 1996; Roberts 1996; Gunlogson 2001).

[3]This not-at-issue component of assertion has an effect similar to what Stalnaker (1978) calls the commonplace effect: the addition of certain new information to the common ground (e.g., who is speaking, what words she is using). This information updates the common ground, but it is not negotiable and cannot be directly challenged or denied. It is added to the common ground even if the essential effect is denied. However, the commonplace effect is pragmatic. It does not reflect the contribution of part of the sentence itself, a morpheme or phrase, as is the case with evidentials.

Floyd won. This proposition, call it p, is the at-issue content of (5.1). The proposal to add p to the common ground yields a structured set of worlds: the initial common ground c_0 and the ordering relation $\leq_p$, which orders p-worlds over $\neg p$-worlds. This is depicted in Figure 5.1, where worlds which are still live possibilities are shaded grey; preferred worlds are represented by a darker grey.
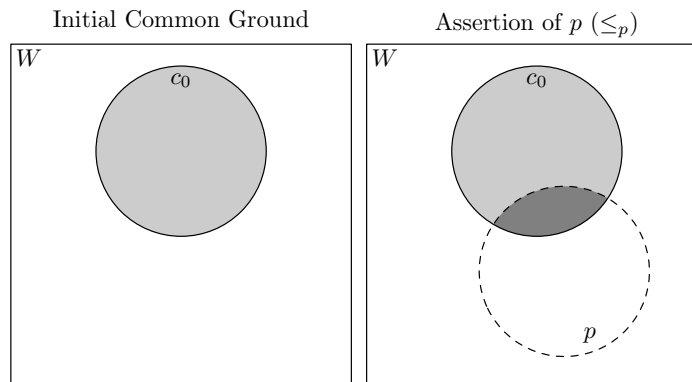
Figure 5.1: The contribution of (5.1): Floyd won

This approach represents the fact that the proposition expressed by (5.1) is negotiable, that it can be directly challenged and denied. For example, when a speaker utters (5.1), her interlocutors may object: *No he didn't!* or *That's not true, Albert won!* In contrast, the not-at-issue component of assertion, which cannot be directly challenged nor denied, would directly update the common ground. For the present purposes, I treat (5.1) as not having, or having an empty, not-at-issue component. In the remainder of this section, I present an analysis of sentences with evidentials that makes use of this distinction in assertion.

5.2.1 The Direct Evidential

It has been well argued in the literature that sentences with evidentials make both a 'propositional' contribution and an 'evidential' contribution, and that these two contributions need to be distinguished (Faller 2002; Matthewson et al. 2007, see also

Chapter 3, above). For example, Cheyenne (5.2), which contains the direct evidential, makes types of contributions.

(5.2) *É-hó'tȧhéva-∅*   *Floyd.*
       3-win-DIR   Floyd
       'Floyd won, I'm sure.'

The propositional contribution of (5.2) is the utterance's main point – that Floyd won. It is comparable to the contribution of unmarked English sentences, such as (5.1). In (5.2), the proposition that Floyd won is the negotiable contribution of the sentence. When a speaker utters (5.2), she proposes to add the information that Floyd won to the common ground. However, her interlocutors may felicitously object: *No he didn't!* or *That's not true! Floyd didn't win, it was Albert!*

The evidential contribution of (5.2) indicates that the speaker has direct evidence for the proposition in the evidential's scope. It entails that the speaker is certain based on personal experience of the scope proposition. The evidential contribution not up for negotiation. It cannot be directly challenged or denied. For example, it is infelicitous to reply to (5.2) with *No you aren't!* or *No you don't!* However, the evidential contribution is new information that reduces the common ground, not information which is presupposed, or cancellable.

I propose that Cheyenne sentences with evidentials be analyzed as encoding a distinction in assertion between what is at-issue and what is not. The evidential contribution is the not-at-issue component – it restricts the common ground, but is not negotiable. The at-issue component is the propositional contribution, the negotiable proposal to add the proposition expressed to the common ground.

I call these two contributions of sentences with evidentials the EVIDENTIAL RE-STRICTION and the ILLOCUTIONARY RELATION[4], respectively. For (5.2), the eviden-

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[4]The choice of evidential has an effect on the content of the proposal, so I might have called this contribution the EVIDENTIAL RELATION. However, Cheyenne evidentials are part of the illocutionary

tial restriction reduces the input common ground c_0 to the worlds where the speaker i is certain (based on personal experience) of the proposition p that Floyd won (written as $CRT(i, p)$, shown in Figure 5.2, below). This analysis is consistent with the idea that the evidential is the 'grounds for making a speech act' (Faller 2002). The new common ground is c_1, the intersection of c_0 and $CRT(i, p)$.
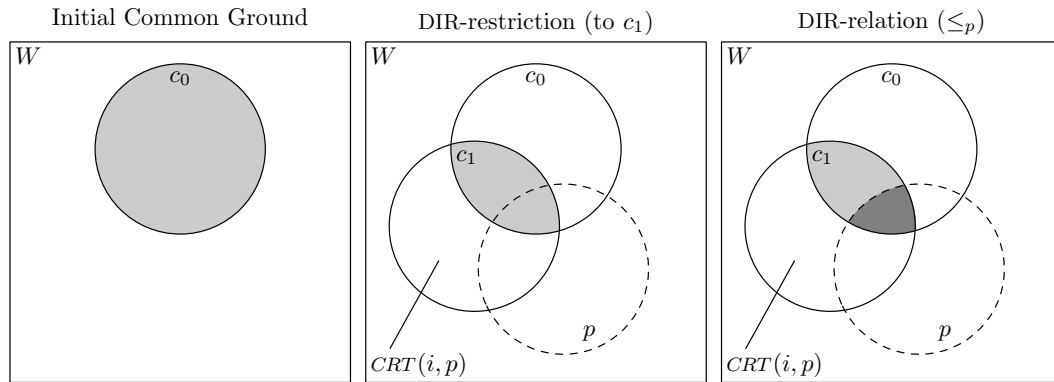
Figure 5.2: The two contributions of (5.2): 3-win-DIR Floyd

The illocutionary relation contributed by the direct evidential in (5.2) represents the proposal to add to the restricted common ground the at-issue proposition p, the proposition that Floyd won. I propose to model this illocutionary relation as an ordering relation on the current context c_1 which orders the p-worlds in c_1 over the $\neg p$-worlds in c_1: $\langle c_1, \leq_p \rangle$. The output is a common ground that is restricted (by the evidential restriction) and structured (by the illocutionary relation). If the proposal to add p to the common ground is accepted, the set of the top-ranked c_1 worlds (darker grey) will become the new common ground, eliminating all $\neg p$-worlds.

mood paradigm and in related work I argue that other mood markers also contribute a type of proposal, formalized as a different sort of relation (see Murray 2010a).

5.2.2 The Reportative Evidential

Sentences with the reportative evidential also make two contributions. For example, consider Cheyenne (5.3), which may be used in a variety of situations, like the English translation, but is limited to second hand reports. A speaker would use (5.3) if they were told (5.2), read it in a newspaper, overheard it, and so on. However, it would not be felicitous for one speaker to repeat (5.3) if she had heard (5.3) from someone else, read it, et cetera. In this case she would use a different indirect evidential.

(5.3) *É-hó'táheva-**sėstse** Floyd.*
    3-win-RPT.3SG   Floyd
    'Floyd won, I hear.'

Sentences with a reportative evidential are analyzed in parallel to ones with a direct evidential: they contribute an evidential restriction and an illocutionary relation. The at-issue proposition in (5.3) is the same as in (5.2): p, that Floyd won. The evidential restriction of (5.3) reduces the input common ground c_0 to worlds where the speaker heard the at-issue proposition p (written $HRD(i, p)$, in Figure 5.3). This contribution is not-at-issue and non-negotiable.
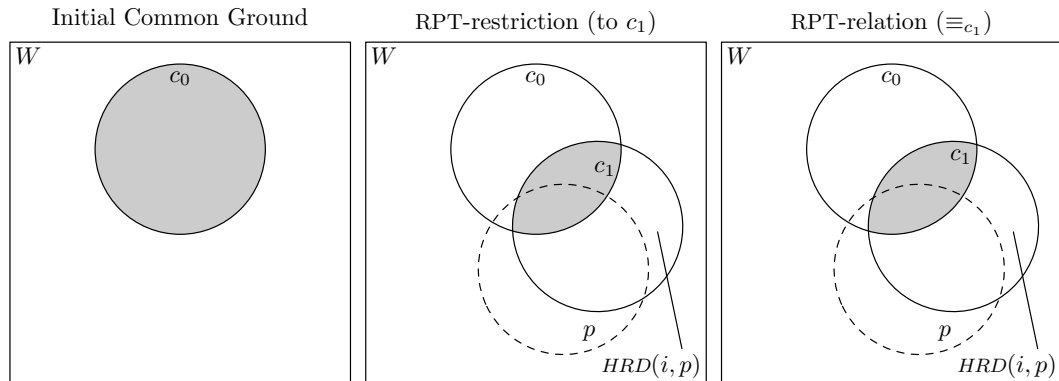
Figure 5.3: The two contributions of (5.3): 3-win-RPT.3SG Floyd

Unlike the direct evidential, the illocutionary relation contributed by a reportative is not the proposal to add the at-issue proposition to the common ground. Instead,

the proposal is to take note of the at-issue proposition, here, p, that Floyd won, but for the common ground to remain unchanged. I propose to represent this as an equivalence relation that ranks all input common ground worlds on a par: $\langle c_1, \equiv_{c_1} \rangle$. In particular, p-worlds and $\neg p$-worlds are equally preferred.

If the proposal is accepted, the new common ground will become the set of top-ranked worlds. However, since all of the worlds are top-ranked, the current common ground (c_1) will remain unchanged. This analysis of the reportative is intended to capture the intuition that a proposition in the scope of a reportative evidential is 'presented' by the speaker (Faller 2002) and is not proposed to be added to the common ground. However, the present analysis need not appeal to a new type of speech act to account for this (see Section 5.4). In addition, it can capture the felicity of conjunctions like (5.4), as is discussed in the next section.

5.2.3   Conjunctions as Sequential Update

In languages with parenthetical-like evidentials, the scope of the reportative can be false (see Chapter 3). Thus, sentences like (5.4), repeated below, are felicitous.

(5.4) (i) *É-hó'táheva-**sėstse*** *Floyd* *naa+oha* (ii) *é-sáa-hó'táheva-he-**Ø***.
  3-win-RPT.3SG Floyd but 3-NEG-win-*h(an)e*-DIR
  'Floyd won, I hear, but I'm certain he didn't.'

Each conjunct of (5.4) contains its own evidential. Following the standard in dynamic semantics, I interpret conjunctions as sequential update: the second conjunct is interpreted not in the original context but in the output of the first conjunct (Groenendijk and Stokhof 1991; Veltman 1996; Muskens 1996). The analysis of (5.4i) was given above (Figure 5.3, Section 5.2.2). The output is a common ground restricted to worlds where the speaker heard the proposition p, that Floyd won, and structured into one cell containing all c_1 worlds, both p-worlds and $\neg p$-worlds: $\langle c_1, \equiv_{c_1} \rangle$.

The second conjunct (5.4ii) contains a direct evidential and contributes its own evidential restriction and illocutionary relation. The evidential restriction reduces the common ground c_1 to the set of worlds where the speaker is certain, based on direct evidence, that $\neg p$, that Floyd did not win (written $CRT(i, \neg p)$ in Figure 5.4).
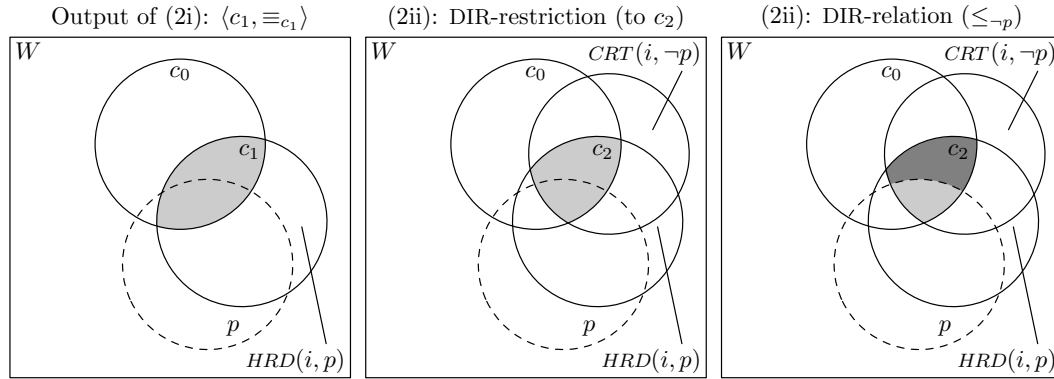
Figure 5.4: Felicitous conjunction of (5.4i) and (5.4ii)

The illocutionary relation is the proposal to add to the common ground the at-issue proposition, here, $\neg p$, that Floyd did not win. I represent this as an ordering relation on the current context, c_2, where $\neg p$-worlds are preferred over p-worlds: $\langle c_2, \leq_{\neg p} \rangle$. If the proposal is accepted, the resulting common ground will consist of c_0 worlds where the speaker heard that p (c_1), is certain that $\neg p$ (c_2), and where $\neg p$ is true (top-ranked c_2 worlds under $\leq_{\neg p}$). Normally, that sequence of updates yields a non-empty common ground, so the conjunction is felicitous.

Infelicitous conjunctions involve incompatible updates, resulting in an output common ground that is necessarily empty – the absurd state. An example of such a conjunction is Cheyenne (5.5), which shows that, unlike in (5.4) with the reportative evidential, the speaker is committed to the direct evidential's scope.

(5.5) $\#_{\perp}$ (i) *É-hó'táhéva-Ø* *Floyd* *naa+oha* (ii) *é-sáa-hó'táheva-he-Ø*.
　　　　　　3-win-DIR　　　　Floyd　but　　　　3-NEG-won-*h(an)e*-DIR
　　　　　　$\#_{\perp}$ 'Floyd won, I'm sure, but I'm sure he didn't.'

Cheyenne (5.5) is a contradiction: the speaker denies in the second conjunct what she asserts in the first. Both conjuncts contain a direct evidential. The output of (5.5i) is a common ground c_1 restricted to worlds where the speaker is certain that Floyd won and structured by a relation that ranks p-worlds over $\neg p$-worlds, written $\langle c_1, \leq_p \rangle$ (see Figure 5.2, Section 5.2.1).

The second conjunct (5.5ii) contributes its own evidential restriction and illocutionary relation. The evidential restriction reduces the common ground c_1 to the set of worlds where the speaker is certain that $\neg p$, that Floyd did not win (written $CRT(i, \neg p)$ in Figure 5.5). The resulting common ground c_2 is one where the speaker is certain, based on direct evidence, that Floyd won and is also certain, based on direct evidence, that he did not win. This is probably already an empty set of worlds. In the unlikely case that any worlds remain in the common ground c_2, as in Figure 5.5, the contribution of the illocutionary relation will rule them out.
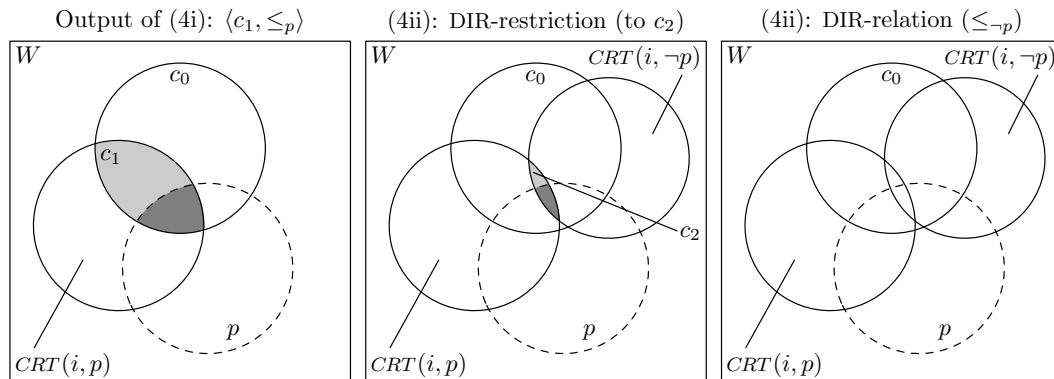
Figure 5.5: Infelicitous denial in (5.5ii) of (5.5i)

The illocutionary relation of (5.5ii) is the proposal to add to the common ground the at-issue proposition, here, $\neg p$, that Floyd did not win. This is represented as an ordering relation on the current context, c_2, where $\neg p$-worlds in c_2 are preferred over p-worlds in c_2. However, this is incompatible with the relation contributed by the first conjunct (5.5i), which ordered p-worlds over $\neg p$-worlds. The proposals of the two conjuncts contradict each other. In short, any context which supports (5.5i)

cannot support (5.5ii).

5.3   Formal Implementation

Hamblin (1973) analyzes English interrogatives like (5.6a) within Montague Grammar as sets of propositions, the set of possible direct answers, as in (5.6b), given in Ty_2 (Gallin 1975). To unify the rules for semantic composition and maintain a category to type correspondence, declarative sentences like (5.7a) are assimilated to this type of semantic object, analyzed as singleton sets of propositions, as in (5.7b).

(5.6)   a. Who won?

   b. $\lambda p[\ \exists x(\mathsf{person}(x) \wedge (p = \lambda w.\mathsf{won}(w, x)))]$

(5.7)   a. Floyd won.

   b. $\lambda p[\ p = \lambda w[\mathsf{won}(w, \mathsf{floyd})]]$

Translations (5.6b) and (5.7b) each represent (the characteristic function of) a set of propositions. The identity condition in each specifies which propositions, if any, are eligible to make it into the set. In the translation of the interrogative in (5.6b), the first conjunct imposes an additional restriction on this set: that x be a person.

   I propose to build on Hamblin's (1973) treatment of sentences as sets of propositions to distinguish the two contributions of sentences with evidentials. The key division is between what is part of the identity condition and what is a further restriction on the set of propositions. Consider Cheyenne (5.2) from Section 5.2.1, repeated below, and its proposed translation in (5.2′).

(5.2) *É-hó'tȧhéva-∅*   *Floyd.*
     3-win-DIR   Floyd
     'Floyd won, I'm sure.'

(5.2′) Hamblin-style representation of (evidential) declarative:

$$\lambda p[\ (p = \lambda w[won(w, floyd)]) \ \wedge \ CRT(v_0, i, p) \qquad \wedge \ p(v_0) \leq p(v_1)]$$
$$\qquad\qquad \text{(at-issue proposition)} \qquad \text{(ev. restriction)} \qquad \text{(ill. relation)}$$

The set characterized by (5.2′) is the singleton of the at-issue proposition if each condition is met, the empty set otherwise. Parallel to Hamblin's (1973) identity conditions in (5.6b) and (5.7b), the first conjunct of (5.2′) identifies the proposition that is eligible to make it into the set. This proposition is the scope of the evidential – the at-issue proposition or 'main point'. The second and third conjuncts in (5.2′), the evidential restriction and illocutionary relation, are further restrictions on this set of propositions, similar to the person restriction in (5.6b).

The two free variables in (5.2′), v_0 and v_1, are used to define the evidential restriction and illocutionary relation. The evidential restriction is defined in terms of an update function by binding the variable v_0. The illocutionary relation, modeled as a relation on the restricted common ground, is defined by binding both v_0 and v_1.

In the remainder of this section, I look in turn at sentences with direct evidentials, sentences with reportatives, and the conjunctions of such sentences. The representation for each sentence is given, as are the rules for interpretation. These formalizations make precise the analysis given in Section 5.2.

5.3.1 The Direct Evidential

The translation of sentence (5.2) is repeated below in (5.2′). The first conjunct represents the at-issue proposition, the scope of the evidential. In (5.2), the at-issue proposition is the proposition that Floyd won. The second conjunct in (5.2′) represents the evidential restriction. This is the evidential contribution, that the speaker is certain, based on direct evidence, that Floyd won. The final condition is the illocutionary relation. In (5.2′), the illocutionary relation represents the proposal

to add the at-issue proposition to the common ground by ordering worlds where the at-issue proposition is true over worlds where it is not.

(5.2′) $\lambda p[(p = \lambda w[\mathsf{won}(w, \mathsf{floyd})]) \wedge \mathsf{CRT}(v_0, i, p) \wedge p(v_0) \leq p(v_1)]$

So far, this implementation does not say anything about context change. However, an elementary update operation which represents the evidential restriction can be defined by binding the world variable v_0, as in Definition 1.

Definition 1 (Evidential Restriction). For a common ground c, a model $\mathcal{M}$, and an $(st)t$ term P, c updated with P is defined as:

$$c[P] = \{w \in c \mid \exists g \exists p \in D_{st}([\![\lambda v_0[P]]\!]^{\mathcal{M},g}(w) = \{p\})\}$$

This definition takes an input common ground and returns the subset where the not-at-issue assertion is true. If we apply this to (5.2′), we get result in (5.8). The full derivations for all examples in this section are given in Appendix A.

(5.8) $c_0[(5.2′)] = \{w \in c_0 \mid \exists g \exists p \in D_{st}([\![\lambda v_0[(5.2′)]]\!]^{\mathcal{M},g}(w) = \{p\})\}$

$\qquad = \{w \in c_0 \mid [\![\mathsf{CRT}]\!]^{\mathcal{M}}(w)([\![i]\!]^{\mathcal{M}})([\![\lambda w[\mathsf{won}(w, \mathsf{floyd})]]\!]^{\mathcal{M}}) = 1 \}$

$\qquad = c_1$

Sentence (5.2) interpreted in context c_0 yields c_1, the restriction of c_0 to worlds where the speaker is certain, based on personal experience, that Floyd won. Given Definition 1, the final conjunct of (5.2′), $p(v_0) \leq p(v_1)$, which specifies the content of the illocutionary relation, contributes a trivial requirement and here can be eliminated.

The illocutionary relation on the restricted common ground can be defined by binding both of the free variables v_0 and v_1, as in Definition 2.

Definition 2 (Illocutionary Relation). For a common ground c, worlds w, w', a model $\mathcal{M}$, and an $(st)t$ term P, w is P, c-related to w', written $w \, \mathcal{R}_{c,P} \, w'$, iff:

$$w, w' \in c \,\&\, [\![\lambda v_0 \lambda v_1[P]]\!]^{\mathcal{M}}(w)(w') \neq \varnothing$$

Definition 2 relates worlds in the input common ground according to the nature of the illocutionary relation, which depends on the morpheme that contributes it. In the examples, I replace $\mathcal{R}$ with $\leq$ or $\equiv$ depending on the properties of the relation. When applied to (5.2′), the result is an ordering relation, given in (5.9).

(5.9) $w \leq_{c_1,(5.2′)} w'$ iff $w, w' \in c_1$ & $[\![\lambda v_0 \lambda v_1[(5.2′)]]\!]^{\mathcal{M}}(w)(w') \neq \varnothing$

$$\text{iff} \quad w, w' \in c_1 \ \& \ [\![\lambda w[\mathsf{won}(w, \mathsf{floyd})]]\!]^{\mathcal{M}}(w)$$
$$\leq \ [\![\lambda w[\mathsf{won}(w, \mathsf{floyd})]]\!]^{\mathcal{M}}(w')$$

The ordering relation in (5.9) is one that ranks worlds in c_1 where Floyd won over worlds in c_1 where Floyd did not win.

5.3.2   The Reportative Evidential

The translation of (5.3), which contains a reportative evidential, is given in (5.3′). The structure of the translation parallels that of the direct evidential in (5.2′), representing the at-issue proposition, the evidential restriction, and the illocutionary relation.

(5.3)   *É-hó'táheva-**sėstse***   *Floyd.*
      3-win-RPT.3SG   Floyd
      'Floyd won, I hear.'

(5.3′) $\lambda p[\ (p = \lambda w[\mathsf{won}(w, \mathsf{floyd})]) \wedge \mathsf{HRD}(v_0, i, p) \wedge v_1 = v_1]$

The at-issue proposition for (5.3) is the same as that for (5.2): the proposition that Floyd won. What differentiates sentences with reportative evidentials from those with direct evidentials is the content of the additional conditions, the evidential restriction and the illocutionary relation. The evidential restriction in (5.3′) is to worlds where the speaker heard that Floyd won. The illocutionary relation ranks all c_1 worlds together as an equivalence class. All worlds in c_1 are equally preferred, representing the proposal to keep the common ground the same. The definitions of evidential

restriction and illocutionary relation given in Section 5.3.1 can be applied to the translation in (5.3′). The results are (5.10) and (5.11), respectively.

(5.10) $c_0[(5.3')] = \{w \in c_0 \mid [\![\mathsf{HRD}]\!]^{\mathcal{M}}(w)([\![i]\!]^{\mathcal{M}})([\![\lambda\mathsf{w}[\mathsf{won}(\mathsf{w},\mathsf{floyd})]]\!]^{\mathcal{M}}) = 1\} = c_1$

(5.11) $w \equiv_{c_1,(5.3')} w'$ iff $w, w' \in c_1$ & $w' = w'$

Ideally, the analysis of the reportative would explicitly draw attention to the at-issue proposition p. This is not represented in the current formulation: the illocutionary relation is trivial and does not depend on p outside of the evidential restriction. An implementation of the proposed analysis in a framework with propositional discourse referents (e.g., Stone 1999; Brasoveanu 2007a; Bittner to appear) could represent drawing attention to p by introducing a discourse referent for p.

5.3.3 Conjunctions as Sequential Update

Following the standard treatment of conjunction in dynamic semantics, I treat conjunctions as sequential update: the second conjunct is interpreted in the output of the first. Felicitous conjunctions are analyzed as compatible updates, infelicitous as incompatible updates. Recall conjunction (5.4) from Section 5.2.3 above. The first conjunct of (5.4) is (5.3), whose output common ground c_1 is (5.10), structured by (5.11). The second conjunct of (5.4) is translated as (5.12) (where 'he' is translated as z_1, assuming $g(z_1) = [\![\mathsf{floyd}]\!]^{\mathcal{M}}$). Interpreted in the common ground restricted by the first conjunct, c_1, (5.12) reduces c_1 to c_2 as in (5.13) and structures c_2 with (5.14).

(5.12) $\lambda\mathsf{p}[(\mathsf{p} = \lambda\mathsf{w}[\neg\mathsf{won}(\mathsf{w},\mathsf{z_1})]) \wedge \mathsf{CRT}(\mathsf{v_0},\mathsf{i},\mathsf{p}) \wedge \mathsf{p}(\mathsf{v_0}) \leq \mathsf{p}(\mathsf{v_1})]$

(5.13) $c_1[(5.12)] = \{w \in c_1 \mid [\![\mathsf{CRT}]\!]^{\mathcal{M}}(w)([\![i]\!]^{\mathcal{M}})([\![\lambda\mathsf{w}[\neg\mathsf{won}(\mathsf{w},\mathsf{z_1})]]\!]^{\mathcal{M},g}) = 1\} = c_2$

(5.14) $w \leq_{c_2,(5.12)} w'$ iff $w, w' \in c_1$ & $[\![\lambda\mathsf{w}[\neg\mathsf{won}(\mathsf{w},\mathsf{z_1})]]\!]^{\mathcal{M},g}(w)$

$$\leq [\![\lambda\mathsf{w}[\neg\mathsf{won}(\mathsf{w},\mathsf{z_1})]]\!]^{\mathcal{M},g}(w')$$

This is a compatible sequence of updates: c_2 in (5.13) is typically a non-empty set of worlds and the proposals in (5.11) and (5.14) are compatible: (5.4) is felicitous.

Contrast this with Cheyenne (5.5), which is contradictory. The first conjunct of (5.5) is (5.2), which is analyzed in Section 5.3.1. The output common ground c_1 is (5.8), structured by (5.9), both of which are repeated below.

(5.8) $c_0[(5.2')] = \{w \in c_0 \mid [\![\mathsf{CRT}]\!]^{\mathcal{M}}(w)([\![i]\!]^{\mathcal{M}})([\![\lambda w[\mathsf{won}(w,\mathsf{floyd})]]\!]^{\mathcal{M}}) = 1\} = c_1$

(5.9) $w \leq_{c_1,(5.2')} w'$ iff $w, w' \in c_1$ & $[\![\lambda w[\mathsf{won}(w,\mathsf{floyd})]]\!]^{\mathcal{M}}(w)$
$\leq [\![\lambda w[\mathsf{won}(w,\mathsf{floyd})]]\!]^{\mathcal{M}}(w')$

The second conjunct of (5.5) is the same as the second conjunct of (5.4), translated as (5.12). However, when interpreted relative to (5.8), (5.12) reduces c_1 to a typically empty set of worlds: worlds where the speaker is certain, based on direct evidence, that Floyd won and is also certain, based on direct evidence, that Floyd did not win. If any such worlds remain, they will be structured by an illocutionary relation which orders worlds where Floyd did not win over worlds where he won (as in (5.14)). This relation is necessarily incompatible with (5.9): (5.5) is contradictory.

5.4 Theory Comparison

5.4.1 Evidentials as Illocutionary Modifiers

One way evidentials have been analyzed is as illocutionary modifiers, operators which can add to or modify the felicity conditions of a speech act. This type of analysis was developed in Faller (2002) for the parenthetical-like evidentials in Cuzco Quechua, e.g., the direct $=mi$ (in (5.15) below) and the reportative $=si$ (in (5.16)).

(5.15) Faller (2002) analysis of Cuzco Quechua direct evidential (p. 167[5])

$$\textbf{=mi} \quad \begin{array}{l} \text{ASSERT}(p) \\ \text{SINC}= \{Bel(s,p)\} \end{array} \quad \mapsto \quad \begin{array}{l} \text{ASSERT}(p) \\ \text{SINC}= \{Bel(s,p), Bpg(s, Bel(s,p))\} \end{array}$$

(5.16) Faller (2002) analysis of Cuzco Quechua reportative evidential (p. 200)

$$\textbf{=si} \quad \begin{array}{l} \text{ASSERT}(p) \\ \text{SINC}= \{Bel(s,p)\} \end{array} \quad \mapsto \quad \begin{array}{l} \text{PRESENT}(p) \\ \text{SINC}= \{\exists s_2(Assert(s_2,p) \wedge s_2 \notin \{h,s\})\} \end{array}$$

On this illocutionary modifier approach, evidentials are functions from speech acts to speech acts.[6] The direct evidential, (5.15), maps an assertion with the sincerity condition that the speaker believes p ($Bel(s,p)$) to an assertion with an added sincerity condition – that the speaker has best possible grounds (Bpg) for her claim.

Unlike the direct evidential, the reportative evidential, (5.16), is "destructive" – it eliminates the sincerity condition of the original speech act, replacing it with a new one, and changes the force from an assertion to a 'presentation', a new type of speech act. Intuitively, (5.16) captures a problematic feature of the reportative: that it does not commit the speaker (either way) to the truth or falsity of the scope proposition. However, the implementation in Faller (2002) requires the introduction of a new speech act primitive. In the present analysis, no new primitive is required to capture this fact. In addition, the illocutionary relation contributed by the reportative fits into a semantic paradigm with the other evidentials and the illocutionary mood markers, e.g., question marking (see Chapter 6 and Murray 2010a).

In Faller (2002), the evidential contribution is analyzed as a sincerity condition. Given this, it is not clear that the analysis makes the correct empirical predictions. For the examples discussed in Chapter 3, Cuzco Quechua evidentials and Cheyenne evidentials behave equivalently. For example, the scope of the reportative can be

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[5]The denotation for the Cuzco Quechua direct evidential given in (5.15) is the one used throughout Faller (2002). A variation, SINC= $\{Bel(s,p), Bpg(s,p)\}$, is given once, in the introduction (p. 25).

[6]On this view, it seems that a sentence will have at least as many speech acts as evidentials. If so, this is a surprising result given certain evidentials can embed (Faller 2002, examples (183) and (213)).

false (Faller 2002; 193), but the reporting event is not deniable, as in Cuzco Quechua (5.17), from Faller (2002; 200, modified translation).

(5.17) # (i) *Para-sha-n=**si**,*   *ichaqa* (ii) *mana-**n** willa-wa-rqa-n-chu.*
        rain-PROG-3=RPT,   but   not-DIR   tell-1O-PST1-3-NEG
        # 'It's raining, I'm told, but I wasn't told this.'

Faller (2002) does not explicitly analyze Quechua (5.17), and it is not clear what the analysis would predict. As I understand the theory, the conjuncts are not contradictory. The only conflict would be between the sincerity condition of the first conjunct and the asserted propositional content of the second conjunct, predicting that (5.17) is merely insincere.[7] This is not strong enough. Cheyenne sentences like (5.17), e.g., (5.18), below, are contradictions, just like their English translations. The speaker denies in the second conjunct what she asserts in the first conjunct.

(5.18) #$_\perp$ (i) *É-hó'táheva-**séstse** Annie naa+oha*
           3-win-RPT.3SG   Annie   but
     (ii) *ná-sáa-néstó-he-**Ø***.
         1-NEG-hear.st-*h(an)e*-DIR
         #$_\perp$ 'Annie won, I hear, but I didn't hear that.'

Under the analysis proposed in this paper, Cheyenne (5.18), translated as (5.18′), is a contradiction. It is analyzed as an incompatible sequence of updates (instead of multiple speech acts). The first conjunct (5.18′i) results in a common ground c_1 restricted to worlds where the speaker heard the proposition p, that Floyd won, and structured by a relation that equally prefers p and $\neg p$-worlds.

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[7]Faller (2002; 200) calls (5.17) an "evidential version of Moore's paradox". However, this is somewhat misleading. In standard Moore's paradox sentences, e.g., *It's raining but I don't believe it*, the second conjunct conflicts with something which is not properly part of the first conjunct, e.g., a norm of assertion. However, in sentences like (5.17), the second conjunct conflicts with a morpheme in the first conjunct: the evidential. Moore's paradox sentences can be true, but not be felicitously asserted – they are pragmatically odd, but not contradictions. Sentences like (5.17) can never be true. A closer English parallel with (5.17) would be *It's raining, I believe, but I don't believe it.*

(5.18′)   i. $[\![\lambda p[\, (p = \lambda w[\text{won}(w, \text{floyd})]) \wedge \text{HRD}(v_0, i, p) \wedge v_1 = v_1]\!]^{\mathcal{M},g}$

ii. $[\![\lambda p[\, (p = \lambda w[\neg \text{HRD}(w, i, p_1)]) \wedge \text{CRT}(v_0, i, p) \wedge p(v_0) \leq p(v_1)]\!]^{\mathcal{M},g}$

$$(\text{where } g(p_1) = [\![\lambda w[\text{raining}(w)]\!]^{\mathcal{M}})$$

The evidential restriction in (5.18′ii) reduces the input common ground c_1 to worlds where the speaker is certain that she did not hear p. The result is the set of worlds where the speaker heard p but is also certain, based on direct evidence, that she did not hear p – this is probably already an empty set of worlds.

Even if any worlds remain, the illocutionary relation in (5.18′ii) is incompatible with (5.18′i). The illocutionary relation contributed by (5.18′ii) orders worlds were the speaker did not hear p (here, translated with the same predicate as the reportative, assuming it is a similar semantic relation) over worlds where the speaker heard p. However, all worlds in the common ground c_2, if there are any, are worlds where the speaker heard p, given the evidential restriction of (5.18′i). As a result, the relation will be necessarily empty – this is an incompatible sequence of updates.

One final observation is that the analysis proposed in this paper need not appeal to separate levels of semantic representation to distinguish the two contributions of evidentials. This simplifies the compositional semantics (see also Murray 2010a). In addition, there are examples that show the two contributions of evidentials are not completely independent of each other. For example, consider Cheyenne (5.19), where the reportative in the second sentence is interpreted as anaphoric to part of the propositional contribution of the first sentence.

(5.19) *Éšee-va   ná-éstsėstov-o-Ø   Dale.   É-hó'tȧheva-**sėstse** Annie.*
day-OBL   1-speak.to.s.o.-1:3-DIR   Dale   3-win-RPT.3SG   Annie
'Yesterday I spoke to Dale. [He says that] Annie won.'

More complex examples of the anaphoric properties of sentences with evidentials exist, see for example Cuzco Quechua (57) in Faller (2002; 69).

5.4.2 Evidentials as Modals with an Evidential Presupposition

Another approach to evidentials has been to treat them as modals with an evidential presupposition (e.g., Izvorski 1997; Matthewson et al. 2007). The evidential presupposition restricts the modal base to worlds where the speaker has the specified type of evidence for the scope proposition. This type of approach has been developed for evidentials that differ from parenthetical-like evidentials on some of the semantic diagnostics. For example, in St'át'imcets, which has modal-like evidentials, conjunctions like (5.4) are infelicitous (Matthewson et al. 2007). That is, the scope of the reportative must be (at least) an open possibility.

While there is genuine cross-linguistic variation in the behavior of evidentials, in all languages the evidential contribution is typically new information. It is thus problematic to analyze it as a presupposition, which is typically old information. Treating the evidential contribution as a presupposition predicts that evidentials should behave similar to, e.g., English verbs like *learn*, which presuppose their complement. However, this is not the case. It is odd to use verbs like *learn* with information that is not familiar or (discourse) old: *#John learned that the Earth is flat.* Sentences with evidentials do not elicit this type of reaction, even though the speaker's source of information is typically not familiar or discourse old.

Faller (2002) points out an additional empirical worry for this type of approach. Specifically, given the analysis in Izvorski (1997) evidentials should only be felicitous when the speaker does not know whether the scope proposition is true and judges her evidence source reliable. If the speaker does not think the source is reliable, or does not know, evidentials are infelicitous (§3.5.2).

On the evidential presupposition approach and the illocutionary modifier approach, evidentials across languages, and even within a language, are very dissimilar sorts of things. There are real cross-linguistic differences in the behavior of eviden-

tials, but there are also many commonalities. On the approach proposed in this paper, these differences can be expressed as a matter of detail, while treating evidentials as a natural semantic class. For example, take a language where sentences like (5.4) (*Floyd won, I hear, but I'm certain he didn't*) are infelicitous. A candidate translation for 'Floyd won-RPT' in such a language is (5.20):

(5.20) $\lambda p[(p = \lambda w[won(w, floyd)]) \land \text{HRD}(v_0, i, p)$

$\land \lambda w[\exists w'(wRw' \land p(w'))](v_0) \leq \lambda w[\exists w'(wRw' \land p(w'))](v_1)]$

The at-issue proposition and evidential restriction in (5.20) are the same as in (5.3′), the translation of a Cheyenne sentence with a reportative. Crucially, the illocutionary relation in (5.20) differs from (5.3′). It represents the proposal to add the possibility of p to the common ground, where possibility is represented as existential quantification over worlds restricted by an accessibility relation (e.g., Kripke 1963). The translation in (5.20) is merely a first approximation, but it seems promising. The possibility of extending the proposed analysis to other languages deserves careful consideration and will have to be left for future research.

5.4.3   Conventional Implicature (Potts 2005)

Though Potts (2005) does not offer an account of evidentials, they share many properties with conventional implicatures (henceforth CIs), e.g., they are discourse-new, speaker oriented, and never take scope under propositional operators. However, Potts (2005) argues that CIs are "logically and compositionally independent" of the at-issue content (p. 11). This is not true of evidentials, and Amaral et al. (2007) argue there is actually more interaction between CIs and at-issue content than Potts (2005) predicts. Like Potts (2005), who proposes a multidimensional system, the analysis proposed in this paper is an attempt to model the at-issue/not-at-issue distinction. However, the ways of modeling this distinction diverge non-trivially.

Two questions come to mind. First, how would a treatment of evidentials look along the lines of Potts (2005)? As Amaral et al. (2007) point out, for Potts (2005), both the at-issue content and CIs end up contributing entailed propositions, which add the same kind of information to the common ground. Given this, it is not clear how Potts (2005) would account for data containing the reportative evidential, most crucially the felicity of (5.4). Furthermore, it is unclear how the analysis would account for the fact that the propositional contribution of sentences with evidentials is directly challengeable and negotiable while the evidential contribution is neither. In the analysis proposed here, this is a difference in the nature of the update, whether it reduces the common ground or imposes structure on it. Lastly, on a very general note, for Potts (2005) the two dimensions (at-issue and CI) are in principle logically and compositionally independent. Thus, it is not clear how the analysis would account for interactions between the two dimensions, such as the anaphora in (5.19). While the implementation used in this paper is not designed to model anaphora, the proposed analysis could be implemented in various frameworks.

Second, would the proposed analysis work for CIs? Take, for example, the sentence *Tivi, who is a cat, enjoys chasing her tail*, which contains a non-restrictive (supplemental) relative. The proposed analysis might be applied as follows. The relative *who is a cat* would contribute to the restriction, the not-at-issue component of assertion, which directly updates the common ground. (Above, I called this the 'evidential restriction', but it could be generalized.) This would account for the fact that the supplemental is not directly challengeable, like evidentials. The illocutionary relation, potentially contributed by declarative intonation, would represent the proposal to add the at-issue proposition, that Tivi enjoys chasing her tail, to the common ground. It remains to be seen to what extent the proposed analysis can account for the nuances of the data discussed in Potts (2005). But it would take into account the effect of CIs on the common ground, and so seems worth exploring.

Chapter 6

A Hamblin Semantics for Evidentials and Questions

Contents

6.1 Introduction

In Chapter 4, I proposed a general analysis of speech acts that has three components: the presentation of the at-issue proposition, a not-at-issue component, which directly restricts the common ground, and an at-issue component, which represents a proposal to update the common ground. In Chapter 5, I proposed a formal implementation of this analysis which captures two of these three components: the at-issue component, modeled as a negotiable update to the common ground, and the not-at-issue component, modeled as a non-negotiable update. I used this implementation to analyze

evidentials in declarative sentences in Cheyenne, accounting for various properties, including the different commitments to the at-issue proposition contributed by different evidentials and the defeasibility of the reportative's scope.

In this chapter, I extend this implementation to polar questions in Cheyenne and their interaction with evidentials. I propose that the distinction between what is at-issue and what is not is also present in questions, and that it can be modeled in the same way. Specifically, both declarative and interrogative restrict and structure the common ground. The restriction is based on the not-at-issue component while the structuring relation is based on the at-issue component. These contributions are called an evidential restriction and an illocutionary relation, respectively.

The proposed analysis utilizes aspects of two existing approaches to the semantics of questions. On one approach, questions are analyzed as sets of possible direct answers (Hamblin 1973; Karttunen 1977). On the other, questions are analyzed as partitions on a set of worlds (Groenendijk and Stokhof 1984b), in some versions a partition on the common ground (Groenendijk 1999). I build on Hamblin's (1973) analysis of sentences as sets of propositions to distinguish what is at-issue from what is not. In addition, I analyze the structuring relation contributed by interrogatives as an equivalence relation on the common ground, following Groenendijk and Stokhof (1984b) and Groenendijk (1999).

This Chapter is structured as follows. In Section 6.2, I review the analysis of polar interrogatives given in Chapter 4 ,analyzing them as also contributing an evidential restriction and an illocutionary relation. Section 6.3 is the formal implementation of this proposal, based on the analysis of interrogative and declarative sentences in Hamblin (1973). Section 6.4 is the conclusion.

6.2 Evidentials and Polar Questions

In Cheyenne, there are two ways to form polar questions: with the interrogative mood and an interrogative clitic. (See Chapter 2 for further details.) The interrogative mood morphologically alternates with evidentials and is thus incompatible with them. However, evidentials can occur with the interrogative clitic.

These two types of polar questions have different felicitous answers. Questions formed with the interrogative mood suffix -*he* can be answered with any evidential. For example, (6.1Q) can be answered by either (6.1A$_1$), which contains a reportative evidential, or (6.1A$_2$), which contains a direct evidential.

(6.1) Q: *É-némene-**he** Floyd*
       3-sing-Y/N   Floyd
       'Did Floyd sing?'/'Given your evidence, did Floyd sing?'

   ✓A$_1$: *Héehe'e é-némene-**sėstse***   ✓A$_2$: *Héehe'e é-néméne-**Ø***
       Yes   3-sing-RPT.3SG   Yes   3-sing-DIR
       'Yes, he sang, I hear.'   'Yes, he sang, I'm sure.'

(6.2) Q: *Mó=é-némene-**sėstse** Floyd*
       y/n=3-sing-RPT.3SG   Floyd
       'Given what you heard, did Floyd sing?'

   ✓A$_1$: *Héehe'e é-némene-**sėstse***   #A$_2$: *Héehe'e é-néméne-**Ø***
       Yes   3-sing-RPT.3SG   Yes   3-sing-DIR
       'Yes, he sang, I hear.'   'Yes, he sang, I'm sure.'

In questions formed with the clitic *mó=*, such as (6.2Q), the evidential specifies the type of evidence for the requested answer. The question (6.2Q) contains a reportative evidential and only (6.2A$_1$), which also contains a reportative evidential, is a felicitous answer. (6.2A$_2$), which contains a direct evidential, is not a felicitous answer to (6.2Q).

Though Cheyenne evidentials scope out of certain operators, like modals, the polar interrogative clitic in (6.2Q) must have wide scope. That is, (6.2Q) has only the ques-

tion interpretation given in (6.2Q). It cannot be interpreted as a reported question, e.g., '[she] asked, did Floyd sing?', an attested interpretation of parenthetical-like reportative evidentials in content questions (Faller 2002; Bittner 2008).

6.2.1 Polar Questions with the Interrogative Clitic

Cheyenne questions formed with the polar interrogative clitic $mó=$, as in (6.3Q), are compatible with evidentials. The evidential specifies the type of evidence that felicitous answers can be based on. In (6.3) (abbreviated from (8.7)) the clitic $mó=$ occurs with the reportative evidential. Question (6.3Q) is felicitous in a context where it is clear the addressee will have reportative evidence for her answer. For example, imagine a context where Annie overhears Dale on the telephone. Dale asks the person on the telephone "Did Floyd sing?" Annie hears this question, but not the answer. However, she expects that Dale will have reportative evidence for the answer, whatever it is (e.g., yes, he sang, or no, he didn't sing). When Dale gets off the phone, she can ask him (6.3).

(6.3) Q: *Mó=é-némene-**séstse*** *Floyd*   A$_1$: ✓yes, 3-sing-RPT
           y/n=3-sing-RPT.3SG   Floyd   A$_2$: # yes, 3-sing-DIR
           'Given what you heard, did Floyd sing?'

Felicitous answers to (6.3Q) will contain the reportative, as in (6.3A$_1$), with the evidential anchored to the addressee (not the speaker) of the question.

I propose an analysis of $mó=$ questions parallel to the analysis of declarative sentences with evidentials given in Chapter 5. (6.3Q) contributes both an evidential restriction and an illocutionary relation. The evidential restriction reduces the input common ground c_0 to the worlds where either the addressee u heard the proposition p that Floyd sang (written $HRD(u, p)$, in Figure 6.1, below) or the addressee u heard that $\neg p$ (written as $HRD(u, \neg p)$). However, question (6.3Q) is only felicitous in such a context – one where it is clear the addressee has reportative evidence for her answer,

whatever her answer is. That is, the evidential restriction of (6.3Q) must be entailed by the input common ground – it is a presupposition in the sense of Stalnaker (1973) and the common ground c_0 remains unchanged.
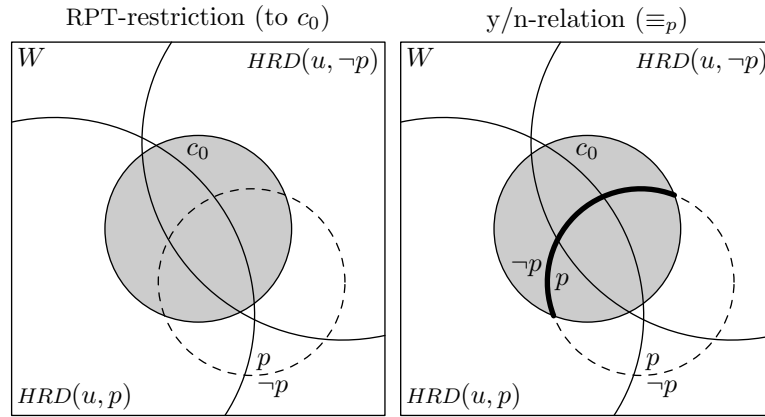
Figure 6.1: The two contributions of (6.3Q): y/n=3-sing-RPT.3SG Floyd

The illocutionary relation contributed by (6.3Q) represents a question, which can be thought of as the proposal to either add p, the proposition that Floyd sang, or $\neg p$ to the common ground (as in Groenendijk 2009). Following the analysis of polar questions in Groenendijk and Stokhof (1984b), I propose to model this illocutionary relation as an equivalence relation on the current common ground c_0: $\langle c_0, \equiv_p \rangle$. The output is a common ground that is (vacuously) restricted (it entails the evidential restriction) and structured (by the illocutionary relation). Possible answers to this question are either p or $\neg p$ with the reportative evidential, e.g., (6.3A$_1$) *'Yes, he sang, I hear'* but not (6.3A$_2$) *'Yes, he sang, I'm sure'*.

6.2.2 Polar Questions with Interrogative Mood

The other strategy for forming polar questions in Cheyenne involves the illocutionary mood suffix *-he*. As part of the illocutionary mood paradigm, evidentials are in morphological alternation with the (polar) interrogative mood suffix *-he*. As a result, *-he* questions are incompatible with evidentials. In contrast to *mó=* questions, questions

formed with the interrogative mood suffix -*he* allow answers with any evidential. For example, in (6.4) (abbreviated from (8.4)) a -*he* question (6.4Q) can be answered with a reportative evidential, e.g., (6.4A$_1$), or a direct evidential, e.g., (6.4A$_2$).

(6.4) Q: *É-némene-**he** Floyd*   A$_1$: ✓ *yes, 3-sing*-RPT
3-sing-Y/N   Floyd   A$_2$: ✓yes, 3-sing-DIR
'Given your evidence, did Floyd sing?'

I propose that Cheyenne questions formed with the interrogative mood suffix -*he* be analyzed as contributing both an evidential restriction and an illocutionary relation, just like declarative sentences with evidentials. The evidentials and the y/n interrogative suffix are thus analyzed as forming a natural semantic class.

For (6.4Q), the evidential restriction reduces the input common ground c_0 to worlds where either the addressee u has some type of evidence for the proposition p, that Floyd sang, (written as $R_{EVI}(u, p)$, shown in Figure 6.2, below) or the addressee u has some type of evidence for $\neg p$ (written as $R_{EVI}(u, \neg p)$). However, question (6.4Q) is only felicitous in such a context – one where it is clear the addressee has some type of evidence for their answer, whatever the answer is. That is, the evidential restriction of (6.4Q) must be entailed by the input common ground c_0 – it is a presupposition in the sense of Stalnaker (1973) and the common ground c_0 remains unchanged.
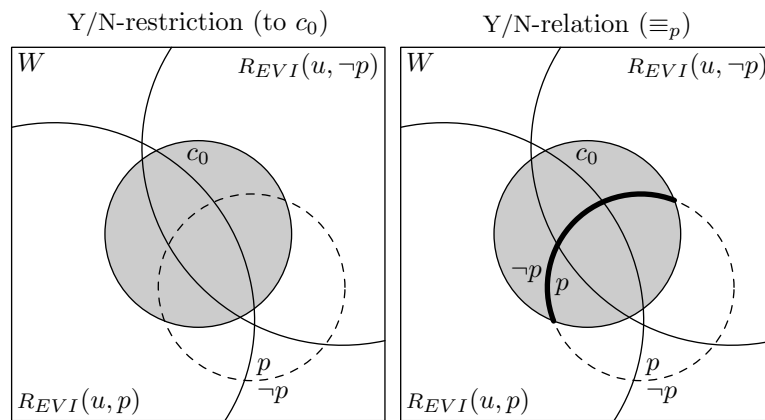
Figure 6.2: The two contributions of (6.4Q): 3-sing-Y/N Floyd

The illocutionary relation contributed by (6.4Q) represents a question, which, like the Cheyenne question formed with $mó=$ in (6.3Q), can be thought of as the proposal to either add p or to add $\neg p$ to the common ground. I propose to model the illocutionary relation contributed by (6.4Q) as an equivalence relation on the current context c_0: $\langle c_0, \equiv_p \rangle$. The output is a common ground that is trivially restricted (it entails the evidential restriction) and structured (by the illocutionary relation). Possible answers to this question are either p or $\neg p$ with any evidential, including (6.4A$_1$) *'Yes, he sang, I hear'* or (6.4A$_1$) *'Yes, he sang, I'm sure'*.

6.3 Formal Semantic Representation

I implement the above analysis of questions in Cheyenne by building on the analysis of evidentials in declarative sentences as implemented in Chapter 5. That implementation in turn builds on the analysis of interrogative and declarative sentences in Hamblin (1973), where both are treated as sets of propositions, as in (6.5), given in Ty$_2$ (Gallin 1975). An interrogative sentence is treated as the set of possible (direct) answers to the question, as in (6.5a), while a declarative sentence is treated as the (at most) singleton set of the proposition expressed, as in (6.5b).

(6.5)   a. Who sang? $\rightsquigarrow$ $\lambda p.\ \exists x(\mathsf{person}(x) \wedge (p = \lambda w.\mathsf{sang}(w, x)))$

   b. Floyd sang. $\rightsquigarrow$ $\lambda p.\ (p = \lambda w.\mathsf{sang}(w, \mathsf{floyd}))$

Each translation in (6.5) represents (the characteristic function of) a set of propositions. The identity condition specifies which proposition(s), if any, will make it into the set. The interrogative in (6.5a) has an additional restriction: the first conjunct, that x be a person. In addition to the identity condition, this person restriction affects which propositions make it into the set.

I propose to build on Hamblin's (1973) analysis to capture both the distinction between the two contributions of sentences with evidentials and the semantic parallels

between evidentials and illocutionary moods in Cheyenne. Consider the Hamblin-style translation in (6.7) of Cheyenne (6.6) from Chapter 5. Like in (6.5), (6.7) contains an identity condition, which identifies the at-issue proposition. In addition, (6.7) is enriched with further conditions, similar to the person restriction in (6.5a): an evidential restriction (second conjunct) and an illocutionary relation (third conjunct).

(6.6) *É-néméne-Ø*   *Floyd*
       3-sing-DIR   Floyd
       'Floyd sang, I'm sure.'

(6.7) $\lambda p[(p = \lambda w.\mathsf{sang}(w, \mathsf{floyd})) \wedge \mathsf{CRT}(v_0, i, p) \wedge p(v_0) \leq p(v_1)]$

The set characterized by (6.7) is the singleton of the at-issue proposition if each of the three conditions is met, the empty set otherwise. The translation in (6.7) contains two free variables, v_0 and v_1, which are used to define the evidential restriction and illocutionary relation. I use the constants i and u for the speaker and the addressee, respectively, and the assignment function to represent the other features of the context.

So far, the implementation does not say anything about context change. However, an elementary update operation can be defined by binding the variable v_0:

Definition 1 (Evidential Restriction). For a common ground c, a model $\mathcal{M}$, and an $(st)t$ term P, c updated with P is defined as:

$$c[P] = \{w \in c \mid \exists g \exists p \in D_{st}([\![\lambda v_0.P]\!]^{\mathcal{M},g}(w) = \{p\})\}$$

This definition takes an input common ground and returns the subset of worlds where the evidential restriction is true. In declarative sentences, this amounts to a nontrivial restriction where the common ground is reduced; it is an assertion of the not-at-issue proposition (evidential contribution). In questions, this amounts to a trivial restriction; it represents the presupposition of the not-at-issue proposition.

For example, take Definition 1 applied to (6.7), the translation of (6.6), a declarative sentence with a direct evidential:

$$(6.8) \quad c_0[(6.7)] \; = \; \{w \in c_0 \mid \exists g \exists p \in D_{st}(\llbracket \lambda \mathsf{v_0}.(6.7) \rrbracket^{\mathcal{M},g}(w) = \{p\})\}$$
$$= \{w \in c_0 \mid \llbracket \mathsf{CRT} \rrbracket^{\mathcal{M}}(w)(\llbracket i \rrbracket^{\mathcal{M}})(\llbracket \lambda \mathsf{w}.\mathsf{sang}(\mathsf{w}, \mathsf{floyd}) \rrbracket^{\mathcal{M}}) = 1\}$$
$$= c_1$$

Interpreted in context c_0, Definition 1 applied to (6.7) returns c_1, the restriction of c_0 to worlds where the speaker is certain (based on personal experience) that Floyd sang.[1]

The illocutionary relation structures the restricted common ground. This relation on the common ground can be defined by binding both $\mathsf{v_0}$ and $\mathsf{v_1}$:

Definition 2 (Illocutionary Relation). For a common ground c, worlds w, w', a model $\mathcal{M}$, and an $(st)t$ term P, w' is P, c-related to w, written $w' \mathcal{R}_{c,P} \, w$,[2] iff:

$$w, w' \in c \; \& \; \llbracket \lambda \mathsf{v_0}.\lambda \mathsf{v_1}.P \rrbracket^{\mathcal{M}}(w)(w') \neq \varnothing$$

The nature of the illocutionary relation depends on the morpheme that contributes it. In the examples, I replace $\mathcal{R}$ with the symbol for an ordering relation ($\geq$) or an equivalence relation ($\equiv$), depending on the properties of the relation.[3] For example, Definition 2 applied to (6.7) yields an ordering relation ($\geq_{c_1,(6.7)}$), given in (6.9). The input common ground c_1 is the restricted common ground defined in (6.8).

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[1] In this definition, the final conjunct of (6.7), $\mathsf{p}(\mathsf{v_0}) \leq \mathsf{p}(\mathsf{v_1})$, which specifies the content of the illocutionary relation, contributes a trivial requirement and can be eliminated.

[2] These subscripts do not directly correspond to the ones in the diagrams in 6.2, which indicate what the relation informally depends on (the at-issue proposition or the input context alone).

[3] I use the symbol '$\leq$' for a relation that is reflexive, transitive, and antisymmetric (ordering relation) and the symbol '$\equiv$' for a relation that is reflexive, transitive, and and symmetric (equivalence relation).

(6.9) $w' \geq_{c_1,(6.7)} w$ iff $w, w' \in c_1$ & $[\![\lambda v_0.\lambda v_1.(6.7)]\!]^{\mathcal{M}}(w)(w') \neq \varnothing$

$$\text{iff} \quad w, w' \in c_1 \text{ \& } [\![\lambda w.\mathsf{sang}(w, \mathsf{floyd})]\!]^{\mathcal{M}}(w)$$

$$\leq \; [\![\lambda w.\mathsf{sang}(w, \mathsf{floyd})]\!]^{\mathcal{M}}(w')$$

The ordering relation in (6.9) ranks worlds in c_1 where Floyd sang over worlds in c_1 where Floyd did not sing. This ordering represents the proposal to add the proposition that Floyd sang to the common ground c_1. If this proposal is accepted, c_1 will be further restricted to the top-ranked worlds, the worlds where Floyd sang.

The translations of the other Cheyenne sentences have structures similar to (6.7). Declarative sentences with other evidentials have the same at-issue proposition but both the evidential restriction and the illocutionary relation differ. For example, consider the translation in (6.11) of (6.10), a declarative sentence with a reportative evidential.

(6.10)   *É-némene-**sėstse***   *Floyd*
        3-sing-RPT.3SG   Floyd
        'Floyd sang, I hear.'

(6.11) $\lambda p. (p = \lambda w.\mathsf{sang}(w, \mathsf{floyd})) \wedge \mathsf{HRD}(v_0, i, p) \wedge v_1 = v_1$

Like in (6.7), the at-issue proposition in (6.11) is the proposition that Floyd sang. In (6.11), the evidential restriction is to worlds where the speaker heard that Floyd sang. The illocutionary relation is a trivial identity relation, which results in an equivalence relation that ranks all c_1 worlds together as an equivalence class. This relation represents the fact that there is no proposal to add the at-issue proposition to the common ground. However, this implementation does not capture the intuition that the at-issue proposition is 'presented' (Faller 2002). In an implementation of this proposal in a dynamic framework with propositional discourse referents (e.g., Stone 1999; Brasoveanu 2007a; Bittner 2008), this intuition could be formalized as the introduction of a discourse referent for the at-issue proposition.

Following Hamblin's (1973) analysis of English interrogatives, I analyze Cheyenne interrogatives as denoting potentially non-singleton sets of proposition. They are translated with the same three components as declarative sentences: an identification condition, an evidential restriction, and an illocutionary relation. For example, consider the translation (6.13) of (6.12), an interrogative formed with the clitic $mó=$ ('y/n=').

(6.12)   Q: *Mó=é-némene-**séstse**   Floyd*   A$_1$: ✓ yes, 3-sing-RPT
         y/n=3-sing-RPT.3SG   Floyd   A$_2$: # yes, 3-sing-DIR
         'Given what you heard, did Floyd sing?'

(6.13) $\lambda p.(p = \lambda w.\mathsf{sang}(w, \mathsf{floyd}) \vee p = \lambda w.\neg \mathsf{sang}(w, \mathsf{floyd}))$

$\wedge \; \mathsf{HRD}(v_0, u, p) \wedge \; p(v_0) = p(v_1)$

Unlike the declarative sentences, the identification condition of interrogatives will admit more than one proposition. The set characterized by (6.13) can contain both the proposition that Floyd sang and the proposition that Floyd did not sing – the at-issue content of the answers to (6.12). The evidential restriction in (6.13) is contributed by the reportative evidential; it is the same as in (6.11) but is anchored to the addressee u. It restricts the common ground to worlds where the addressee u has reportative evidence for her answer, whatever that answer is. However, question (6.12) is only felicitous in such contexts, so this restriction is trivial. Definition 1 applied to (6.13) yields (6.14).

(6.14) $c_0[(6.13)] = \{w \in c_0 \mid \exists g \exists p \in D_{st}(\llbracket \lambda v_0.(6.13) \rrbracket^{\mathcal{M},g}(w) = \{p\})\}$

$= \{w \in c_0 \mid \llbracket \mathsf{HRD} \rrbracket^{\mathcal{M}}(w)(\llbracket u \rrbracket^{\mathcal{M}})(\llbracket \lambda w.\mathsf{sang}(w, \mathsf{floyd}) \rrbracket^{\mathcal{M}}) = 1$

$\vee \llbracket \mathsf{HRD} \rrbracket^{\mathcal{M}}(w)(\llbracket u \rrbracket^{\mathcal{M}})(\llbracket \lambda w.\neg \mathsf{sang}(w, \mathsf{floyd}) \rrbracket^{\mathcal{M}}) = 1\}$

$= c_0$

The evidential restriction of (6.13) is a presupposition in the sense of Stalnaker (1973); it is entailed by the input common ground. Yet, the proposed translations do not rep-

resent the difference between a presupposition and an assertion. For example, there is no indication in (6.13) that the evidential restriction is a presupposition. However, an implementation of the current proposal in an existing dynamic theory of presupposition (e.g., van der Sandt 1992; Beaver 2001) could represent this distinction.

Definition 2 applied to (6.13) returns the relation in (6.15).

(6.15) $\quad w' \equiv_{c_0,(6.13\text{b})} w \quad$ iff $\quad w, w' \in c_0$ & $[\![\lambda\mathsf{v}_0.\lambda\mathsf{v}_1.(6.13\text{b})]\!]^{\mathcal{M}}(w)(w') \neq \varnothing$

$$\text{iff} \quad w, w' \in c_0 \ \& \ [\![\lambda\mathsf{w}.\mathsf{sang}(\mathsf{w}, \mathsf{floyd})]\!]^{\mathcal{M}}(w)$$
$$= [\![\lambda\mathsf{w}.\mathsf{sang}(\mathsf{w}, \mathsf{floyd})]\!]^{\mathcal{M}}(w')$$

The illocutionary relation in (6.15) is an equivalence relation, following Groenendijk and Stokhof (1984b). It partitions worlds in the input common ground c_0 into two cells: worlds where Floyd sang and worlds where Floyd did not sing. This analysis of Cheyenne questions merges two approaches to the semantics of questions, typically seen as competitors: questions as sets of answers (Hamblin 1973) and questions as partitions (Groenendijk and Stokhof 1984b). Both innovations are used, and both are needed: the set of propositions specifies what is at issue and allows the addressee to bear the evidential relation to either answer. The equivalence relation structures the common ground, representing the proposal to either add p or to add $\neg p$ to the common ground (see also Groenendijk 2009).

Interrogatives formed with the illocutionary mood suffix -*he* ('-Y/N') are analyzed as having the same identification conditions and illocutionary relation as interrogatives formed with *mó=*. However, -*he* interrogatives contribute a different evidential restriction. For example, the translation of (6.16) is given in (6.17).

(6.16) Q: *É-némene-**he** Floyd* A_1: ✓*yes, 3-sing*-RPT
        3-sing-Y/N   Floyd A_2: ✓*yes, 3-sing*-DIR
      'Given your evidence, did Floyd sing?'

(6.17) $\lambda p.(p = \lambda w.\text{sang}(w, \text{floyd}) \vee p = \lambda w.\neg\text{sang}(w, \text{floyd}))$

$\qquad \wedge\ R_{\text{EVI}}(v_0, u, p)\ \wedge\ p(v_0) = p(v_1)$

The illocutionary relation in (6.17) is an equivalence relation like in (6.13): it partitions the worlds in the common ground into two cells: worlds where Floyd sang and worlds where Floyd did not sing. The evidential restriction in (6.17) is a variable over evidential predicates, $R_{\text{EVI}}(v_0, u, p)$, representing the fact that *-he* questions can be answered by any evidential.[4]

6.4   Conclusions

In Cheyenne, evidentials and the polar interrogative mood marker belong to the same illocutionary mood paradigm. The presented analysis treats the morphemes in this paradigm as a natural semantic class. They are analyzed as grammatically encoding a distinction between what is at-issue and what is not. This distinction is modeled as the difference between restricting the common ground (with the evidential restriction) and structuring it (with the illocutionary relation).

The evidential restriction in declarative sentences amounts to an assertion about the type of evidence the speaker has for the scope proposition. This new information is not-at-issue, non-negotiable, and is added directly to the common ground. The evidential restriction in interrogative sentences amounts to a presupposition about the type of evidence the addressee of the question has for her answer. This not-at-issue information must be entailed by the input common ground. The evidential restriction accounts for the difference in felicitous answers for the two types of polar

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[4]Alternatively, the variable over evidential restrictions $R_{EVI}(v_0, u, p)$ could be left out of the translation of (6.4). This may be desirable given the goal of extending the proposed analysis to other illocutionary moods, which may not contribute an evidential restriction. However, it would complicate the answerhood relation and would treat Cheyenne *-he* questions like basic English polar questions.

interrogatives: *-he* questions, which can be answered with any evidential, and *mó=* questions, which restricts answers to ones containing the evidential from question.

The proposed analysis distinguishes the evidential and propositional contributions without positing a separate level of illocutionary meaning (contra Faller 2002). Furthermore, it accounts for the intuitions that the information contributed by the evidential in declarative sentences is new, not presupposed (contra Izvorski 1997; Matthewson et al. 2007), and that both contributions affect the truth conditions (contra Faller 2002). Though not discussed here, the proposed analysis is also compositional (like Hamblin 1973), with the exception of the translation of *mó=* (see Murray (2010a)).

Chapter 7

Evidentials in Update Semantics

Contents

7.1 Introduction

In Chapter 4, I argued for an analysis of Cheyenne evidentials that implies a more articulated theory of speech acts. Central to this analysis is a distinction between at-issue and not-at-issue content. In particular, I argue for speech acts being composed of three contributions: the presentation of the at-issue proposition, a non-negotiable update that directly restricts the common ground, and a negotiable update that imposes structure on the common ground. In assertions, for example, the structure

imposed on the restricted common ground is an ordering relation that represents the proposal to update the common ground in a certain way. In Chapters 5 and 6, I proposed a formal implementation aimed at capturing the latter two components: information which is directly added to, or imposed on, the common ground (not-at-issue restriction) and information which is proposed to be added to the common ground (illocutionary relation).

In this chapter, I give an implementation of all three components in an update semantics with individual and modal discourse referents: Update with Centering (Bittner to appear, 2010). I model the first component, the presentation of the at-issue proposition, as the introduction of a propositional discourse referent. This modeling of anaphora allows for an account of certain facts not captured by the implementation presented in Chapters 5 and 6.

For example, in some evidential systems, discourses of the form 'p-RPT & $(\neg p)$-DIR' are coherent (e.g., Faller 2002; Murray 2010b), like English discourses with parentheticals, e.g., *Annie won, they say, but I'm certain she didn't.* The analysis of such parenthetical-like reportatives remains a puzzle. The illocutionary modifier analysis of Faller (2002) requires a new speech act primitive, PRESENT, which is not independently motivated and therefore not explanatory. The not-at-issue assertion analysis presented above in Chapter 5 does not require any ad hoc stipulations, but it captures only the deniability of the reportative's scope, not the intuition that this proposition is merely 'presented', introduced without the speaker endorsing its truth, falsity, or possibility.

The implementation proposed in this chapter captures the intuition that sentences with reportatives merely present the at-issue proposition: all speech acts involve this presentation. However, sentences with reportatives are a special case because there is no proposal to update the common ground with the at-issue proposition.

Presentation of the at-issue proposition is modeled as the introduction of a propo-

sitional discourse referent for that proposition. However, no other propositional discourse referents are introduced – crucially, not for the evidential contribution. Thus, facts about the non-challengeability of the evidentials themselves fall out as a special case of propositional anaphora.

This chapter is structured as follows. In Section 7.2, I introduce a fragment of Update with Centering (Bittner to appear), illustrating the properties of this system that are key to implementing the analysis. This fragment is explicitly defined as UC_ω in Bittner (2010); the definitions are reproduced in Appendix B. In Section 7.3, I give the implementation of structured assertion in UC_ω and discuss the contribution of evidentials. Conjunctions are analyzed in Section 7.4. In Section 7.5 I discuss the challengeability tests and the implications of the proposed treatment of propositional anaphora. Section 7.6 is a summary.

7.2 Framework: Update with Centering

In this section, I introduce Update with Centering (Bittner to appear, 2010), an update semantics that models centering-based discourse reference (for work on centering, see also Grosz et al. 1995; Hardt 1996; Stone and Hardt 1999; Hardt 2004; a.o.). In particular, I introduce a fragment of Update with Centering (UC) that has discourse referents for individuals, worlds, and propositions. This fragment is called Update with Modal Centering, abbreviated UC_ω. Before moving on to the details, I'd like to give a brief account of the motivation for such a framework, in abstract of the present analysis.

The essential feature of update semantics is summarized in the following quote:

> "The standard definition of logical validity runs as follows: An argument is valid if its premises cannot all be true without its conclusion being true as well. Most logical theories developed so far have taken this definition of validity as their starting point. Consequently, the heart of these theories consists in a

specification of truth conditions. The heart of the theories developed in this paper does not consist in a specification of truth conditions. The slogan 'You know the meaning of a sentence if you know the conditions under which it is true' is replaced by this one: 'You know the meaning of a sentence if you know the change it brings about in the information state of anyone who accepts the news conveyed by it'. Thus, meaning becomes a dynamic notion: the meaning of a sentence is an operation on information states." (Veltman 1996; p.221)

In particular, in update semantics meaning is a function from information states to information states. This view of meaning is particularly interesting when we consider evidentials. Consider again the proposed slogan of update semantics: "'You know the meaning of a sentence if you know the change it brings about in the information state of anyone who accepts the news conveyed by it"' (Veltman 1996; p.221). When meaning is thought of like this, evidentials seem to fit naturally into the picture: they are support for the main point of the sentence. They encode the source of information the speaker has for the at-issue proposition, and no doubt play a role in what the news is and whether or not it is accepted.

The second key component of UC is that it models discourse reference. The following quote from Karttunen (1976) describes the basic idea of what a discourse referent is.

"Consider a device designed to read a text in some natural language, interpret it, and store the content in some manner, say, for the purpose of being able to answer questions about it. To accomplish this task, the machine will have to fulfill at least the following basic requirement. It has to be able to build a file that consists of records of all the individuals, that is, events, objects, etc., mentioned in the text and, for each individual, record whatever is said about it."   (Karttunen 1976; p.363)

Discourse referents represent objects under discussion, objects that can be referred to in subsequent discourse. Understanding the interaction of discourse reference and evidentials is key to understanding the semantics of sentences with evidentials. Many of the semantic diagnostics used to classify evidentials crucially depend on anaphora to propositions (See Chapter 3).

UC combines these two visions of representing meaning, incorporating a dynamic notion of meaning with the representation of objects under discussion. It is a dynamic logic that represents changing information as well as changing focus of attention. Grammatical centering (e.g., Grosz et al. 1995) is analyzed with sequences of ranked discourse referents. Because there are discourse referents for various types of objects, this system can account for centering parallels across domains (Stone 1997; Stone and Hardt 1999).

In the remainder of this section, I give a detailed introduction to UC_ω through examples adapted from Bittner (to appear) and Bittner (2010). These examples represent a specific analysis of assertions and questions, which will be discussed in turn along with the examples. In later sections of this chapter, I use this representation language to implement my own analysis of the structure of speech acts. In my proposal, the analysis of assertions and questions crucially differs from the following examples; however, they are useful in illustrating the system.

7.2.1   (Stalnaker) Assertion

What is an assertion? A standard view is that assertion adds information to the common ground, which can be modeled as the intersection of the initial common ground with the asserted proposition (Stalnaker 1978). Consider the English example in (7.1) and the diagram in Figure 7.1 that illustrates this intersection of propositions, represented as sets of possible worlds.

(7.1) Annie is sick
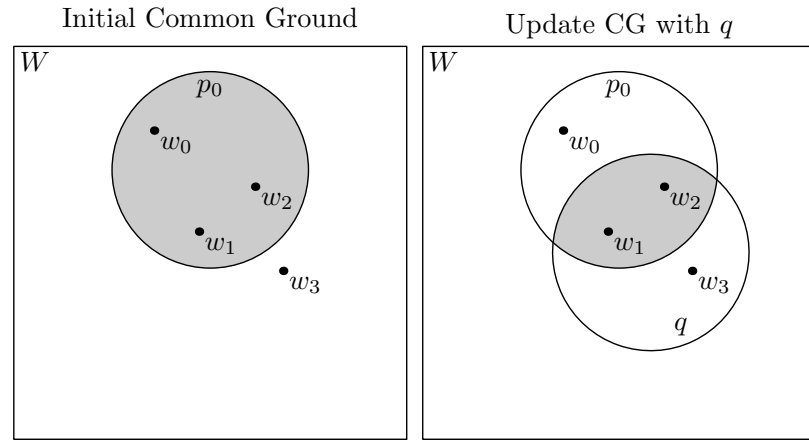
Figure 7.1: Diagram for the assertion of (7.1), after Stalnaker (1978)

In Figure 7.1, the initial common ground is labeled p_0 and the proposition that Annie is sick is labeled q.[1] A few possible worlds have also been included in the diagram, as dots with labels such as w_1. Figure 7.1 assumes a model where Annie is sick in worlds w_1, w_2, and w_3 (and not sick in w_0). The proposition that Annie is sick, q, contains these three worlds. The initial common ground contains the worlds w_0, w_1, and w_2 – worlds where Annie is sick and a world where she is not sick. Thus, the initial common ground does not contain the information that Annie is (or is not) sick. When (7.1) is asserted, the common ground is updated to include the information that Annie is sick. The proposition expressed, q, is intersected with the initial common ground, in Figure 7.1 leaving a set containing two worlds, w_1 and w_2.

The view of assertion presented in Bittner (to appear, 2010) is slightly different, but still maintains the idea that assertions directly update the common ground. Instead of intersecting two sets of world, one set of worlds, the initial common ground, is directly restricted to a subset of worlds satisfying a certain condition. For (7.1), the condition is that the worlds are ones where Annie is sick. This is represented by the diagram in Figure 7.2. The model for Figure 7.2 is the same as for Figure 7.1.

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[1]Throughout this chapter and the next I will use this convention – ps for the common ground and qs for propositions that are added to the common ground.
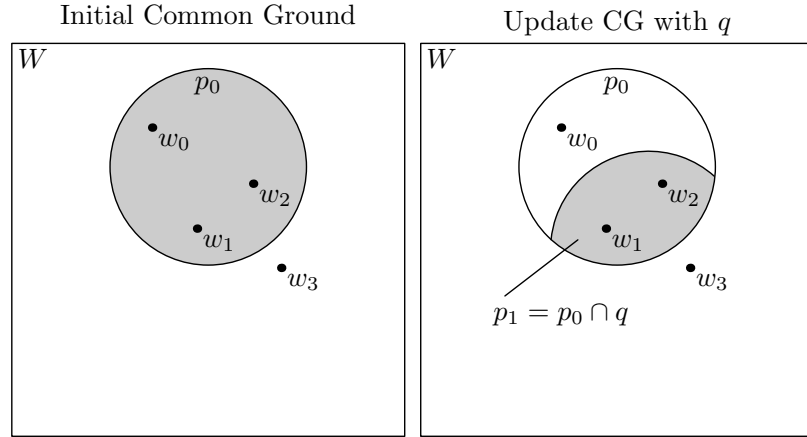
Figure 7.2: Diagram for the assertion of (7.1), after Bittner (to appear, 2010)

Though the difference between these two ways of representing assertion are slight, that difference is important. Crucially, according to Bittner (to appear, 2010) there is no explicit representation of the proposition q. Instead, the common ground is directly reduced to q-worlds. Though this analysis of English (7.1) differs from Stalnaker (1978) in this detail, it still implements the view that assertion directly updates the common ground. Bittner (to appear, 2010) formalizes this analysis of assertion in Update with Centering (UC). The translation of (7.1) into UC_ω is (7.2).

(7.2) $\underbrace{^\top[\mathsf{x}|\mathsf{x} = \mathsf{annie}]; [\mathsf{sick}_{\top\omega}\langle\top\delta\rangle];}_{\text{(update CG)}} \underbrace{^\top[\mathsf{p}|\mathsf{p} = \top\omega||]}_{\text{(modal re-centering)}}$

This translation involves three updates. The first, $^\top[\mathsf{x}|\mathsf{x} = \mathsf{annie}]$, introduces a discourse referent for the subject, Annie. The second, $[\mathsf{sick}_{\top\omega}\langle\top\delta\rangle]$, reduces the common ground to worlds where Annie is sick. The last update, $^\top[\mathsf{p}|\mathsf{p} = \top\omega||]$, introduces a propositional discourse referent for the new common ground. The next few paragraphs work through this example in detail.

Anaphora in UC is sequence-based, like Dekker (1994), except sequences are structured to distinguish currently topical and currently backgrounded information.

Specifically, each sequence is divided into two sub-sequences: one for currently topical ($\top$) referents and one for currently backgrounded ($\bot$) referents. An entire sequence, called a $\top\bot$-sequence, is a pair of these two sub-sequences: $\langle \top, \bot \rangle$. The motivation for having two sub-sequences comes from grammatical centering, present in languages like Kalaallisut and Cheyenne. However, this distinction is useful for analyzing English phenomena as well, such as negation, as will be discussed below, and tense, as in Bittner (to appear). In addition, I make use of this distinction to implement the difference between at-issue and not-at-issue information, crucial to my proposed analysis of evidentials (see Section 7.3).

In UC, each update is a function from an information state to an information state. An information state is a set of $\top\bot$-sequences, i.e., it is a plural state, in the sense of van den Berg (1996). In UC, information states represent both information and attention. Two example information states, c and c', are given in Table 7.1, below. Each information state is a set of sequences, or lists, of discourse referents; c contains four sequences while c' contains only three. The information state c doesn't have any discourse referents in the background (sub-)sequence ($\bot$), but c' does: w_2 in each of the three sequences.

c	c'
$\langle\!\langle w_0, p_0 \rangle \langle\ \rangle\!\rangle$	
$\langle\!\langle w_1, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle w_1, p_0 \rangle \langle w_2 \rangle\!\rangle$
$\langle\!\langle w_2, p_1 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle w_2, p_1 \rangle \langle w_2 \rangle\!\rangle$
$\langle\!\langle w_1, p_1 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle w_1, p_1 \rangle \langle w_2 \rangle\!\rangle$

Table 7.1: Sample UC_ω information states

We can refer to the most prominent object of a list, e.g., $\top\delta$ for the most prominent (leftmost) individual (δ) on the top list ($\top$) and $\bot\omega$ for the most prominent world (ω) on the bottom list ($\bot$). Anaphora can be either local, within a list (row), or global, across lists (column), as in van den Berg (1996) and Brasoveanu (2007b). Global anaphors are written with the addition of two pipes, e.g., $\bot\omega||$, intended

to be mnemonic for a column. For example, $\top\omega\|$ is the set of worlds from the most prominent world (ω) column ($\|$) in the top list ($\top$), i.e., for c in Table 7.1, $\top\omega\| = \{w_0, w_1, w_2\}$. For c' in Table 7.1, $\top\omega\| = \{w_1, w_2\}$. For Bittner (to appear, 2010), topic worlds have a special status: they represent the worlds in the current common ground. Eliminating rows in the information state can eliminate worlds in the common ground, modeling update of information.

Let's look again now at (7.2), repeated below.

(7.2) $\underbrace{\top[x|x = \mathsf{annie}]; [\mathsf{sick}_{\top\omega}\langle\top\delta\rangle];}_{\text{(update CG)}} \underbrace{\top[p|p = \top\omega\|]}_{\text{(modal re-centering)}}$

The first update, $\top[x|x = \mathsf{annie}]$, introduces an individual discourse referent for the subject, Annie, into the top sequence, signified by the preposed superscript $\top$. The second update, $[\mathsf{sick}_{\top\omega}\langle\top\delta\rangle]$, reduces the common ground, the topic worlds $\top\omega$, to worlds where Annie, now the topical individual $\top\delta$, is sick. Specifically, this update checks *for each row* whether the topical individual is sick in the topic world. If not, that row is eliminated. This can potentially update the common ground. If all rows containing a specific topic world are eliminated, the common ground will no longer contain that world. The last update, $\top[p|p = \top\omega\|]$, introduces a propositional discourse referent for the new common ground, the set of worlds $\top\omega\|$, into the top sequence.

Example information states corresponding to the updates in (7.2) are given in Table 7.2, below, assuming the model used in Figure 7.2 on page 160. The first information state c_0 represents the initial information state, which contains a propositional discourse referent for the initial common ground (p_0) and a sequence for each world in the common ground (w_0, w_1, and w_2). The information state c_1 is the result of updating c_0 with the first update in (7.2) (i.e., with $\top[x|x = \mathsf{annie}]$), c_2 is the result of updating c_1 with the second update in (7.2) (i.e., with $[\mathsf{sick}_{\top\omega}\langle\top\delta\rangle]$), and c_3 is the

result of updating c_2 with the third update in (7.2) (i.e., with $^\top[\mathsf{p}|\mathsf{p} = \top\omega||]$).

c_0	c_1	c_2	c_3
$\langle\!\langle w_0, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle a, w_0, p_0 \rangle \langle\ \rangle\!\rangle$		
$\langle\!\langle w_1, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle a, w_1, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle a, w_1, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle p_1, a, w_1, p_0 \rangle \langle\ \rangle\!\rangle$
$\langle\!\langle w_2, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle a, w_2, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle a, w_2, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle p_1, a, w_2, p_0 \rangle \langle\ \rangle\!\rangle$

Table 7.2: Updates for (7.2)

The first update, $^\top[\mathsf{x}|\mathsf{x} = \mathsf{annie}]$, introduces the individual discourse referent a for the subject, Annie, into each top sequence, resulting in c_1. The second update, $[\mathsf{sick}_{\top\omega}\langle\top\delta\rangle]$, checks for each row whether or not the topical individual ($\top\delta$, here, Annie) is sick in the topical world ($\top\omega$) *of that row*. The first sequence is eliminated because w_0 is not a world where Annie is sick, but the other two sequences are preserved, resulting in c_2. The common ground, $\top\omega||$, has been updated to the set $\{w_1, w_2\}$, and now includes the information that Annie is sick. The last update, $^\top[\mathsf{p}|\mathsf{p} = \top\omega||]$, is a modal re-centering update. It introduces into the top sequence ($\top$) the propositional discourse referent p_1, which represents the new common ground ($\top\omega|| = \{w_1, w_2\}$), resulting in c_3. This proposition representing the new common ground is now the primary topic, the most prominent position in the top sequence.

Truth in this system is sensitive to what the primary topic is. Truth values are only assigned to terms that update the primary topic to a proposition. Thus, assertions are assigned truth values while things like questions and commands are not. The definition of truth from Bittner (2010) is given below in (1). (See all UC_ω definitions in Appendix B).

Definition 1 (truth). Given an information state c, an $(st)st$ term K introduces the set of primary topics $\top_c K = \{(\top j)_1 | \forall g : j \notin {}^{\{\}}c \ \& \ j \in {}^{\{\}}(c[\![K]\!]^g)\}$

   i. K is *true* in c at world w iff $\exists p \in D_{\omega t} : \top_c K = \{p\} \ \& \ w \in {}^{\{\}}p$

   ii. K is *false* in c at world w iff $\exists p \in D_{\omega t} : \top_c K = \{p\} \ \& \ w \notin {}^{\{\}}p$

This definition assigns (7.2), relative to an information state, a truth value, since it updates the primary topic to a proposition (see c_3 in Table 7.2). Relative to the initial information state, (7.2) is true in a world w if and only if w is in the primary topic, the set of worlds representing the current common ground, and false if and only if w is not in that set of worlds. In other words, (7.2) is true in a world if and only if Annie is sick in that world.

For this basic sentence under this analysis of assertion, the bottom sequence, or list, has not been needed. In the next sub-section, I work through the treatment of the negation of (7.1), which does make use of the bottom sequence. In Chapter 8, Section 8.2, I discuss the analysis of questions presented in Bittner (to appear), which also makes use of the bottom sequence.

7.2.2   Negation and the Bottom Sequence

One way that Bittner (2010) uses the bottom list in UC$_\omega$ is to model negation. In particular, the scope of negation is introduced into the bottom sequence. As an illustration, consider English (7.3) and the diagram in Figure 7.3

(7.3) Annie isn't sick
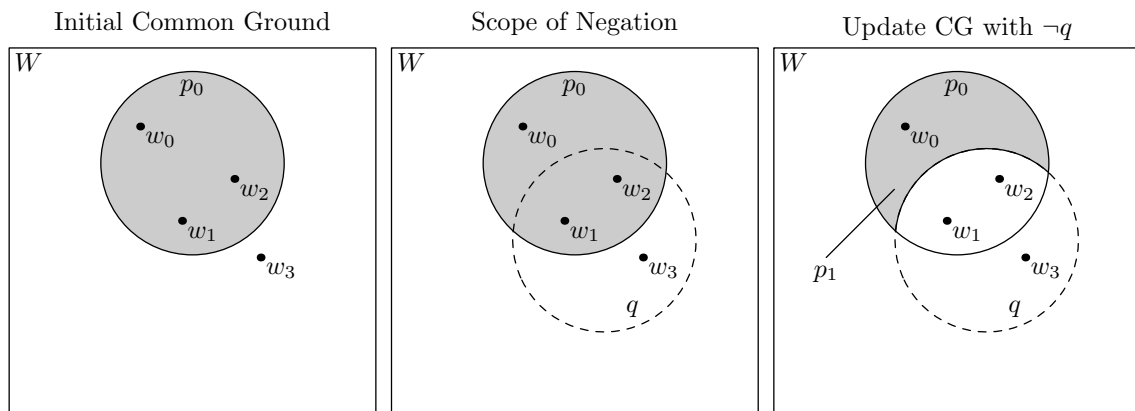
Figure 7.3: Diagram for the assertion of (7.3), after Bittner (2010)

The second picture in Figure 7.3 represents the introduction of the scope of negation, q, into the bottom sequence. In the diagrams, solid lines delineate propositions introduced into the top list and dashed circles represent propositions introduced into the bottom list. The third picture represents the update of the common ground to include only worlds where $\neg q$ is true – the complement of the proposition q. This analysis implements the idea of Stone and Hardt (1999) that negation is a type of modal reference.

The translation of (7.3), corresponding to Figure 7.3, is given in (7.4).

(7.4) $\underbrace{{}^\top[\mathsf{x}|\mathsf{x} = \mathsf{annie}]; [\mathsf{w}|\mathsf{sick_w}\langle\top\delta\rangle)];}_{\text{(scope of negation)}} \underbrace{[\top\omega \notin \bot\omega||];}_{\text{(update CG)}} \underbrace{{}^\top[\mathsf{p}|\mathsf{p} = \top\omega||]}_{\text{(modal re-centering)}}$

An example sequence of updates corresponding to (7.4) is given in Table 7.3. I assume the model given in Figure 7.3: Annie is sick in w_1, w_2, and w_3 and is not sick in w_0. The initial common ground includes worlds w_0, w_1, and w_2. The initial state c_0 contains three sequences, corresponding to the three worlds in the initial common ground. Each contains a propositional discourse referent for the initial common ground p_0 and a world discourse referent for one of the worlds in the input common ground, w_{0-2}. The subsequent states c_{1-4} correspond sequentially to the output of the four updates in (7.4).

c_0	c_1	c_2	c_3	c_4
$\langle\!\langle w_0, p_0\rangle\langle\ \rangle\!\rangle$	$\langle\!\langle a, w_0, p_0\rangle\langle\ \rangle\!\rangle$	$\langle\!\langle a, w_0, p_0\rangle\langle w_1\rangle\!\rangle$	$\langle\!\langle a, w_0, p_0\rangle\langle w_1\rangle\!\rangle$	$\langle\!\langle p_1, a, w_0, p_0\rangle\langle w_1\rangle\!\rangle$
		$\langle\!\langle a, w_0, p_0\rangle\langle w_2\rangle\!\rangle$	$\langle\!\langle a, w_0, p_0\rangle\langle w_2\rangle\!\rangle$	$\langle\!\langle p_1, a, w_0, p_0\rangle\langle w_2\rangle\!\rangle$
		$\langle\!\langle a, w_0, p_0\rangle\langle w_3\rangle\!\rangle$	$\langle\!\langle a, w_0, p_0\rangle\langle w_3\rangle\!\rangle$	$\langle\!\langle p_1, a, w_0, p_0\rangle\langle w_3\rangle\!\rangle$
$\langle\!\langle w_1, p_0\rangle\langle\ \rangle\!\rangle$	$\langle\!\langle a, w_1, p_0\rangle\langle\ \rangle\!\rangle$	$\langle\!\langle a, w_1, p_0\rangle\langle w_1\rangle\!\rangle$		
		$\langle\!\langle a, w_1, p_0\rangle\langle w_2\rangle\!\rangle$		
		$\langle\!\langle a, w_1, p_0\rangle\langle w_3\rangle\!\rangle$		
$\langle\!\langle w_2, p_0\rangle\langle\ \rangle\!\rangle$	$\langle\!\langle a, w_2, p_0\rangle\langle\ \rangle\!\rangle$	$\langle\!\langle a, w_2, p_0\rangle\langle w_1\rangle\!\rangle$		
		$\langle\!\langle a, w_2, p_0\rangle\langle w_2\rangle\!\rangle$		
		$\langle\!\langle a, w_2, p_0\rangle\langle w_3\rangle\!\rangle$		

Table 7.3: Sample updates for (7.4)

The first update, $^\top[\mathsf{x}|\mathsf{x} = \mathsf{annie}]$, has the same effect as before: it introduces the individual discourse referent a into each top sequence, resulting in c_1. It is the second update, $[\mathsf{w}|\mathsf{sick_w}\langle\top\delta\rangle]$, which is crucially different: it introduces the worlds where Annie is sick into the bottom sequence, resulting in c_2. There are several important things to note at this point. Whether an update introduces a discourse referent into the top or bottom sequence depends on whether or not it has a preposed $\top$ superscript, as in the first update in (7.4). Second, maximization is built into the definition of update. For each sequence in the input, there will be as many corresponding sequences in the output as there are worlds that satisfy the condition. For this update, that is worlds where Annie is sick. This ensures that no accidental dependencies are introduced. Since there are three sequences in the input and three worlds where Annie is sick, the output state c_2 will have nine sequences, as in Table 7.3. The resulting set of worlds $\bot\omega||$ in c_2 will be the maximal set of worlds where Annie is sick.

The third update, $[\top\omega \notin \bot\omega||]$, checks row-wise that the topical world $\top\omega$ is *not* in the bottom set of worlds, $\bot\omega||$, the scope of negation. This update results in c_3. All sequences where $\top\omega$ is w_1 or w_2 are eliminated because they are worlds where Annie is sick. The sequences where $\top\omega$ is w_0 are preserved because this is the world where Annie is not sick. The common ground, $\top\omega||$, has been directly updated, and now includes the information that Annie is not sick. The last update, $^\top[\mathsf{p}|\mathsf{p} = \top\omega||]$, introduces the propositional discourse referent p_1 for the new common ground $\{w_0\}$, into the top sequence, resulting in c_4.

The analysis of examples (7.1) and (7.3) both involve updates of information (elimination of rows) and attention (introduction of discourse referents). However, certain sentences can purely update attention, such as questions as analyzed by Bittner (to appear). See Chapter 8 for a discussion of Questions in $\mathrm{UC_\omega}$, including the analysis proposed in Bittner (to appear) where questions are pure attention updates.

Like negation, the analysis of questions in Bittner (to appear) also makes use of the bottom sequence.

In the next section, I use the formal system developed in Bittner (to appear, 2010) to present a novel analysis of assertion. Using the same underlying logic, UC_ω, I build a different analysis of assertion, one that distinguishes two components: an at-issue component and a not-at-issue component. Essentially, this is analyzed as a centering distinction in the modal domain – a distinction between what propositional information is added to the bottom sequence and what is added to the top sequence.

7.3 Structured Assertion and Evidentials

It has often been observed that sentences with evidentials make two contributions: a 'propositional' contribution, which is directly challengeable, deniable, up for negotiation, and an evidential contribution, which is not directly challengeable, deniable, or up for negotiation. These two contributions have a different status, they are somewhat separate, but yet dependent on each other. A satisfactory analysis has been elusive because the evidential contribution does not fit neatly into any established category of meaning. It is not a presupposition because it is new information and has a different, though similar, projection profile. It is not a conversational implicature because it cannot be cancelled, nor is it a conventional implicature because it affects the truth conditions for a sentence and is necessarily dependent on the main, at-issue proposition (see Section 3.7).

My proposal, given in informal terms above in Chapter 4, is that these two contributions of evidentials correspond to two components of assertion: what is at issue and what is not. The evidential contribution is not-at-issue; it is information that is imposed on, or directly added to, the common ground. The at-issue proposition is the scope of the evidential; it is negotiable information, and is not directly added to

the common ground. The type of evidential, e.g., direct or reportative, affects what is done with the at-issue proposition. With the direct evidential, the at-issue proposition is proposed to be added to the common ground. With the reportative, there is no such proposal. Other evidentials may contribute different types of proposals.

In this section, I implement this idea about a finer-grained structure of assertion in Update with Modal Centering (UC_ω). The presentation of the at-issue proposition is modeled as the introduction of a discourse referent for that proposition into the bottom sequence. Non-negotiable update is modeled as direct predication of the topic worlds – the common ground. Negotiable update is modeled as a relation between the at-issue proposition, in the bottom sequence, and the worlds in the top sequence, the common ground worlds. Thus, the worlds represented in the bottom, or background, sequence represent what we are talking about, while the worlds in the top, or topic, sequence represent candidates for worlds we are in – the current common ground. Thus, the distinction between at-issue information and not-at-issue information is modeled as a centering distinction in the modal domain.

7.3.1 The Direct Evidential

As an example, consider Cheyenne (7.5), a basic sentence containing a direct evidential, and the corresponding diagram in Figure 7.4.

(7.5) *É-néméne-Ø*   *Andy*
      3-sing-DIR   Andy
      'Andy sang, I'm sure.'
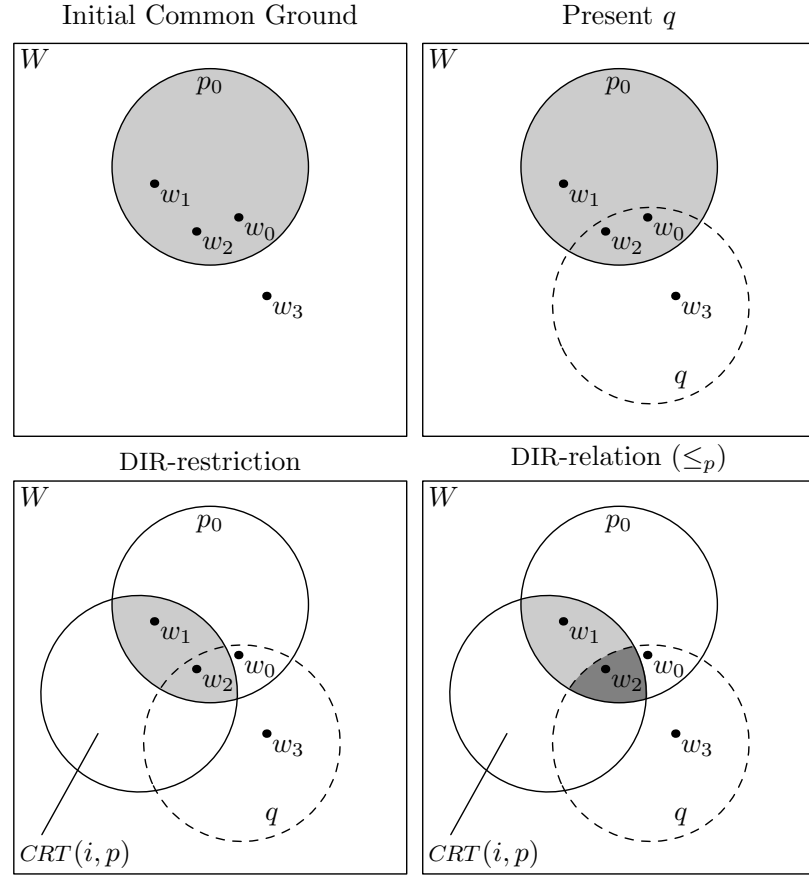
Figure 7.4: Diagram for (7.5): the Direct Evidential

The first image depicts the initial common ground, which includes worlds w_0, w_1, and w_2. The second image represents the presentation of the at-issue proposition q, the introduction of a discourse referent for this proposition into the bottom sequence. The third image represents the not-at-issue assertion of the evidential information – that the speaker has a certain type of evidence for at-issue proposition q. This is modeled as direct predication of the topic worlds, directly updating the common ground. The last image represents the proposal to update the common ground with the at-issue proposition q. This proposal is modeled as an ordering relation which ranks q worlds over $\neg q$ worlds; higher-ranked worlds are represented in the diagram with a darker shade of gray. The at-issue proposition is not added directly to the common ground.

The implementation of this proposal in UC_ω makes the distinction between the top and the bottom sequence. Following Bittner (to appear, 2010), I use the top sequence to keep track of the current common ground. However, I use the bottom sequence to track the at-issue propositions, the main point of assertions. Not-at-issue information is directly added to the common ground – it directly predicates topic worlds. At-issue information does not directly predicate topic worlds. Instead, it is added to the bottom sequence and a proposal is made about what to do with it. There could be a proposal to add it to the common ground, to add its possibility to the common ground, or to leave it as merely presented. It is negotiable information.

To make this discussion concrete, consider (7.6), the proposed analysis of (7.5) in UC_ω. The updates are annotated with their general role.

(7.6) $\underbrace{^\top[x|x = \mathsf{andy}]; [w|\mathsf{sang}_w\langle\top\delta\rangle]; [p|p = \bot\omega||]}_{\text{(present at-issue proposition } q)};$

$\underbrace{[\mathsf{CRT}_{\top\omega}\langle i, \bot\Omega\rangle]}_{\text{(not-at-issue restriction)}}; \qquad \underbrace{[\bot\omega \in \top\omega||]}_{\text{(at-issue proposal)}}; \quad (\underbrace{[\top\omega \in \bot\omega||]}_{\text{(accept)}}; \quad \underbrace{^\top[p|p = \top\omega||]}_{\text{(recenter)}})$

The first three updates present the at-issue proposition, here the proposition that Andy sang. The first two updates are parallel to the negation case discussed above in Section 7.2.2: the first introduces an individual discourse referent for Andy into the top sequence and the second introduces the worlds where he won into the bottom sequence. The third update introduces a propositional discourse referent for the at-issue proposition into the bottom sequence. All three of these updates are pure attention updates; no rows are lost and there is no reduction of the common ground.

The next update, $[\mathsf{CRT}_{\top\omega}\langle i, \bot\Omega\rangle]$, represents the not-at-issue restriction, the contribution of the evidential. This update directly predicates topic worlds: it requires of each topic world $\top\omega$ that the speaker is certain based on personal experience of the at-issue proposition $\bot\Omega$. Thus, it directly updates the common ground.

The fifth update $[\bot\omega \in \top\omega||]$ represents the proposal to update the common ground with the at-issue proposition.[2] Specifically, it requires of each most prominent world in a bottom sequence that it is in the common ground. The remaining worlds are all worlds where Andy sang and worlds that are in the common ground. This corresponds to the darker gray area in Figure 7.4, the proposed update to the common ground.[3] This update has the potential to remove rows in the information state, but no common ground world will be entirely eliminated.[4] It does not directly predicate topic worlds, and thus does not directly update the common ground. If the proposal is accepted, either overtly or by not objecting, then it is added to the common ground.

The penultimate update $[\top\omega \in \bot\omega||]$ represents the acceptance of the proposal to update the common ground. It requires for each top world, the common ground worlds, that it is in the set of most prominent background worlds $\bot\omega||$. These are all worlds where the at-issue proposition is true. Thus, this update adds the at-issue information to the common ground, in essence accepting this proposal. In the translation in (7.6), this update is in parenthesis. I offset it because, strictly speaking, it is not associated with a particular morpheme in the sentence. It must have a slightly different status.[5] For the purposes of this dissertation, I assume this acceptance update is a grammatical default associated with declarative sentences that

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[2]There are other possible ways of representing this proposal, such as using a higher order discourse referent for relations between worlds. However, instead of stating that there is a relation between worlds, I chose this formulation, which enforces a relation between worlds already present in the information state. In addition, this formulation minimizes the types of discourse referents needed for the analysis.

[3]This update makes necessary a separate propositional discourse referent for the entire at-issue proposition. After this update, the collection of the most prominent worlds in the bottom sequence is no longer the at-issue proposition – it is a subset of that proposition. It is the worlds that are both in the at-issue proposition and in the common ground.

[4]Because maximality is built into the definition of update, each bottom world was introduced in a sequence with every top world $([\mathsf{w}|\mathsf{sang}_\mathsf{w}\langle\top\delta\rangle]$. Thus, even if all rows containing a certain bottom world are eliminated, no top world will be entirely eliminated. The only exception is if all worlds are eliminated, resulting in the empty (absurd) state.)

[5]If the acceptance update were, say, part of the translation of the direct evidential, the at-issue information would be directly added to the common ground. The net effect of the presented analysis would be the same as Stalnaker (1978) and Bittner (to appear, 2010).

make explicit proposals.

The last update $^{\top}[\mathsf{p}|\mathsf{p} = \top\boldsymbol{\omega}\|]$ is the modal re-centering update proposed in the analysis of assertion in Bittner (to appear, 2010). This update must come after the acceptance update to include the at-issue information in the new common ground.

A sample sequence of updates for (7.6) is given in Table 7.4 assuming the model given in Figure 7.4. The initial state is c_0; the remaining states correspond sequentially to the updates in (7.6).

c_0	c_1	c_2	c_3
$\langle\!\langle w_0, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle a, w_0, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle a, w_0, p_0 \rangle \langle w_0 \rangle\!\rangle$	$\langle\!\langle a, w_0, p_0 \rangle \langle q, w_0 \rangle\!\rangle$
		$\langle\!\langle a, w_0, p_0 \rangle \langle w_2 \rangle\!\rangle$	$\langle\!\langle a, w_0, p_0 \rangle \langle q, w_2 \rangle\!\rangle$
		$\langle\!\langle a, w_0, p_0 \rangle \langle w_3 \rangle\!\rangle$	$\langle\!\langle a, w_0, p_0 \rangle \langle q, w_3 \rangle\!\rangle$
$\langle\!\langle w_1, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle a, w_1, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle a, w_1, p_0 \rangle \langle w_0 \rangle\!\rangle$	$\langle\!\langle a, w_1, p_0 \rangle \langle q, w_0 \rangle\!\rangle$
		$\langle\!\langle a, w_1, p_0 \rangle \langle w_2 \rangle\!\rangle$	$\langle\!\langle a, w_1, p_0 \rangle \langle q, w_2 \rangle\!\rangle$
		$\langle\!\langle a, w_1, p_0 \rangle \langle w_3 \rangle\!\rangle$	$\langle\!\langle a, w_1, p_0 \rangle \langle q, w_3 \rangle\!\rangle$
$\langle\!\langle w_2, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle a, w_2, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle a, w_2, p_0 \rangle \langle w_0 \rangle\!\rangle$	$\langle\!\langle a, w_2, p_0 \rangle \langle q, w_0 \rangle\!\rangle$
		$\langle\!\langle a, w_2, p_0 \rangle \langle w_2 \rangle\!\rangle$	$\langle\!\langle a, w_2, p_0 \rangle \langle q, w_2 \rangle\!\rangle$
		$\langle\!\langle a, w_2, p_0 \rangle \langle w_3 \rangle\!\rangle$	$\langle\!\langle a, w_2, p_0 \rangle \langle q, w_3 \rangle\!\rangle$

c_4	c_5	$(c_6$	$c_7\ )$
$\langle\!\langle a, w_1, p_0 \rangle \langle q, w_0 \rangle\!\rangle$			
$\langle\!\langle a, w_1, p_0 \rangle \langle q, w_2 \rangle\!\rangle$	$\langle\!\langle a, w_1, p_0 \rangle \langle q, w_2 \rangle\!\rangle$		
$\langle\!\langle a, w_1, p_0 \rangle \langle q, w_3 \rangle\!\rangle$			
$\langle\!\langle a, w_2, p_0 \rangle \langle q, w_0 \rangle\!\rangle$			
$\langle\!\langle a, w_2, p_0 \rangle \langle q, w_2 \rangle\!\rangle$	$\langle\!\langle a, w_2, p_0 \rangle \langle q, w_2 \rangle\!\rangle$	$\langle\!\langle a, w_2, p_0 \rangle \langle q, w_2 \rangle\!\rangle$	$\langle\!\langle p_1, a, w_2, p_0 \rangle \langle q, w_2 \rangle\!\rangle$
$\langle\!\langle a, w_2, p_0 \rangle \langle q, w_3 \rangle\!\rangle$			

Table 7.4: Example Information States for (7.6)

The effect of the non-negotiable update, the information imposed on the common ground, can be seen in c_4: all sequences with w_0 in the top world position have been eliminated. In the above model, w_0 is a world where the speaker does not have direct evidence for the at-issue proposition.

The effect of the proposal update can be seen in c_5: certain sequences (rows) have been eliminated, but no topic worlds have been. That is, the common ground in c_5 is unchanged from the common ground in c_4. The remaining worlds are both q-worlds and worlds in the common ground. This represents the proposal to update the

common ground to q-worlds. Accepting this proposal would mean further reducing the common ground to q-worlds, which is what the acceptance update does. The last update introduces a propositional discourse referent for the new common ground. This proposition is now the primary topic, the most prominent position in the top sequence.

Though the architecture of my analysis of assertion is different, I use the definition of truth given in Bittner (to appear, 2010), discussed above in Section 7.2.1.[6] Given this definition, the truth conditions for (7.6) include both the not-at-issue information and the at-issue information. Relative to the initial information state, (7.6) is true in a world w if and only if Andy sang in w and the speaker has direct evidence in w that Andy sang. It is false if and only if w is not a world where Andy sang and the speaker has direct evidence that he sang. That is, (7.6) can be false in a world w if Andy didn't sing in w or if the speaker does not have direct evidence in w that Andy sang. Unlike in prior analyses, on the proposed analysis the evidential contribution is strictly part of the truth conditions.

One important difference between the present analysis and the analysis of assertion presented in Bittner (to appear, 2010) is that for the later author, the modal re-centering update is associated with declarative morphology. In the present analysis, the re-centering update must occur after the acceptance update. Thus, truth is defined on an update term that includes this acceptance update. There is room for worry about metaphysical commitments of this analysis, and it seems an explicit theory of dialogue with multiple commitment sets may be needed to make proper

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[6]An potential alternate way of defining truth would be to define it on update terms that propose to update the common ground. However, this would not work for the reportative under the present analysis, where there is no explicit proposal. The reportative could be made to have a trivial proposal, as in the formulation from Chapter 5. However, there are desirable results of analyzing the reportative as not making an explicit proposal. For one, it uses only two of the three proposed components of a speech acts. This modularity was desirable, and we can understand English sentences without evidentials as making use of a different two components.

sense of the idea of acceptance.

However, it is important to be clear that this is a definition of truth for sentences, and not for propositions. Propositions are still understood as sets of worlds, true in a world if and only if that world is in the proposition. A proposition can be true or false independent of whether or not a sentence proffering that proposition is true. The definition of truth for a sentence is supposed to track out intuitions of when an utterance of that sentence is counted as true. In order to count an utterance of a sentence as true, you have to accept it.

7.3.2 The Reportative Evidential

In contrast to the direct evidential in (7.5), sentences with the reportative evidential merely present the at-issue proposition: there is no proposal to add it to common ground. Consider the example with the reportative evidential (7.7) and the corresponding diagram in Figure 7.5.

(7.7) *É-némene-**séstse*** *Andy*
　　　3-sing-RPT.3SG　　Andy
　　　'Andy sang, I hear.'
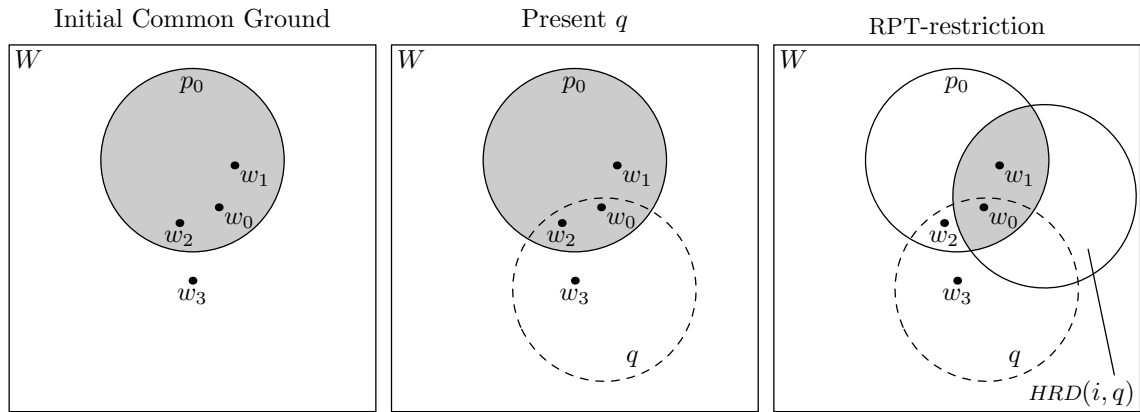
Figure 7.5: Diagram for (7.7): The Reportative Evidential

The first two images in Figure 7.5 are the same as for Figure 7.4, the example with the direct evidential. The third image is parallel to the third image of Figure 7.4,

only the content of the evidential predicate is different. The crucial difference for the reportative is that there is no further relation imposed on this restricted common ground.

The translation of (7.7) is given in (7.8). Example states assuming the model given in Figure 7.5 are given in Table 7.3.2.

(7.8) $\underbrace{^\top[x|x = \mathsf{andy}]; [w|\mathsf{sang}_w\langle\top\delta\rangle]; [p|p = \bot\omega||];}_{\text{(present at-issue proposition } q)}$ $\underbrace{[\mathsf{HRD}_{\top\omega}\langle i, \bot\Omega\rangle];}_{\text{(not-at-issue restriction)}}$ $\underbrace{(^\top[p|p = \top\omega||])}_{\text{(new CG)}}$

c_0	c_1	c_2	c_3
$\langle\!\langle w_0, p_0\rangle\langle\ \rangle\!\rangle$	$\langle\!\langle a, w_0, p_0\rangle\langle\ \rangle\!\rangle$	$\langle\!\langle a, w_0, p_0\rangle\langle w_0\rangle\!\rangle$	$\langle\!\langle a, w_0, p_0\rangle\langle q, w_0\rangle\!\rangle$
		$\langle\!\langle a, w_0, p_0\rangle\langle w_2\rangle\!\rangle$	$\langle\!\langle a, w_0, p_0\rangle\langle q, w_2\rangle\!\rangle$
		$\langle\!\langle a, w_0, p_0\rangle\langle w_3\rangle\!\rangle$	$\langle\!\langle a, w_0, p_0\rangle\langle q, w_3\rangle\!\rangle$
$\langle\!\langle w_1, p_0\rangle\langle\ \rangle\!\rangle$	$\langle\!\langle a, w_1, p_0\rangle\langle\ \rangle\!\rangle$	$\langle\!\langle a, w_1, p_0\rangle\langle w_0\rangle\!\rangle$	$\langle\!\langle a, w_1, p_0\rangle\langle q, w_0\rangle\!\rangle$
		$\langle\!\langle a, w_1, p_0\rangle\langle w_2\rangle\!\rangle$	$\langle\!\langle a, w_1, p_0\rangle\langle q, w_2\rangle\!\rangle$
		$\langle\!\langle a, w_1, p_0\rangle\langle w_3\rangle\!\rangle$	$\langle\!\langle a, w_1, p_0\rangle\langle q, w_3\rangle\!\rangle$
$\langle\!\langle w_2, p_0\rangle\langle\ \rangle\!\rangle$	$\langle\!\langle a, w_2, p_0\rangle\langle\ \rangle\!\rangle$	$\langle\!\langle a, w_2, p_0\rangle\langle w_0\rangle\!\rangle$	$\langle\!\langle a, w_2, p_0\rangle\langle q, w_0\rangle\!\rangle$
		$\langle\!\langle a, w_2, p_0\rangle\langle w_2\rangle\!\rangle$	$\langle\!\langle a, w_2, p_0\rangle\langle q, w_2\rangle\!\rangle$
		$\langle\!\langle a, w_2, p_0\rangle\langle w_3\rangle\!\rangle$	$\langle\!\langle a, w_2, p_0\rangle\langle q, w_3\rangle\!\rangle$

	c_4	(c_5)
	$\langle\!\langle a, w_0, p_0\rangle\langle q, w_0\rangle\!\rangle$	$\langle\!\langle p_1, a, w_0, p_0\rangle\langle q, w_0\ \rangle\!\rangle$
	$\langle\!\langle a, w_0, p_0\rangle\langle q, w_2\rangle\!\rangle$	$\langle\!\langle p_1, a, w_0, p_0\rangle\langle q, w_2\ \rangle\!\rangle$
	$\langle\!\langle a, w_0, p_0\rangle\langle q, w_3\rangle\!\rangle$	$\langle\!\langle p_1, a, w_0, p_0\rangle\langle q, w_3\ \rangle\!\rangle$
	$\langle\!\langle a, w_1, p_0\rangle\langle q, w_0\rangle\!\rangle$	$\langle\!\langle p_1, a, w_1, p_0\rangle\langle q, w_0\ \rangle\!\rangle$
	$\langle\!\langle a, w_1, p_0\rangle\langle q, w_2\rangle\!\rangle$	$\langle\!\langle p_1, a, w_1, p_0\rangle\langle q, w_2\ \rangle\!\rangle$
	$\langle\!\langle a, w_1, p_0\rangle\langle q, w_3\rangle\!\rangle$	$\langle\!\langle p_1, a, w_1, p_0\rangle\langle q, w_3\ \rangle\!\rangle$

Table 7.5: Example Information States for (7.8)

The first three updates in (7.7) are the same as in (7.5) for the direct evidential. This corresponds to the intuition that the at-issue proposition is the same for each evidential sentence. The not-at-issue update differs, representing the distinct evidential contributions of the different evidentials. The reportative requires that the speaker heard, or has reportative evidence for, the at-issue proposition. There is no explicit proposal update in (7.8), and so there is no acceptance update. The

modal re-centering update is still needed to introduce a new common ground referent ($^\top$[p|p $= \top$ω||]), as in c_5.

Because there is no proposal to add the at-issue information to the common ground, no information is added to the common ground. Thus, the truth conditions for (7.8) will only include the not-at-issue information. Relative to the initial information state, (7.8) is true in a world w if and only if the speaker heard in w that Andy sang. This sentence can be true whether Andy sang or not in w.

7.4 Conjunction

Once assertion is divided into two components, a natural question is how conjunction will be analyzed. As in many dynamic analyses, I treat conjunction as sequential update. Specifically, a sentence with two conjuncts will be interpreted with the updates for the presentation, restriction, and proposal components of each conjunct sequenced in order. There will only be one acceptance update for each sentence. For most examples, this treatment of conjunction is sufficient. For example, consider example (7.9) below, a conjunction of two reportative clauses.

(7.9) i. *É-némene-**sėstse** Andy naa* ii. *é-némene-**sėstse** Lucy*
   3-sing-RPT.3SG   Andy and   3-sing-RPT.3SG   Lucy
   'Andy sang, I hear, and Lucy sang, I hear.'

The translation of example (7.9), given in (7.10), is just the sequencing of the updates for each conjunct, with one modal re-centering update at the end.

(7.10)   i. $^\top$[x|x $=$ andy]; [w|sang$_w$⟨$\top$δ⟩]; [p|p $= \bot$ω||];[HRD$_{\top\omega}$⟨i, $\bot$Ω⟩];

   ii. $^\top$[x|x $=$ lucy]; [w|sang$_w$⟨$\top$δ⟩]; [p|p $= \bot$ω||];[HRD$_{\top\omega}$⟨i, $\bot$Ω⟩]; ($^\top$[p|p $= \top$ω||])

The last update, in parentheses, is the modal re-centering update that introduces a new propositional discourse referent for the new common ground. After the updates

in (7.10), the new common ground will include the information that the speaker heard that Andy sang and the speaker heard that Lucy sang. It will still include worlds where Andy sang and worlds where he did not sing, worlds where Lucy sang and worlds where she did not.

This treatment of conjunction is also sufficient for examples where a reportative and a direct evidential are conjoined, as in (7.11), as translated in (7.12).

(7.11) i. *É-némene-séstse* *Andy* *naa* ii. *é-néméne-Ø* *Lucy*
3-sing-RPT.3SG   Andy and   3-sing-DIR   Lucy
'Andy sang, I hear, and Lucy sang, I'm sure.'

(7.12) i. $^\top[\mathsf{x}|\mathsf{x} = \mathsf{andy}]; [\mathsf{w}|\mathsf{sang_w}\langle\top\delta\rangle]; [\mathsf{p}|\mathsf{p} = \bot\omega||]; [\mathsf{HRD}_{\top\omega}\langle\mathsf{i}, \bot\Omega\rangle];$

ii. $^\top[\mathsf{x}|\mathsf{x} = \mathsf{lucy}]; [\mathsf{w}|\mathsf{sang_w}\langle\top\delta\rangle]; [\mathsf{p}|\mathsf{p} = \bot\omega||]; [\mathsf{CRT}_{\top\omega}\langle\mathsf{i}, \bot\Omega\rangle]; [\bot\omega \in \top\omega||];$
$([\top\omega \in \bot\omega||]; ^\top[\mathsf{p}|\mathsf{p} = \top\omega||])$

In certain cases, however, pure sequencing does not suffice. For example, consider the example (7.13), where the direct conjunct is first, followed by the reportative.

(7.13) i. *É-néméne-Ø* *Lucy* *naa* ii. *é-némene-séstse* *Andy*
3-sing-DIR   Lucy and   3-sing-RPT.3SG   Andy
'Lucy sang, I'm sure, and Andy sang, I hear.'

The issue with analyzing this conjunction as sequential update stems from the acceptance update associated with the direct evidential, or any evidential that makes an explicit proposal. Consider the translation in (7.14), which is (7.12) with the order of the conjuncts reversed.

(7.14) i. $^\top[\mathsf{x}|\mathsf{x} = \mathsf{lucy}]; [\mathsf{w}|\mathsf{sang_w}\langle\top\delta\rangle]; [\mathsf{p}|\mathsf{p} = \bot\omega||]; [\mathsf{CRT}_{\top\omega}\langle\mathsf{i}, \bot\Omega\rangle]; [\bot\omega \in \top\omega||];$

ii. $^\top[\mathsf{x}|\mathsf{x} = \mathsf{andy}]; [\mathsf{w}|\mathsf{sang_w}\langle\top\delta\rangle]; [\mathsf{p}|\mathsf{p} = \bot\omega||]; [\mathsf{HRD}_{\top\omega}\langle\mathsf{i}, \bot\Omega\rangle];$
$([\top\omega \in \bot\omega||]; ^\top[\mathsf{p}|\mathsf{p} = \top\omega||])$

This translation makes the wrong predictions. The source of the problem is the acceptance update, $[\top\omega \in \bot\omega||]$. What should be accepted is the proposal of the direct evidential, that Lucy sang. However, because the reportative clause intervenes, the currently most prominent bottom worlds ($\bot\omega||$) are worlds where Andy sang – they have nothing to do with Lucy. Thus, this acceptance update incorrectly updates the common ground to worlds where Andy sang.

One potential, but ultimately incorrect, solution to this problem would be to add an additional update that further restricts the most prominent bottom worlds to worlds where Lucy sang, as in (7.15).

(7.15) i. $^\top[x|x = \mathsf{lucy}]; [w|\mathsf{sang}_w\langle\top\delta\rangle]; [p|p = \bot\omega||]; [\mathsf{CRT}_{\top\omega}\langle i, \bot\Omega\rangle]; [\bot\omega \in \top\omega||];$

  ii. $^\top[x|x = \mathsf{andy}]; [w|\mathsf{sang}_w\langle\top\delta\rangle]; [p|p = \bot\omega||]; [\mathsf{HRD}_{\top\omega}\langle i, \bot\Omega\rangle];$
  $[\bot\omega \in \bot\omega_2||]; ([\top\omega \in \bot\omega||]; ^\top[p|p = \top\omega||])$

The added update, $[\bot\omega \in \bot\omega_2||];$, requires that each most prominent bottom world ($\bot\omega$) is also one of the second most prominent bottom worlds ($\bot\omega_2||$). It is these second most prominent bottom worlds ($\bot\omega_2||$) that are worlds where Lucy sang. Now, the acceptance update will indeed add the information that Lucy sang to the common ground, but it will also add the information that Andy sang. This too is incorrect.

Two solutions come to mind that do not require adding any new machinery or radically altering the architecture of the present analysis. The first is to have each conjunct have its own acceptance update, if it makes an explicit proposal. The translation of (7.13) along these lines is given in (7.16).

(7.16) i. $^\top[x|x = \mathsf{lucy}]; [w|\mathsf{sang}_w\langle\top\delta\rangle]; [p|p = \bot\omega||]; [\mathsf{CRT}_{\top\omega}\langle i, \bot\Omega\rangle]; [\bot\omega \in \top\omega||];$
  $[\top\omega \in \bot\omega||];$

  ii. $^\top[x|x = \mathsf{andy}]; [w|\mathsf{sang}_w\langle\top\delta\rangle]; [p|p = \bot\omega||]; [\mathsf{HRD}_{\top\omega}\langle i, \bot\Omega\rangle];$
  $(^\top[p|p = \top\omega||])$

A consequence of this solution is that the content of the first conjunct is already accepted into the common ground before the second conjunct is processed.[7] An alternative would be to have an additional update that introduces new bottom worlds and requires that *these* worlds are one where the first conjunct holds, e.g., $[w|w \in \bot\omega_2||]$ in (7.17).

(7.17)   i. $^\top[x|x = \text{lucy}]; [w|\text{sang}_w\langle\top\delta\rangle]; [p|p = \bot\omega||];[\text{CRT}_{\top\omega}\langle i, \bot\Omega\rangle]; [\bot\omega \in \top\omega||];$

     ii. $^\top[x|x = \text{andy}]; [w|\text{sang}_w\langle\top\delta\rangle]; [p|p = \bot\omega||];[\text{HRD}_{\top\omega}\langle i, \bot\Omega\rangle];$

        $[w|w \in \bot\omega_2||]; ([\top\omega \in \bot\omega||]; ^\top[p|p = \top\omega||])$

However, this is not really an improvement. This conjunction update would have to be different depending on what the conjuncts are. Such an update is not necessary when the first conjunct is the reportative, as discussed above. In addition, for examples where both conjuncts contain a direct evidential, as in (7.18) below, the update will have to introduce worlds where both conjuncts hold, e.g., $[w|w \in \bot\omega|| \cap \bot\omega_2||]$ in (7.19).

(7.18) i.   *É-néméne-Ø*   *Andy*   *naa*   ii.   *é-néméne-Ø*   *Andy*
        3-sing-DIR   Andy   and   3-sing-DIR   Lucy
        'Andy sang, I'm sure, and Lucy sang, I'm sure.'

(7.19)   i. $^\top[x|x = \text{andy}]; [w|\text{sang}_w\langle\top\delta\rangle]; [p|p = \bot\omega||];[\text{CRT}_{\top\omega}\langle i, \bot\Omega\rangle]; [\bot\omega \in \top\omega||];$

     ii. $^\top[x|x = \text{lucy}]; [w|\text{sang}_w\langle\top\delta\rangle]; [p|p = \bot\omega||];[\text{CRT}_{\top\omega}\langle i, \bot\Omega\rangle]; [\bot\omega \in \top\omega||];$

        $[w|w \in \bot\omega|| \cap \bot\omega_2||]; ([\top\omega \in \bot\omega||]; ^\top[p|p = \top\omega||])$

Instead of $[w|w \in \bot\omega|| \cap \bot\omega_2||]$ in examples with two direct evidentials, the update $[\bot\omega \in \bot\omega_2||];$ would work. However, as discussed above, this does not work for examples with a direct evidential followed by a reportative. In any case, if conjunction

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[7]See Section 7.3.1 for a discussion of the status of this acceptance update.

updates are used, it seems that different ones will be needed for different types of sentence, depending on the conjuncts.

The two strategies for analyzing conjunction – each conjunct to have its own acceptance update and having a separate proposal update for the conjunction – make different predictions, and thus it should be possible to distinguish them empirically. For the remainder of this dissertation, I will adopt the first strategy, where each conjunct has its own acceptance update, if it makes an explicit proposal. I find this preferable to having to having multiple definitions of conjunction, even if it calls the metaphysical status of the acceptance update into question. The other strategy may turn out to be more desirable, but for the purpose of this dissertation it is important to have an explicit analysis of conjunction. Such an analysis is necessary to make the analysis of the challengeability tests explicit.

7.5 Challengeability Tests

In languages with parenthetical-like evidentials (see Faller (2002) and Chapter 3, above), the reportative's scope can be denied, as in (7.20). However, the reportative contribution itself is not deniable: (7.20) cannot be interpreted as 'Ko'éstse won, I hear, but I don't believe that I heard it'.

(7.20) i. *É-hó'táheva-**sėstse** Ko'éstse naa oha*
       3-won-RPT.3SG   Ko'éstse and CNTR
           ii. *ná-sáa-oné'seómátsésta-he-∅.*
               1-neg-believe_B-MOD_A-DIR
       'Ko'éstse won, I hear, but I don't believe it.'

In the proposed analysis, this fact comes out as a special case of propositional anaphora. A discourse referent is introduced for the at-issue proposition, the reportative's scope, here, the proposition that Ko'éstse won. However, no referent is introduced for the not-at-issue evidential contribution, the proposition that the speaker

heard that Ko'ėstse won. The proposed translation of (7.20) is given in (7.21)[8]. Because (7.20) is a single sentence, a conjunction, there is only one acceptance update and only one modal re-centering update (see Section 7.4).

(7.21) i. $^\top[\mathsf{x}|\mathsf{x} = \mathsf{ko'ėstse}]; [\mathsf{w}|\mathsf{won_w}\langle\top\delta\rangle]; [\mathsf{p}|\mathsf{p} = \bot\omega||]; [\mathsf{HRD}_{\top\omega}\langle\mathsf{i}, \bot\Omega\rangle];$

    ii. $[\mathsf{w}|\mathsf{believe_w}\langle\mathsf{i}, \bot\Omega\rangle]; [\mathsf{w}|\mathsf{w} \notin \bot\omega||]; [\mathsf{p}|\mathsf{p} = \bot\omega||]; [\mathsf{CRT}_{\top\omega}\langle\mathsf{i}, \bot\Omega\rangle];$

        $[\bot\omega \in \top\omega||]; ([\top\omega \in \bot\omega||]; {}^\top[\mathsf{p}|\mathsf{p} = \top\omega||])$

In (7.21i), the third update introduces a discourse referent for the at-issue proposition, that Ko'ėstse won. The first update of (7.21ii) refers back to this proposition. It is identified as the propositional argument of believe by means of the propositional anaphor $\bot\Omega$, which refers back to the most prominent (leftmost) proposition in the bottom sequence. At this point, there is only one propositional discourse referent in the bottom sequence, the one that refers to the at-issue proposition introduced in (7.21i). However, the third update of (7.21ii) introduces a new propositional discourse referent into the bottom sequence, which represents the at-issue proposition of (7.20ii), that the speaker doesn't believe that Ko'ėstse won. This becomes the new most prominent (leftmost) proposition in the bottom sequence, and is the proposition referred to by the fourth update of (7.21ii), $[\mathsf{CRT}_{\top\omega}\langle\mathsf{i}, \bot\Omega\rangle]$.

Thus, the truth conditions predicted for (7.20) are that the speaker heard that Ko'ėstse won, the speaker does not believe that Ko'ėstse won, and that the speaker has direct evidence for that belief. It is left open whether or not Ko'ėstse actually did win.

The same basic analysis can be given for the examples that show that evidentials cannot be directly challenged in discourse. For example, consider (7.22):

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[8]This translation is weaker than it should be. The sentence *I don't believe that Ko'ėstse won* does not mean that there is no state such that the speaker believes that Ko'ėstse won. It actually means something stronger: that the speaker believes that Ko'ėstse did not win. The same is true of Cheyenne (7.20). However, for simplicity, I have left the translation as it is in (7.21).

(7.22) a. *Méave'ho'eno   é-hestȧhe-**sėstse**   Mókéé'e.*
      Lame Deer   3-be.from-RPT.3SG   Mókéé'e
      'Mókéé'e is from Lame Deer, I hear.'

    b. *É-sáa-nė-hetóméto-hane-∅. É-sáa-hestȧhe-he-∅   Méave'ho'eno*
      3-neg-AN-be.true-MOD$_B$-DIR 3-neg-be.from-MOD$_A$-DIR Lame Deer
      'That's not true. She's not from Lame Deer.'

   b′. # *É-sáa-nė-hetóméto-hane-∅. Né-sáa-nė-néstó-he-∅.*
        3-neg-AN-be.true-MOD$_B$-DIR 3-neg-AN-hear.B-MOD$_A$-DIR
       # 'That's not true. You didn't hear that.'

The scope of the evidential in (7.22a) – that Mókéé'e is from Lame Deer – can be challenged and denied, as in (7.22b). However, the evidential contribution – that the speaker heard that Mókéé'e is from Lame Deer – can be neither challenged nor denied, as in (7.22b′). On the proposed analysis, only one propositional discourse referent is introduced by (7.22a), and that referent is for the proposition that Mókéé'e is from Lame Deer. Thus, the propositional anaphor in sentences like 'that's not true' cannot pick out the evidential contribution, only the at-issue proposition.

In a related phenomenon, in languages with illocutionary evidentials, the scope of the reportative can be false. An illustration of this is example (7.23), where the speaker indicates in the second conjunct that she has direct evidence to the contrary of what was presented in the first conjunct.

(7.23) i. *É-hó'tȧheva-**sėstse** Annie naa oha*   ii. *é-sáa-hó'tȧheva-he-∅.*
      3-win-RPT.3SG   Annie and CNTR   3-neg-win-MOD$_A$-DIR
      'Annie won, I hear, but I'm certain she didn't.'

The translation of (7.23) is given in (7.24), which is a compatible sequence of updates.

(7.24)   i. $^\top[x|x = \mathsf{annie}]; [w|\mathsf{won}_w\langle\top\delta\rangle]; [p|p = \bot\omega||]; [\mathsf{HRD}_{\top\omega}\langle i, \bot\Omega\rangle];$

      ii. $[w|\mathsf{won}_w\langle\top\delta\rangle]; [w|w \notin \bot\omega||]; [p|p = \bot\omega||]; [\mathsf{CRT}_{\top\omega}\langle i, \bot\Omega\rangle]; [\bot\omega \in \top\omega||];$

         $([\top\omega \in \bot\omega||];^\top[p|p = \top\omega||])$

The predicted truth conditions for (7.23) are that the speaker heard that Annie won, the speaker has direct evidence that Annie did not win, and in fact Annie did not win.

While the scope of the reportative can be false, the scope of the direct evidential cannot be. This is shown in (7.25), whose translation, given in (7.26), is an incompatible sequence of updates.

(7.25) $\#_\perp$ i. *É-hó'táhéva-Ø*   *Andy*   *naa*   *oha*   ii.   *é-sáa-hó'táheva-he-Ø.*
            3-win-DIR   Andy   and   CNTR   3-neg-win-MOD$_A$-DIR
            $\#_\perp$ 'Andy won, I'm sure, but I'm certain he didn't.'

(7.26)   i. $^\top[x|x = \mathsf{andy}]; [w|\mathsf{won}_w\langle\top\delta\rangle]; [p|p = \perp\omega||]; [\mathsf{CRT}_{\top\omega}\langle i, \perp\Omega\rangle]; [\perp\omega \in \top\omega||];$

         $[\top\omega \in \perp\omega||];$

     ii. $[w|\mathsf{won}_w\langle\top\delta\rangle]; [w|w \notin \perp\omega||]; [p|p = \perp\omega||]; [\mathsf{CRT}_{\top\omega}\langle i, \perp\Omega\rangle]; [\perp\omega \in \top\omega||];$

         $([\top\omega \in \perp\omega||]; {}^\top[p|p = \top\omega||])$

The key problem with (7.26) is that the proposals are contradictory – the proposal of the first conjunct is to add the proposition that Andy won to the common ground, while the proposal of the second conjunct is to add the proposition that Andy didn't win to the common ground. Updating with the conjunction update $[\perp\omega \in \perp\omega_3||]$ will result in the empty information state – one with no sequences – the absurd state. Consider what this update requires – that each most prominent bottom world $\perp\omega||$ is in the set of worlds $\perp\omega_3||$. However, at this point in (7.26), all of the most prominent bottom worlds are ones where Andy didn't win. The set of worlds $\perp\omega_3||$ is the set of worlds where Andy did win. No worlds, and thus no sequences, will satisfy this update. This result is not due to a peculiarity with the conjunction update – these conjuncts will come out as incompatible even if one of the alternate ways of translating conjunction is used (see Section 7.4).

Though the scope of the reportative can be denied, and can be false, the speaker is committed to the fact that she has reportative evidence for the at-issue proposition.

This is illustrated by example (7.27), whose translation is an incompatible sequence of updates. The key problem is that the proposal of the second conjunct is to add the proposition that the speaker didn't hear that Annie won to the common ground. However, at this point, because of the evidential contribution of the first conjunct, the common ground only includes worlds where the speaker heard that Annie won.

(7.27) $\#_\perp$ i. *É-hó'táheva-**sėstse** Annie naa oha*   ii. *ná-sáa-néstó-he-**Ø***.
           3-win-RPT.3SG   Annie and CNTR   1-neg-hear.st-*h(an)e*-DIR
           $\#_\perp$ 'Annie won, I hear, but I didn't hear that.'

7.6 Summary

In this chapter, I formally implemented the idea that speech acts have a general, three-part structure: the presentation of the at-issue proposition, a non-negotiable update (restriction), and a negotiable update (relation). Unlike the implementation in Chapter 5, this one can represent all three components, including the presentation of the at-issue proposition, which is modeled as the introduction of a propositional discourse referent into the bottom sequence. The distinction between at-issue and not-at-issue information is treated as a centering distinction – centering in the modal domain. At-issue information is tracked in the bottom sequence while not-at-issue information is tracked in the top sequence.

This implementation preserves the main results of the one presented in Chapter 5. Evidentials are not-at-issue content. They contribute new, not presupposed, information (contra Matthewson et al. 2007), and there is still no appeal to a separate level of meaning (contra Faller 2002). In addition, this implementation allows a novel account of the challengeability tests in terms of the availability of propositional discourse referents. In the next chapter, I extend this implementation to questions, which are also analyzed as having the three-part speech act structure.

Chapter 8

Questions in Update Semantics

Contents

8.1 Introduction

In Chapter 4, I proposed that all speech acts can be analyzed as having three components: the presentation of the at-issue proposition, not-at-issue information, which is added directly to the common ground, and at-issue information, which is proposed to be added to the common ground. In Chapter 7, I implemented the analysis of assertion in an update semantics with individual and modal discourse referents and showed its application to declarative sentences with evidentials. In this chapter, I

extend this implementation to another type of speech act: queries[1]. In particular, I analyze Cheyenne interrogatives and their interactions with evidentials. On this analysis, Cheyenne evidentials and illocutionary mood markers form a natural semantic class.

For queries, I propose that the presentation of the at-issue proposition is the presentation of all of the possible direct answers. Queries also involve a direct update to the common ground and a proposal. However, the content of the proposal for queries is different. Instead of proposing to add certain information to the common ground, the speaker is making a request for information, asking what information to add to the common ground. For polar interrogatives, these updates impose an equivalence relation on the information state, partitioning it into the two possible answers, effectively implementing Groenendijk and Stokhof (1984a). More generally, a cover is imposed over the common ground, representing each of the direct answers.

The proposed analysis directly extends to two phenomena related to questions: illocutionary variability and quantificational variability of interrogative nouns. In Cheyenne, content questions containing evidentials have a special property that I call illocutionary variability: they are ambiguous between a direct question and a statement of uncertainty. The interpretation of interrogative nouns can also vary, parallel to indeterminate pronouns in Japanese (see Kratzer and Shimoyama 2002). These phenomena can be accounted for using only previously introduced components, such as the definition of negation given in Chapter 7. On the proposed analysis, all of the possible answers are introduced. These alternatives remain available, and can interact with various operators.

This chapter is organized as follows. In Section 8.2, I summarize the analysis of

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[1]Throughout this chapter, I will use the term *interrogative* for a sentence type, the term *query* for the speech act of uttering an interrogative, and *question* for a semantic object, following the three-way terminological distinction in e.g., Ginzburg (1992) and Groenendijk and Stokhof (1996). The later authors use the term *interrogative act* for the speech act, instead of *query*.

questions in UC$_\omega$ given in Bittner (to appear). Though I do not directly use this analysis of questions, this illustration is useful as an example of how questions can be represented in UC$_\omega$. The remaining sections of this chapter formally implement the idea that queries have the same three components as assertions (see Chapter 4 for the informal analysis and Chapter 7 for the dynamic implementation of the analysis for assertions). In Section 8.3, I analyze one type of polar interrogative in Cheyenne: those formed with the interrogative mood suffix, which morphologically alternates with evidentials. In Section 8.4, I analyze the other type of Cheyenne polar interrogative, which is formed with an interrogative clitic. Such interrogatives can contain an evidential, which specifies the expected type of evidence for the requested answer. In Section 8.5, I extend the analysis to content questions containing evidentials. I also discuss the analysis of illocutionary variability and the quantificational variability of interrogative nouns. Section 8.6 is a summary.

8.2   Questions as Updates of Attention

In Bittner (to appear), queries are analyzed as a sequence of updates to attention only – they are pure attention updates. That is, they introduce discourse referents but they do not add information (eliminate rows or common ground worlds). This contrasts with the analysis of assertions discussed in Chapter 7, which involved updates of both attention and information (new discourse referents as well as a reduction in the common ground). However, the analysis of queries shares many features with the analysis of negation, given in Section 7.2.2. Like negation, the analysis of queries in Bittner (to appear) makes use of the bottom sequence. For Bittner (to appear), both the scope of the interrogative mood and a propositional discourse referent for the yes answer are introduced into the bottom sequence. As an example, consider (8.1) and the corresponding diagram in Figure 8.1.

(8.1) Is Annie sick?
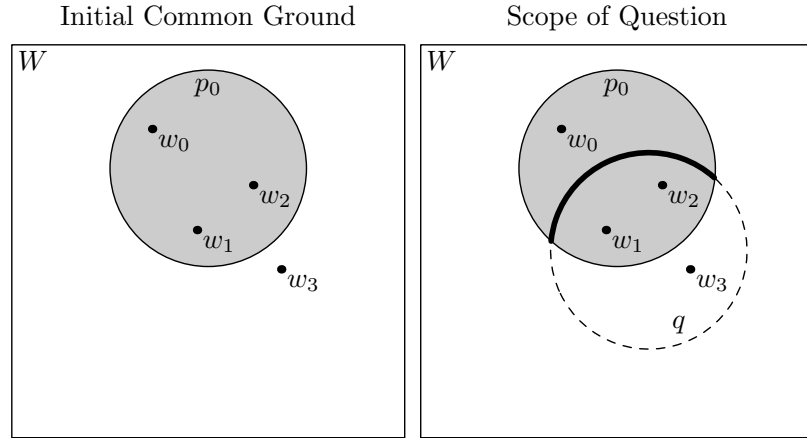
Figure 8.1: Diagram for the question (8.1), after Bittner (to appear)

The scope of the interrogative mood in example (8.1) is the proposition that Annie is sick (q in Figure 8.1). For Bittner (to appear), the scope of the interrogative mood, like the scope of negation (see Section 7.2.2), is introduced into the bottom sequence, represented in Figure 8.1 as a dashed circled. Figure 8.1 also represents the de facto partition of the common ground induced by this proposition. The partition is represented in the diagram by the thick black line. The translation of (8.1) into UC_ω[2] is given in (8.2) (adapted from Bittner (to appear)).

(8.2) $\underbrace{^\top[x|x = \mathsf{annie}]; [w|\mathsf{sick}_w\langle\top\delta\rangle];}_{\text{(scope of question)}} \underbrace{[p|p = \bot\omega||]}_{\text{(modal recentering (yes answer))}}$

The first two updates in (8.2) are the same as the ones for (7.3), the previously discussed example with negation. However, for queries, there is no update to the common ground. There is a modal re-centering update, but, it does not introduce a new propositional discourse referent for a new common ground, as in assertions.

[2]Update with Modal Centering – see Chapter 7 for a discussion of this system.

Instead, this update introduces a propositional discourse referent for the yes answer to the query. This discourse referent is introduced into the bottom sequence.

An example sequence of information states corresponding to the updates in (8.2) is given in Table 8.1. I assume the model given in the diagram (8.1): Annie is sick in w_1, w_2, and w_3 and is not sick in w_0. The default state c_0 contains three sequences. Each contains a propositional discourse referent for the default common ground p_0 and a world discourse referent for one of the worlds in the input common ground, w_{0-2}. The subsequent states c_{1-3} correspond sequentially to the output of the three updates in (7.4).

c_0	c_1	c_2	c_3
$\langle\!\langle w_0, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle a, w_0, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle a, w_0, p_0 \rangle \langle w_1 \rangle\!\rangle$	$\langle\!\langle a, w_0, p_0 \rangle \langle q, w_1 \rangle\!\rangle$
		$\langle\!\langle a, w_0, p_0 \rangle \langle w_2 \rangle\!\rangle$	$\langle\!\langle a, w_0, p_0 \rangle \langle q, w_2 \rangle\!\rangle$
		$\langle\!\langle a, w_0, p_0 \rangle \langle w_3 \rangle\!\rangle$	$\langle\!\langle a, w_0, p_0 \rangle \langle q, w_3 \rangle\!\rangle$
$\langle\!\langle w_1, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle a, w_1, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle a, w_1, p_0 \rangle \langle w_1 \rangle\!\rangle$	$\langle\!\langle a, w_1, p_0 \rangle \langle q, w_1 \rangle\!\rangle$
		$\langle\!\langle a, w_1, p_0 \rangle \langle w_2 \rangle\!\rangle$	$\langle\!\langle a, w_1, p_0 \rangle \langle q, w_2 \rangle\!\rangle$
		$\langle\!\langle a, w_1, p_0 \rangle \langle w_3 \rangle\!\rangle$	$\langle\!\langle a, w_1, p_0 \rangle \langle q, w_3 \rangle\!\rangle$
$\langle\!\langle w_2, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle a, w_2, p_0 \rangle \langle\ \rangle\!\rangle$	$\langle\!\langle a, w_2, p_0 \rangle \langle w_1 \rangle\!\rangle$	$\langle\!\langle a, w_2, p_0 \rangle \langle q, w_1 \rangle\!\rangle$
		$\langle\!\langle a, w_2, p_0 \rangle \langle w_2 \rangle\!\rangle$	$\langle\!\langle a, w_2, p_0 \rangle \langle q, w_2 \rangle\!\rangle$
		$\langle\!\langle a, w_2, p_0 \rangle \langle w_3 \rangle\!\rangle$	$\langle\!\langle a, w_2, p_0 \rangle \langle q, w_3 \rangle\!\rangle$

Table 8.1: Sample information states for (8.2) using model in (8.1)

The first update, $^\top[\mathsf{x}|\mathsf{x} = \mathsf{annie}]$, and the second update, $[\mathsf{w}|\mathsf{sick}_\mathsf{w}\langle\top\boldsymbol{\delta}\rangle]$, have the same effect as before. The first introduces the individual discourse referent a for Annie into the top sequence, resulting in c_1, and the second introduces the worlds where Annie is sick into the bottom sequence, resulting in c_2 (see Chapter 7 for further details). The third update, $[\mathsf{p}|\mathsf{p} = \bot\boldsymbol{\omega}||]$, is where the force of the interrogative comes in. This update introduces a propositional discourse referent q for the yes answer to the question into the bottom sequence, resulting in c_3.

This analysis of questions interacts with the definition of truth in this system. Everything is an update, so the semantic type of a term will not distinguish questions from assertions. However, truth is only defined on update terms that introduce a

propositional discourse referent into the top sequence. Questions do not do this, not in the analysis of Bittner (to appear) nor in the analysis I will propose below.

In the remainder of the chapter, I discuss the implementation of my analysis of queries in UC_ω. It builds on the implementation in Chapter 7 of the analysis of assertions as well as the analysis of questions in Bittner (to appear). I use the representation language, UC_ω, but I do not model questions in the same manner as Bittner (to appear, 2010), discussed above. However, I make use of the essential properties of the system, including the modeling of both information and attention and the distinction between the top and bottom sequences.

As discussed in Chapter 2, there are two types of polar interrogatives in Cheyenne: ones formed with an illocutionary mood marker and ones formed with an interrogative clitic. In the next section, I discuss the interrogatives formed with the mood suffix; the other type of interrogative is discussed in Section 8.4.

8.3 The Polar Interrogative Mood

In Chapter 4, I argued that, like assertions, queries can be analyzed as having three components: the presentation of the at-issue proposition, a not-at-issue restriction, and a structuring update. In this section, I give an implementation of that proposal in UC_ω. Specifically, I use this three-part structure to give a semantic analysis of Cheyenne polar interrogatives formed with an illocutionary mood suffix. This analysis is extended to the other type of Cheyenne polar interrogative in Section 8.4.

Evidentials in Cheyenne morphologically alternate with illocutionary mood suffixes (see Chapter 2). One such illocutionary mood suffix is -*he*, the marker for polar interrogative mood, illustrated in (8.3). Because the interrogative suffix occurs in the same morphological slot as the evidentials, evidentials cannot occur in this type of interrogative. Thus, this type of interrogative is evidentially unspecified. Evidentially

unspecified interrogatives can be answered with a sentence containing any evidential.

Two possible answers to (8.3) are given in (8.4).

(8.3) *É-hó'táheva-__he__* *Andy?*
     3-win-Y/N   Andy
     'Given your evidence, did Andy win?'

(8.4) ✓A_1: *Héehe'e* *é-hó'táheva-__séstse__.*   ✓A_2: *Héehe'e* *é-hó'táhéva-Ø.*
             Yes   3-win-RPT.3SG   Yes   3-win-DIR
             'Yes, he won, I hear.'   'Yes, he won, I'm sure.'

The diagram illustrating the proposed analysis of (8.3) is given below in Figure 8.2.
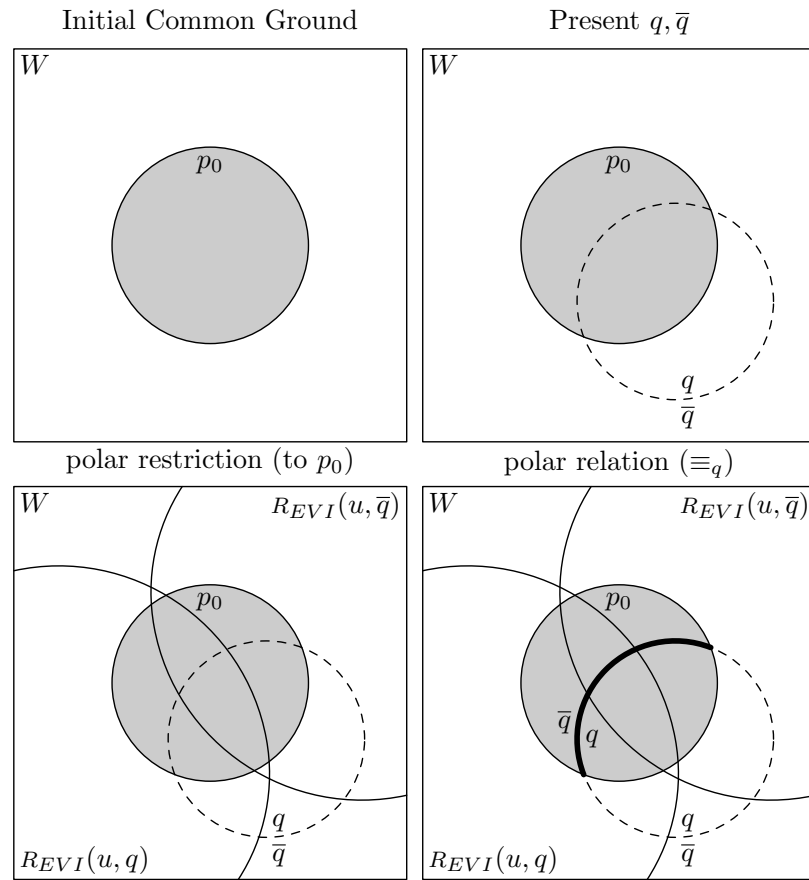
Figure 8.2: Diagram for the polar interrogative with interrogative mood (8.3)

The implementation in UC$_\omega$ of this three-part analysis of queries draws on the implementation of the analysis of assertion in Chapter 7. The presentation component

for queries is the presentation of the possible answers. As with assertions, I implement this in UC_ω as the introduction of propositional discourse referents into the bottom sequence. However, for queries, one propositional discourse referent is introduced for each possible direct answer. For polar interrogatives, the possible direct answers are the at-issue proposition and its complement. For (8.3), the at-issue proposition is the proposition that Andy won and its complement is the proposition that Andy did not win. The not-at-issue restriction for queries is implemented directly parallel to the restriction for assertions: it is a condition on common ground worlds, the most prominent worlds in the top sequence. However, in queries, this restriction is a presupposition – a condition on the input common ground. The structuring relation for queries is a partition. However, this relation does not to be explicitly stated in an update – it is imposed by the previous updates.

For example, consider the translation of (8.3) into UC_ω given in (8.5).

(8.5) $\underbrace{^\top[x|x = \mathsf{andy}]; [w|\mathsf{won}_w\langle\top\delta\rangle]; [p|p \in {}^?\bot\omega||]}_{\text{(presentation of possible answers)}}; \underbrace{^\mathsf{P}[\mathsf{EVI}_{\top\omega}\langle u, \bot\Omega\rangle]}_{\text{(not-at-issue restriction)}}$

The first two updates in (8.5) are the same as with the evidentials in Section 7.3: the introduction of an individual discourse referent for Andy into the top sequence and the introduction of discourse referents the worlds where Andy won into the bottom sequence. These represent the at-issue proposition.

The third update, $[p|p \in {}^?\bot\omega||]$, introduces a discourse referent for the at-issue proposition and its complement, the possible direct answers. These propositions are $\bot\omega||$ (the proposition that Andy won) and the complement set of $\bot\omega||$ (the proposition that Andy didn't win). The set of these two propositions is represented in (8.5) as ${}^?\bot\omega||$: $[\![{}^?\bot\omega||]\!]^g = \{[\![\bot\omega||]\!]^g, [\![\overline{\bot\omega||}]\!]^g\}$, where $[\![\overline{A}]\!]^g = D_\omega \setminus [\![A]\!]^g$.

The last update in (8.5), $^\mathsf{P}[\mathsf{EVI}_{\top\omega}\langle u, \bot\Omega\rangle]$, is the not-at-issue restriction. In queries, this is a classical presupposition, required to be entailed by the input common ground,

as depicted in Figure 8.2. It does not add new information in that it does not eliminate topic worlds (common ground worlds). However, it can eliminate rows. In particular, this update requires that, for each row, the most prominent propositional discourse referent in the bottom sequence, $\bot\Omega$, is the proposition that the addressee u has evidence for in the topical world $\top\omega$. In other words, it checks that the direct answers are matched with evidence the addressee has.

Unlike the analysis of the direct evidential (see Section 7.3.1), but like that of the reportative (see Section 7.3.2), queries do not require an update that explicitly states the illocutionary relation. The illocutionary relation for polar interrogatives is an equivalence relation, which is imposed already by the updates given in (8.5). The possible answers, the at-issue proposition and its complement, impose a partition on the common ground.[3] The discourse referents for the possible answers impose a partition on the information state: there are two substates, one for each of the two direct answers.

As an example to illustrate the updates in (8.5), let's consider a model where Andy won in worlds w_4, w_5, and w_6 and didn't win in any other worlds, the addressee has evidence in w_2 and w_6 that Andy won, and has evidence in w_1 and w_5 that Andy didn't win. We can even be more specific and say that the kind of evidence the addressee has is reportative in worlds w_1 and w_6 and direct in worlds w_2 and w_5.

The sequence of updates in Table 8.2 assumes this model and a common ground p_0 containing four worlds, w_1, w_2, w_5, and w_6. One world where Andy won, w_4, is excluded from the common ground and there are no worlds in the common ground where the addressee has no evidence for either answer. For simplicity, there are also no worlds where the addressee has evidence for both propositions. An example which includes worlds where the addressee has evidence for both propositions is given in

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[3]For queries in general, a cover is imposed on the common ground, not a partition. See Section 8.5 for a discussion of content questions.

Appendix C.

c_1	c_2	c_3	c_4
$\langle\langle a, w_1, p_0 \rangle\langle \ \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle w_4 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle q, w_4 \rangle\rangle$	
		$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$
	$\langle\langle a, w_1, p_0 \rangle\langle w_5 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle q, w_5 \rangle\rangle$	
		$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$
	$\langle\langle a, w_1, p_0 \rangle\langle w_6 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle q, w_6 \rangle\rangle$	
		$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$
$\langle\langle a, w_2, p_0 \rangle\langle \ \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle w_4 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_4 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_4 \rangle\rangle$
		$\langle\langle a, w_2, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$	
	$\langle\langle a, w_2, p_0 \rangle\langle w_5 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_5 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_5 \rangle\rangle$
		$\langle\langle a, w_2, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$	
	$\langle\langle a, w_2, p_0 \rangle\langle w_6 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_6 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_6 \rangle\rangle$
		$\langle\langle a, w_2, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$	
$\langle\langle a, w_5, p_0 \rangle\langle \ \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle w_4 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle q, w_4 \rangle\rangle$	
		$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$
	$\langle\langle a, w_5, p_0 \rangle\langle w_5 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle q, w_5 \rangle\rangle$	
		$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$
	$\langle\langle a, w_5, p_0 \rangle\langle w_6 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle q, w_6 \rangle\rangle$	
		$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$
$\langle\langle a, w_6, p_0 \rangle\langle \ \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle w_4 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_4 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_4 \rangle\rangle$
		$\langle\langle a, w_6, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$	
	$\langle\langle a, w_6, p_0 \rangle\langle w_5 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_5 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_5 \rangle\rangle$
		$\langle\langle a, w_6, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$	
	$\langle\langle a, w_6, p_0 \rangle\langle w_6 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_6 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_6 \rangle\rangle$
		$\langle\langle a, w_6, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$	

Table 8.2: Sequence of updates for (8.5)

The first two updates in (8.5) are the same as the examples given in Chapter 7: the first update adds a discourse referent for Andy to the top sequence (c_1) and the second adds the worlds where Andy won to the bottom sequence, for each sequence in the input (c_2). In c_3, the result of updating c_2 with $[\mathsf{p}|\mathsf{p} \in \ ^?\bot\boldsymbol{\omega}||]$, there are two sequences for every sequence in c_2. Each has a propositional discourse referent introduced into the bottom sequence, q for the yes answer, that Andy won, and $\bar{q}$ for the no answer, that Andy did not win.[4] The last update, $^{\mathsf{P}}[\mathsf{EVI}\top_{\boldsymbol{\omega}}\langle\mathsf{u}, \bot\boldsymbol{\Omega}\rangle]$, is the evidential restriction,

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[4] I use the symbol $\bar{q}$ to represent the complement of q: $D_{\boldsymbol{\omega}} \setminus q$.

which is presuppositional in queries. The presupposition is satisfied because it does not reduce the common ground ($\top\omega\|$ in $c_3 = \top\omega\|$ in c_4). However, this update does eliminate rows. Specifically, it eliminates rows where, row-wise, the proposition $\bot\Omega$ is not the proposition that the addressee has evidence for in $\top\omega$. That is, the update $^\mathsf{P}[\mathsf{EVI}_{\top\omega}\langle\mathsf{u}, \bot\Omega\rangle]$ aligns answers (q and $\overline{q}$) with the evidence the addressee has in each top (common ground) world.

An interrogative update can be defined as a sequence of updates that introduces multiple propositional discourse referents into the the most prominent position of the bottom sequence of an information state. In other words, the leftmost column in the bottom sequence contains multiple propositional discourse referents. This intuition is formalized in Definition 1 below.

Definition 1 (Interrogative Update). Given an information state c, an $(st)st$ term K introduces the set of primary bottom referents $\bot_c K = \{(\bot j)_1 | \; j \notin {}^{\{\}}c \; \& \; \forall g : \; j \in {}^{\{\}}(\llbracket K \rrbracket^g(c))\}$. K is a *interrogative update* iff $|\bot_c K| \geq 2$ and $\bot_c K \subseteq D_{\omega t}$.

This set of propositions can be thought of as the *answer set* for the interrogative update.For example, in Table 8.2, the answer set for the interrogative update (8.5) given the input state c_0 is the set $\{q, \overline{q}\}$. The propositions in this answer set will be the at-issue propositions of the direct responses. I will give an explicit definition of answerhood below. However, I would first like to say a bit more about Definition 1.

This definition of interrogative update is closely parallel to the definition of declarative update in Bittner (to appear), discussed above in Chapter 7. In addition, it adapts the definition of inquisitiveness used in Inquisitive Semantics (e.g., Groenendijk and Roelofsen 2009; Groenendijk 2009). For Groenendijk and Roelofsen (2009), a question is inquisitive (involving multiple alternatives) and not informative. At some point, it might be necessary to add this later requirement to the definition in

1 – that an interrogative update does not reduce the common ground, i.e. that the set of most prominent worlds in the top sequence in the output state is identical to the set in the input state. (Given an information state c, an $(st)st$ term K does not update the common ground if and only if, for all assignments g, $\top\omega_1\{c\} = \top\omega_1\{[\![K]\!]^g(c)\}$.) However, at this point, I will refrain, as it seems at least plausible that there are interrogative sentences that could be informative.[5]

After the sequence of updates in (8.5), there is a partition on the information state – there are sequences with a discourse referent for the yes answer, the at-issue proposition, and sequences with a discourse referent for the no answer, the complement of the at-issue proposition.[6] This analysis adapts partition theories of questions, e.g., Groenendijk and Stokhof (1984a), and theories of questions as sets of propositions, e.g., Hamblin (1973). On this analysis, a question corresponds to a partition of an information state – not a set of worlds. This partition is imposed by a set of propositions: the most prominent propositions in the bottom sequence, which are the at-issue proposition and its complement.

These propositions, q and $\overline{q}$, are what I have been calling the possible direct answers to (8.3), the members of the answer set of (8.5). Now that the theory has been laid out in detail, I can be more specific. Direct responses are substates of the question information state, one of the partitions identified by the most prominent proposition on the bottom sequence. These propositions are what, on a theory like that of Hamblin (1973), would be identified as the possible answers. However, on the proposed analysis there is additional information associated with each proposition

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[5]Initially plausible examples are interrogatives that include non-restrictive relative clauses or appositives, e.g., *Has Gwen, Lucy's sister, arrived yet?*

[6]These two propositions also impose a partition on the common ground; however, this partition does not directly line up with the partition on the information state imposed by the two propositional discourse referents. Not all worlds where Andy sang are worlds where the addressee has evidence that Andy sang, and vice versa. This is clear in Figure 8.2 – the common ground is split into several cells.

that is stored in the information state. Identifying direct answers with substates allows this information to be included in the answer. But there is still a correspondence to the traditional notion of answer. The set of the most prominent propositions on the bottom sequence, the answer set $\bot_c K$, is equivalent to the set of possible answers in Hamblin (1973). On the proposed analysis, any direct response will have one of the propositions in the answer set as its at-issue proposition.

To illustrate, in Table 8.3 I have reordered the information state c_4, the output of the updates for the question, so that the partitions, and thus the answers, are clear.

c_4, reordered

top worlds are $\neg q$-worlds	$\langle\langle\, a, w_2, p_0\,\rangle\langle\, q, w_4\,\rangle\rangle$
	$\langle\langle\, a, w_2, p_0\,\rangle\langle\, q, w_5\,\rangle\rangle$
	$\langle\langle\, a, w_2, p_0\,\rangle\langle\, q, w_6\,\rangle\rangle$
top worlds are q-worlds	$\langle\langle\, a, w_6, p_0\,\rangle\langle\, q, w_4\,\rangle\rangle$
	$\langle\langle\, a, w_6, p_0\,\rangle\langle\, q, w_5\,\rangle\rangle$
	$\langle\langle\, a, w_6, p_0\,\rangle\langle\, q, w_6\,\rangle\rangle$
top worlds are $\neg q$-worlds	$\langle\langle\, a, w_1, p_0\,\rangle\langle\, \overline{q}, w_4\,\rangle\rangle$
	$\langle\langle\, a, w_1, p_0\,\rangle\langle\, \overline{q}, w_5\,\rangle\rangle$
	$\langle\langle\, a, w_1, p_0\,\rangle\langle\, \overline{q}, w_6\,\rangle\rangle$
top worlds are q-worlds	$\langle\langle\, a, w_5, p_0\,\rangle\langle\, \overline{q}, w_4\,\rangle\rangle$
	$\langle\langle\, a, w_5, p_0\,\rangle\langle\, \overline{q}, w_5\,\rangle\rangle$
	$\langle\langle\, a, w_5, p_0\,\rangle\langle\, \overline{q}, w_6\,\rangle\rangle$

yes answer, $\bot\Omega = q$ (first six rows)

no answer, $\bot\Omega = \overline{q}$ (last six rows)

Table 8.3: Last information state in (8.5), with rows reordered

The yes answer corresponds to the substate that has q as the most prominent propositional discourse referent on the bottom sequence ($\bot\Omega$). All of the common ground worlds in this substate are worlds where the addressee has evidence for q. The no answer corresponds to the substate which has $\overline{q}$ as the most prominent propositional discourse referent on the bottom sequence. All of the common ground worlds in this substate are worlds where the addressee has evidence for $\overline{q}$. A simple *yes* or *no* answer will pick out one of these substates: *yes* can be translated as $[\bot\Omega = \bot\omega||]$ and *no* as $[\bot\Omega = \overline{\bot\omega}||]$. Essentially, the yes reply indicates that the responder has evidence for the proposition that Andy win. The no reply indicates that the responder has

evidence for the proposition that Andy did not win.

On this analysis of questions, a short answer of *yes* or *no* does not entail the truth of that proposition. That is, the substate picked out by a yes answer does not entail the truth of the proposition q, that Andy won. The substate representing the yes answer, where $\bot\Omega = q$, includes both q and $\neg q$ top worlds (common ground worlds), as illustrated in Table 8.3. In other words, the propositional discourse referents determines the answer, but not the truth, or falsity, of the proposition represented by that discourse referent.

This property of the analysis of Cheyenne interrogatives is essential because a response to a query can contain a reportative evidential, which, as discussed above (e.g., in Chapter 4), does not commit the speaker to the truth or falsity of the reportative's scope.[7] It is the content of the full response to the query that will determine whether or not the information that Andy won will be added to the common ground.

Let me at last turn to the formal definition of answerhood. It must allow sentences with various kinds of evidentials to express answers to (8.3), which is evidentially unspecified. However, responses must have an at-issue proposition that is in the answer set of the query. Consider again the interrogative in (8.3), repeated below, and four possible responses given in (8.4), the first three of which are felicitous. The response in A_4 is not felicitous because its at-issue proposition is not a member of the answer set for (8.3).

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[7]It is an open question whether this feature should be present in an analysis of English questions. I am inclined to say that it should be. It seems like a way of understanding interrogatives like *Given your evidence, did Andy win?*, a translation of the Cheyenne interrogative. The answer "yes" to such a query does not necessarily entail the truth of the proposition that Andy won. As another example, consider the interrogative *Given what you heard, am I the murderer?*. An affirmative reply to this query should not add the information that the speaker is the murderer to the common ground. While this analysis might extend to interrogatives containing parentheticals or epistemic modals, it is unclear whether it should extend to basic interrogatives. Is the following a good query/response pair? Q: *Did Andy win?* A: *Yes, he won, I hear.* What about answers like *Yes, I hear he won* or *Yes, I think.* Do they commit the answerer to Andy having won?

(8.3) *É-hó'táheva-**he*** *Andy?*
     3-win-Y/N   Andy
     'Given your evidence, did Andy win?'

(8.4) ✓ A_1: *Héehe'e* *é-hó'táheva-**séstse***   ✓ A_2: *Héehe'e* *é-hó'táhéva-**Ø***
          Yes   3-win-RPT.3SG   Yes   3-win-DIR
          'Yes, he won, I hear.'   'Yes, he won, I'm sure.'

     ✓ A_3: *Hová'áháne* *é-sáa-hó'táheva-he-**séstse***
          No   3-neg-win-MOD$_A$-RPT.3SG
          'No, he didn't win, I hear.'

     # A_4: *Héehe'e* *é-hó'táheva-**séstse***
           Yes   3-win-RPT.3SG
           'Yes, Lucy won, I hear.'

The definition of answerhood must be flexible enough to account for the different effects a response can have on the common ground. Answering (8.3) with (8.4A_2), which contains a direct evidential, will result in the proposition that Andy won being added to the common ground. However, answering (8.3) with (8.4A_1), which contains a reportative, will *not* result in the proposition that Andy won being added to the common ground. Even in a response to a query, the reportative evidential does not commit the speaker to the reportative's scope. The only information conveyed by (8.4A_1) is the type of evidence the answerer has for the proposition that Andy won.

The definition of a direct response is given below in Definition 2. It incorporates the previously introduced notion of the set of primary bottom referents, $\perp_c K$, which for an interrogative update is the answer set. It also adapts the notion of the set of primary topics to the set of primary world topics, which are the worlds in the current common ground: $\top\omega_c K = \{((\top j)_\omega)_1 | \ \forall g : \ j \in {}^{\{\}}(\llbracket K \rrbracket^g(c))\}$.

Definition 2 (Answerhood). Given an information state c, and $(st)st$ terms K, K', K' is a *direct response* to K iff K is an interrogative update, $\exists p \in D_{\omega t} : \perp_c K' = \{p\}$ & $p \in \perp_c K$, and $\top\omega_c K' \subseteq \top\omega_c K$.

The first condition, that K is an interrogative update, will ensure that the set of primary bottom referents for K will have the right structure, i.e., that it will be an answer set. The second condition requires that the at-issue proposition of the response ($p_{\omega t} : \bot_c K' = \{p\}$) is in the answer set associated with the interrogative update ($p \in \bot_c K$). The last condition requires that the not-at-issue content of the response entails the not-at-issue content of the query. This last condition is crucial for the analysis of interrogatives containing evidentials, as will be discussed in the next section. First, I would like to apply this definition of answerhood to the replies in (8.4).

Sentences A_1, A_2, and A_3 in (8.4) can all be used as felicitous replies to (8.3). The analysis of (8.3), given in (8.5), is an interrogative update, so the first condition of Definition 2 is met. The at-issue proposition of A_1 and A_2 is the same: the proposition that Andy won. The at-issue proposition of A_3 is the proposition that Andy did not win. Both of these propositions are in the answer set of (8.5), so the second condition of Definition 2 is met. The not-at-issue content of (8.4) is that the addressee has some (any) kind evidence for one of the propositions in the answer set. Thus, any evidential relation to either of the propositions in the answer set will satisfy the last condition of Definition 2.

Sentence A_4 in (8.4) is not a felicitous reply to (8.3). The second condition of Definition 2 rules this response out. The at-issue proposition of A_4 is the proposition that Lucy won; this is not one of the propositions in the answer set.

To summarize, under Definition 2, all felicitous direct responses to (8.3) will have as their at-issue proposition either that Andy won or that he did not win. In addition, they will indicate what type of evidence the responder has for the at-issue proposition.

In the next section, I apply the analysis presented in this section to Cheyenne interrogatives formed with an interrogative clitic. Evidentials occur in this type of interrogative, restricting the space of possible responses.

8.4 The Polar Interrogative Clitic

In the previous section, I discussed interrogatives formed with an illocutionary mood marker. The interrogative mood alternates with evidentials, and thus questions formed with this mood cannot contain evidentials. However, there is another way to form polar interrogatives in Cheyenne: with the interrogative clitic *mó=*. Such questions can contain evidentials, as in (8.6) with the reportative. Question (8.6) is only felicitous in a context where it is clear the addressee will have reportative evidence for her answer. For example, imagine a context where Annie overhears Dale on the telephone. Dale asks the person on the telephone "Did Andy win?" Annie hears this question, but not the answer. However, she expects that Dale will have reportative evidence for the answer, whatever it is (e.g., yes, he win, or no, he didn't win). When Dale gets off the phone, Annie can ask him (8.6).

(8.6) *Mó=é-hó'táheva-**séstse** Andy?*
       y/n=3-win-RPT.3SG   Andy
       'Given what you heard, did Andy win?'

(8.7) ✓ *A₁: Héehe'e é-hó'táheva-**séstse***   #A₂: *Héehe'e é-hó'táhéva-**Ø***
        Yes   3-win-RPT.3SG   Yes   3-win-DIR
        'Yes, he won, I hear.'   'Yes, he won, I'm sure.'

The evidential that occurs in the interrogative constrains the possible answers, as in (8.7). Example (8.7A₁), which contains a reportative evidential, is a felicitous response to (8.6) while (8.7A₂), which contains a direct evidential, is not a felicitous response.

Evidentials in interrogatives, like evidentials in declaratives, contribute to the not-at-issue component, a presupposition in questions. The diagram corresponding to the analysis is given in Figure 8.3 – it is directly parallel to the question formed with the interrogative mood except a specific evidential relation is required. The translation

of (8.6) into UC_ω is given in (8.8).
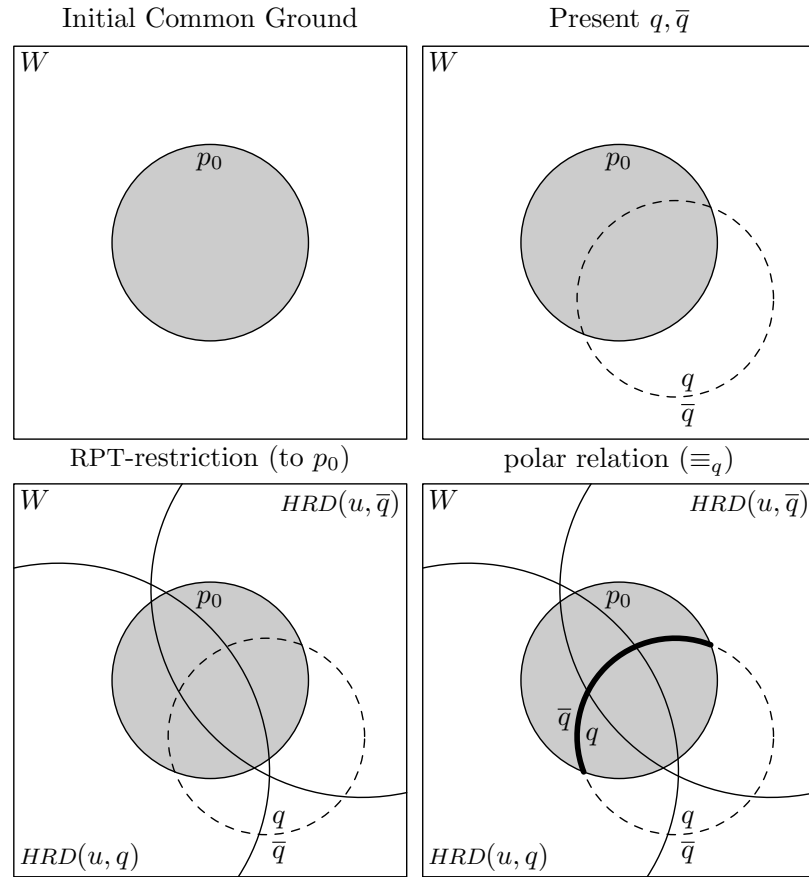
Figure 8.3: Diagram for the polar interrogative with interrogative clitic (8.6)

(8.8) $\underbrace{^\top[x|x = \mathsf{andy}]; [w|\mathsf{sang_w}\langle\top\delta\rangle]; [p|p \in {}^?\!\bot\omega|]|}_{\text{(presentation of possible answers)}}; \underbrace{{}^\mathsf{P}[\mathsf{HRD}_{\top\omega}\langle u, \bot\Omega\rangle]}_{\text{(not-at-issue restriction)}}$

The translation of (8.8) is nearly identical to (8.5), the translation of the polar interrogative formed with the illocutionary mood suffix. The only difference is the content of the not-at-issue restriction has changed. In (8.8), the not-at-issue evidential restriction is that the addressee has reportative evidence for the answer, written ${}^\mathsf{P}[\mathsf{HRD}_{\top\omega}\langle u, \bot\Omega\rangle]$. It is this condition that accounts for the fact that evidentials in interrogatives restrict the space of felicitous responses – it affects the content of the

substates. The updates corresponding to (8.8) will look the same as the updates for (8.5), given in Table 8.2, modulo a slight change in the model, replacing 'has evidence for' with 'has reportative evidence for'.

As an example to illustrate the updates in (8.8), let's consider a model where Andy won in worlds w_4, w_5, and w_6 and didn't win in any other worlds. Let's also assume that the addressee has reportative evidence in w_2 and w_6 that Andy won, reportative evidence in w_1 and w_5 that Andy didn't win, direct evidence that Andy won in w_4 and w_6, and no other evidence for either answer.

The sequence of updates in Table 8.4 assumes this model and a common ground p_0 containing four worlds, w_1, w_2, w_5, and w_6. One p-world, w_4, is excluded from the common ground. This omission is intended, and necessary: w_4 is a world where the only evidence that the addressee has is direct evidence that Andy won. This world is excluded by the presupposition contributed by the not-at-issue restriction, $^\mathsf{P}[\mathsf{HRD}_{\top\omega}\langle \mathsf{u}, \bot\Omega\rangle]$. If w_4 were included in the common ground, this update would eliminate a topic world, a common ground world, and the presupposition would fail. So, only worlds where the addressee has reportative evidencen for one of the answers are included in the common ground. This accords with the intuitions described above that this type of interrogative is only felicitous in a context where it has been established that the addressee has reportative evidence for an answer.

Certain other worlds have been intentionally omitted from the common ground. There are no worlds in the example common ground where the addressee has no evidence for either answer. These worlds would also be ruled out by the presupposition contributed by the not-at-issue restriction, $^\mathsf{P}[\mathsf{HRD}_{\top\omega}\langle \mathsf{u}, \bot\Omega\rangle]$. Furthermore, for simplicity, I have not included worlds where the addressee has reportative evidence for both answers in the model. An example that includes such worlds is given in Appendix C.

c_1	c_2	c_3	c_4
$\langle\langle a, w_1, p_0 \rangle\langle \ \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle w_4 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle q, w_4 \rangle\rangle$	
		$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$
	$\langle\langle a, w_1, p_0 \rangle\langle w_5 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle q, w_5 \rangle\rangle$	
		$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$
	$\langle\langle a, w_1, p_0 \rangle\langle w_6 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle q, w_6 \rangle\rangle$	
		$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$
$\langle\langle a, w_2, p_0 \rangle\langle \ \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle w_4 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_4 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_4 \rangle\rangle$
		$\langle\langle a, w_2, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$	
	$\langle\langle a, w_2, p_0 \rangle\langle w_5 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_5 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_5 \rangle\rangle$
		$\langle\langle a, w_2, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$	
	$\langle\langle a, w_2, p_0 \rangle\langle w_6 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_6 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_6 \rangle\rangle$
		$\langle\langle a, w_2, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$	
$\langle\langle a, w_5, p_0 \rangle\langle \ \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle w_4 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle q, w_4 \rangle\rangle$	
		$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$
	$\langle\langle a, w_5, p_0 \rangle\langle w_5 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle q, w_5 \rangle\rangle$	
		$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$
	$\langle\langle a, w_5, p_0 \rangle\langle w_6 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle q, w_6 \rangle\rangle$	
		$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$
$\langle\langle a, w_6, p_0 \rangle\langle \ \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle w_4 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_4 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_4 \rangle\rangle$
		$\langle\langle a, w_6, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$	
	$\langle\langle a, w_6, p_0 \rangle\langle w_5 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_5 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_5 \rangle\rangle$
		$\langle\langle a, w_6, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$	
	$\langle\langle a, w_6, p_0 \rangle\langle w_6 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_6 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_6 \rangle\rangle$
		$\langle\langle a, w_6, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$	

Table 8.4: Sample information states for (8.8)

The first three updates in (8.8) are the same as in (8.5), the polar interrogative formed with the illocutionary mood marker. The first update adds a discourse referent for Andy to the top sequence (c_1) and the second adds the worlds where Andy won to the bottom sequence, for each sequence in the input (c_2). The third update introduces a propositional discourse referent for the at-issue proposition, that Andy won, and its complement (c_3). This is the answer set.

The last update in (8.8) is the not-at-issue restriction. It has the same form as the last update in (8.5), but contains a different, more strict requirement. It requires for each row that the addressee has reportative evidence for the bottom proposition,

or answer, in that row. It eliminates several rows, as can be seen in c_4. However, since it is a presupposition, no common ground worlds are eliminated.

The definitions given in Section 8.3 when discussing interrogatives formed with the illocutionary mood morphology work equally well for the interrogatives discussed in this section, which are formed with the interrogative clitic and contain evidentials. The evidential in the interrogative restricts the felicitous responses to sentences containing the same evidential, as can be seen in (8.6) and (8.7), repeated below.

(8.6) *Mó=é-hó'táheva-sėstse* *Andy?*
    y/n=3-win-RPT.3SG   Andy
    'Given what you heard, did Andy win?'

(8.7) ✓A_1: *Héehe'e* *é-hó'táheva-sėstse.*   #A_2: *Héehe'e* *é-hó'táhéva-Ø.*
        Yes   3-win-RPT.3SG   Yes   3-win-DIR
        'Yes, he won, I hear.'   'Yes, he won, I'm sure.'

Responses to (8.6) that contain a reportative evidentials, e.g., A_1 in (8.7), are felicitous. Responses with other types of evidentials are not felicitous. For example, A_2 in (8.7), which contains a direct evidential, is not a felicitous response to (8.6), even though it has a suitable at-issue proposition.[8]

The definition of answerhood given above in Section 8.3, repeated below, successfully accounts for the (in)felicity of these responses. A_1 is a felicitous response to (8.6) because it meets all three of the definition's conditions. However, A_2 does not meet the third condition, that the not-at-issue content of the response entails the not-at-issue content of the query. The not-at-issue content of (8.6) is that the addressee/responder has reportative evidence for one of the answers. The not-at-issue content of A_2 is that the addressee/responder has direct evidence for the proposition

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[8]However, a follow-up to the response that contains a direct evidential is not semantically ruled out (see, e.g., (7.23) in Section 7.5).

that Andy won, which does not entail that the addressee has reportative evidence for any proposition. (See Section 8.3 for a discussion of this definition.)

8.5   Content Interrogatives

Content interrogatives with evidentials in Cheyenne, such as (8.9), display a property I call illocutionary variability. That is, they can have two interpretations that vary in their illocutionary force. The first interpretation, illustrated in (8.9i), is a direct question that restricts the possible answers to the evidential specified in the question, as with polar interrogatives formed with the interrogative clitic. The second interpretation, given in (8.9ii), is not a direct question – it is a statement of uncertainty.

(8.9) *Tósa'e   é-hoo'e-**séstse**   Andy*
     where   3-live-RPT.3SG   Andy
    (i) 'Given what you heard, where does Andy live?'
    (ii) 'Andy lives somewhere, I wonder where.'

The translation of the first interpretation, (8.9i), is given in (8.10). It is parallel to the polar interrogative containing a reportative evidential, given above in (8.8).[9]

(8.10) $\underbrace{[\mathsf{w}\ \mathsf{x}|\mathsf{place}_\mathsf{w}\langle\mathsf{x}\rangle];\ ^\top[\mathsf{x}|\mathsf{x} = \mathsf{andy}];[\mathsf{live}_{\perp\omega}\langle\top\delta, \perp\delta\rangle];[\mathsf{p}|\mathsf{p} = \perp\omega||_{\perp\delta}]}_{\text{(presentation of possible answers)}};\underbrace{^\mathsf{P}[\mathsf{HRD}_{\top\omega}\langle\mathsf{u}, \perp\Omega\rangle]}_{\text{(not-at-issue restriction)}}$

The only new component of the translation in (8.10) occurs in the last update of the presentation component: $[\mathsf{p}|\mathsf{p} = \perp\omega||_{\perp\delta}]$. The function of this update is to introduce a propositional discourse referent for each of the possible answers, e.g., Andy lives in Chicago, Andy lives in Detroit, etc. There is one proposition for each

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[9]In the translation in (8.10), I've treated the fact that there is a place as part of the at-issue proposition. The place predicate could instead be treated as a fact about the actual world: $[\mathsf{x}];^\mathsf{P}[\mathsf{place}_{\top\omega}\langle\perp\delta\rangle]$. It is presently unclear which translation would better track the data.

place in the domain, so the propositions need to be restricted to places. This is the effect of the subscript $\perp\delta$ on $\perp\omega||$ in $[\mathsf{p}|\mathsf{p} = \perp\omega||_{\perp\delta}]$; $\perp\omega||_{\perp\delta}$ represents the bottom column of worlds restricted to a specific individual, also in the bottom sequence ($\perp\delta$). This is a substate of the information state, restricted to specific individual (here, a place) on the bottom sequence. A propositional discourse referent is introduced for each substate, representing each possible answer.

As an example, consider a model where there are two places, Chicago (c) and Detroit (d). There are four worlds: w_0, w_1, w_2 and w_3. Chicago is a place in worlds w_0 and w_1 only, and Detroit is a place in worlds w_1, w_2 and w_3. Andy lives in Chicago in worlds w_0 and w_1 and in Detroit in worlds w_2 and w_3. In worlds w_1 and w_3, the addressee heard that Andy lives in Chicago, in worlds w_2 and w_3 the addressee heard that Andy lives in Detroit, and the addressee has no other reportative evidence in any world. Thus, because of the presupposition, w_0 is excluded from the common ground. Assuming this model, sample updates are given in Table 8.5, the result of updating c_0 with (8.10). For space considerations, I have left out c_0, which contains three sequences representing the common ground $p_0 = \{w_1, w_2, w_3\}$.

The first three updates are familiar types of updates. The first, $[\mathsf{w}\ \mathsf{x}|\mathsf{place_w(x)}]$, adds two discourse referents to the bottom sequence. The two discourse referents represent worlds and places in those worlds. (If there are no places in a certain world, then a discourse referent for that world will not be included.) The second update, $^\top[\mathsf{x}|\mathsf{x} = \mathsf{andy}]$, adds a discourse referent for Andy to the top sequence. The third, $[\mathsf{live}_{\perp\omega}\langle\top\delta, \perp\delta\rangle]$, checks that the topical individual ($\top\delta$, i.e., Andy) lives in the bottom place ($\perp\delta$, i.e., Chicago or Detroit) in the bottom world ($\perp\omega$, i.e., at-issue worlds, not common ground (top) worlds), and eliminates sequences (rows) where this condition does not hold. None of these updates can eliminate common ground worlds.

c_1	c_2	c_3
$\langle\langle w_1,p_0 \rangle\langle c,w_0 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle c,w_0 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle c,w_0 \rangle\rangle$
$\langle\langle w_1,p_0 \rangle\langle c,w_1 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle c,w_1 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle c,w_1 \rangle\rangle$
$\langle\langle w_1,p_0 \rangle\langle d,w_1 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle d,w_1 \rangle\rangle$	
$\langle\langle w_1,p_0 \rangle\langle d,w_2 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle d,w_2 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle d,w_2 \rangle\rangle$
$\langle\langle w_1,p_0 \rangle\langle d,w_3 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle d,w_3 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle d,w_3 \rangle\rangle$
$\langle\langle w_2,p_0 \rangle\langle c,w_0 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle c,w_0 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle c,w_0 \rangle\rangle$
$\langle\langle w_2,p_0 \rangle\langle c,w_1 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle c,w_1 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle c,w_1 \rangle\rangle$
$\langle\langle w_2,p_0 \rangle\langle d,w_1 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle d,w_1 \rangle\rangle$	
$\langle\langle w_2,p_0 \rangle\langle d,w_2 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle d,w_2 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle d,w_2 \rangle\rangle$
$\langle\langle w_2,p_0 \rangle\langle d,w_3 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle d,w_3 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle d,w_3 \rangle\rangle$
$\langle\langle w_3,p_0 \rangle\langle c,w_0 \rangle\rangle$	$\langle\langle a,w_3,p_0 \rangle\langle c,w_0 \rangle\rangle$	$\langle\langle a,w_3,p_0 \rangle\langle c,w_0 \rangle\rangle$
$\langle\langle w_3,p_0 \rangle\langle c,w_1 \rangle\rangle$	$\langle\langle a,w_3,p_0 \rangle\langle c,w_1 \rangle\rangle$	$\langle\langle a,w_3,p_0 \rangle\langle c,w_1 \rangle\rangle$
$\langle\langle w_3,p_0 \rangle\langle d,w_1 \rangle\rangle$	$\langle\langle a,w_3,p_0 \rangle\langle d,w_1 \rangle\rangle$	
$\langle\langle w_3,p_0 \rangle\langle d,w_2 \rangle\rangle$	$\langle\langle a,w_3,p_0 \rangle\langle d,w_2 \rangle\rangle$	$\langle\langle a,w_3,p_0 \rangle\langle d,w_2 \rangle\rangle$
$\langle\langle w_3,p_0 \rangle\langle d,w_3 \rangle\rangle$	$\langle\langle a,w_3,p_0 \rangle\langle d,w_3 \rangle\rangle$	$\langle\langle a,w_3,p_0 \rangle\langle d,w_3 \rangle\rangle$

c_4	c_5
$\langle\langle a,w_1,p_0 \rangle\langle q_c,c,w_0 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle q_c,c,w_0 \rangle\rangle$
$\langle\langle a,w_1,p_0 \rangle\langle q_c,c,w_1 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle q_c,c,w_1 \rangle\rangle$
$\langle\langle a,w_1,p_0 \rangle\langle q_d,d,w_2 \rangle\rangle$	
$\langle\langle a,w_1,p_0 \rangle\langle q_d,d,w_3 \rangle\rangle$	
$\langle\langle a,w_2,p_0 \rangle\langle q_c,c,w_0 \rangle\rangle$	
$\langle\langle a,w_2,p_0 \rangle\langle q_c,c,w_1 \rangle\rangle$	
$\langle\langle a,w_2,p_0 \rangle\langle q_d,d,w_2 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle q_d,d,w_2 \rangle\rangle$
$\langle\langle a,w_2,p_0 \rangle\langle q_d,d,w_3 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle q_d,d,w_3 \rangle\rangle$
$\langle\langle a,w_3,p_0 \rangle\langle q_c,c,w_0 \rangle\rangle$	$\langle\langle a,w_3,p_0 \rangle\langle q_c,c,w_0 \rangle\rangle$
$\langle\langle a,w_3,p_0 \rangle\langle q_c,c,w_1 \rangle\rangle$	$\langle\langle a,w_3,p_0 \rangle\langle q_c,c,w_1 \rangle\rangle$
$\langle\langle a,w_3,p_0 \rangle\langle q_d,d,w_2 \rangle\rangle$	$\langle\langle a,w_3,p_0 \rangle\langle q_d,d,w_2 \rangle\rangle$
$\langle\langle a,w_3,p_0 \rangle\langle q_d,d,w_3 \rangle\rangle$	$\langle\langle a,w_3,p_0 \rangle\langle q_d,d,w_3 \rangle\rangle$

Table 8.5: Sample information states for (8.10)

The fourth update, $[\mathsf{p}|\mathsf{p} = \bot\omega||_{\bot\delta}]$, which results in c_4, is the key for content questions. The propositions have to be sorted by place – there is one proposition in the answer set for each place where Andy might live. The effect of this update in Table 8.5 is to sort c_3 into two substates, where $\bot\delta = c$ and where $\bot\delta = d$. Then, in c_4, a different propositional discourse referent is introduced for each state. The proposition that Andy lives in Chicago, $q_c = \{w_0, w_1\}$, is introduced for the

substate where $\bot\delta = c$. The proposition that Andy lives in Detroit, $q_d = \{w_2, w_3\}$, is introduced for the substate where $\bot\delta = d$. In Table 8.6, I have reordered the information states c_4 and c_5 by substates to better illustrate the effect of this update.

c_4 (reordered)	c_5 (reordered)	
$\langle\langle\, a, w_1, p_0\,\rangle\langle\, q_c, c, w_0\,\rangle\rangle$	$\langle\langle\, a, w_1, p_0\,\rangle\langle\, q_c, c, w_0\,\rangle\rangle$	
$\langle\langle\, a, w_1, p_0\,\rangle\langle\, q_c, c, w_1\,\rangle\rangle$	$\langle\langle\, a, w_1, p_0\,\rangle\langle\, q_c, c, w_1\,\rangle\rangle$	
$\langle\langle\, a, w_2, p_0\,\rangle\langle\, q_c, c, w_0\,\rangle\rangle$		
$\langle\langle\, a, w_2, p_0\,\rangle\langle\, q_c, c, w_1\,\rangle\rangle$		substate where $\bot\delta = c$
$\langle\langle\, a, w_3, p_0\,\rangle\langle\, q_c, c, w_0\,\rangle\rangle$	$\langle\langle\, a, w_3, p_0\,\rangle\langle\, q_c, c, w_0\,\rangle\rangle$	
$\langle\langle\, a, w_3, p_0\,\rangle\langle\, q_c, c, w_1\,\rangle\rangle$	$\langle\langle\, a, w_3, p_0\,\rangle\langle\, q_c, c, w_1\,\rangle\rangle$	
$\langle\langle\, a, w_1, p_0\,\rangle\langle\, q_d, d, w_2\,\rangle\rangle$		
$\langle\langle\, a, w_1, p_0\,\rangle\langle\, q_d, d, w_3\,\rangle\rangle$		
$\langle\langle\, a, w_2, p_0\,\rangle\langle\, q_d, d, w_2\,\rangle\rangle$	$\langle\langle\, a, w_2, p_0\,\rangle\langle\, q_d, d, w_2\,\rangle\rangle$	$\bot\delta = d$
$\langle\langle\, a, w_2, p_0\,\rangle\langle\, q_d, d, w_3\,\rangle\rangle$	$\langle\langle\, a, w_2, p_0\,\rangle\langle\, q_d, d, w_3\,\rangle\rangle$	
$\langle\langle\, a, w_3, p_0\,\rangle\langle\, q_d, d, w_2\,\rangle\rangle$	$\langle\langle\, a, w_3, p_0\,\rangle\langle\, q_d, d, w_2\,\rangle\rangle$	
$\langle\langle\, a, w_3, p_0\,\rangle\langle\, q_d, d, w_3\,\rangle\rangle$	$\langle\langle\, a, w_3, p_0\,\rangle\langle\, q_d, d, w_3\,\rangle\rangle$	

Table 8.6: Sample states for (8.8), reordered

The fifth and final update of (8.10), $^P[\mathsf{HRD}\top\omega\langle u, \bot\Omega\rangle]$, which results in c_5, checks that the addressee u has reportative evidence for bottom proposition ($\bot\Omega$) in the top (common ground) world ($\top\omega$), and eliminates rows where this condition does not hold. In essence, it aligns propositions with the evidence the addressee has in the worlds in the common ground. However, the update is a presupposition, requiring that it does not eliminate any top (common ground) worlds. There are multiple rows for each top world. This update can eliminate some rows, but it cannot completely eliminate all of the rows for any top (common ground) worlds.

The analysis of the second interpretation of (8.9) – the statement of uncertainty – is less clear. Generally speaking, the interpretation (8.9ii) seems to be part question and part assertion: it asserts that there is somewhere that Andy lives, but leaves open the question of where this is, without directly asking. However, there is a puzzle: the evidential requirement of reportative evidence for the at-issue proposition does not seem to be present. That is, the requirement that someone has reportative evidence

for something is missing.

A first attempt at a translation of the interpretation (8.9ii) is given in (8.11).

(8.11) $\underbrace{[\mathsf{w}\ \mathsf{x}|\mathsf{place}_\mathsf{w}(\mathsf{x})];\ ^\top[\mathsf{x}|\mathsf{x}=\mathsf{andy}];\ [\mathsf{live}_{\perp\omega}\langle\top\delta,\perp\delta\rangle];\ [\mathsf{p}|\mathsf{p}=\perp\omega||]}$
(presentation of the at-issue proposition)

The first three updates are the same as in (8.10). The key difference is the fourth update, $[\mathsf{p}|\mathsf{p}=\perp\omega||]$, which, unlike in (8.10), adds the same proposition to all rows. Instead of introducing a different proposition for each place, as in (8.10), $[\mathsf{p}|\mathsf{p}=\perp\omega||]$ introduces a single proposition which includes all of the places. That is, it introduces the proposition that Andy lives *somewhere*, including worlds where Andy lives in Chicago and worlds where Andy lives in Detroit.

According to the definitions, (8.11) is neither a question nor an assertion. It presents the alternatives of a question, but sums them into a single proposition. Thus, it does not directly request an answer. However, it also does not propose to add anything to the common ground. In that way, it is like the reportative: there is no proposal. While there is no evidential restriction, and there is still the puzzle of what happened to the requirement of reportative evidence, the lack of a proposal connects it to the reportative. Whereas the reportative in a declarative is the presentation of a propositions, this analysis of (8.9ii) is as a presentation of a set of propositions, the presentation of a question.

As an illustration of (8.11), consider the following model. There are two places, Chicago (c) and Detroit (d), and four worlds, w_0, w_1, w_2 and w_3, but w_3 is not in the common ground. Chicago is a place in worlds w_0 and w_1, and Detroit is a place in w_1, w_2, and w_3. Andy lives in Chicago in w_1 and in Detroit in w_2 and w_3. Sample information states are given in Table 8.7, the result of updating c_0 with (8.11). I have left out c_0, which contains three sequences representing the common ground $p_0=\{w_0, w_1, w_2\}$.

c_1	c_2	c_3
$\langle\langle\ w_0,p_0\ \rangle\langle\ c,w_0\ \rangle\rangle$	$\langle\langle\ a,w_0,p_0\ \rangle\langle\ c,w_0\ \rangle\rangle$	
$\langle\langle\ w_0,p_0\ \rangle\langle\ c,w_1\ \rangle\rangle$	$\langle\langle\ a,w_0,p_0\ \rangle\langle\ c,w_1\ \rangle\rangle$	$\langle\langle\ a,w_0,p_0\ \rangle\langle\ c,w_1\ \rangle\rangle$
$\langle\langle\ w_0,p_0\ \rangle\langle\ d,w_1\ \rangle\rangle$	$\langle\langle\ a,w_0,p_0\ \rangle\langle\ d,w_1\ \rangle\rangle$	
$\langle\langle\ w_0,p_0\ \rangle\langle\ d,w_2\ \rangle\rangle$	$\langle\langle\ a,w_0,p_0\ \rangle\langle\ d,w_2\ \rangle\rangle$	$\langle\langle\ a,w_0,p_0\ \rangle\langle\ d,w_2\ \rangle\rangle$
$\langle\langle\ w_0,p_0\ \rangle\langle\ d,w_3\ \rangle\rangle$	$\langle\langle\ a,w_0,p_0\ \rangle\langle\ d,w_3\ \rangle\rangle$	$\langle\langle\ a,w_0,p_0\ \rangle\langle\ d,w_3\ \rangle\rangle$
$\langle\langle\ w_1,p_0\ \rangle\langle\ c,w_0\ \rangle\rangle$	$\langle\langle\ a,w_1,p_0\ \rangle\langle\ c,w_0\ \rangle\rangle$	
$\langle\langle\ w_1,p_0\ \rangle\langle\ c,w_1\ \rangle\rangle$	$\langle\langle\ a,w_1,p_0\ \rangle\langle\ c,w_1\ \rangle\rangle$	$\langle\langle\ a,w_1,p_0\ \rangle\langle\ c,w_1\ \rangle\rangle$
$\langle\langle\ w_1,p_0\ \rangle\langle\ d,w_1\ \rangle\rangle$	$\langle\langle\ a,w_1,p_0\ \rangle\langle\ d,w_1\ \rangle\rangle$	
$\langle\langle\ w_1,p_0\ \rangle\langle\ d,w_2\ \rangle\rangle$	$\langle\langle\ a,w_1,p_0\ \rangle\langle\ d,w_2\ \rangle\rangle$	$\langle\langle\ a,w_1,p_0\ \rangle\langle\ d,w_2\ \rangle\rangle$
$\langle\langle\ w_1,p_0\ \rangle\langle\ d,w_3\ \rangle\rangle$	$\langle\langle\ a,w_1,p_0\ \rangle\langle\ d,w_3\ \rangle\rangle$	$\langle\langle\ a,w_1,p_0\ \rangle\langle\ d,w_3\ \rangle\rangle$
$\langle\langle\ w_2,p_0\ \rangle\langle\ c,w_0\ \rangle\rangle$	$\langle\langle\ a,w_2,p_0\ \rangle\langle\ c,w_0\ \rangle\rangle$	
$\langle\langle\ w_2,p_0\ \rangle\langle\ c,w_1\ \rangle\rangle$	$\langle\langle\ a,w_2,p_0\ \rangle\langle\ c,w_1\ \rangle\rangle$	$\langle\langle\ a,w_2,p_0\ \rangle\langle\ c,w_1\ \rangle\rangle$
$\langle\langle\ w_2,p_0\ \rangle\langle\ d,w_1\ \rangle\rangle$	$\langle\langle\ a,w_2,p_0\ \rangle\langle\ d,w_1\ \rangle\rangle$	
$\langle\langle\ w_2,p_0\ \rangle\langle\ d,w_2\ \rangle\rangle$	$\langle\langle\ a,w_2,p_0\ \rangle\langle\ d,w_2\ \rangle\rangle$	$\langle\langle\ a,w_2,p_0\ \rangle\langle\ d,w_2\ \rangle\rangle$
$\langle\langle\ w_2,p_0\ \rangle\langle\ d,w_3\ \rangle\rangle$	$\langle\langle\ a,w_2,p_0\ \rangle\langle\ d,w_3\ \rangle\rangle$	$\langle\langle\ a,w_2,p_0\ \rangle\langle\ d,w_3\ \rangle\rangle$

c_4
$\langle\langle\ a,w_0,p_0\ \rangle\langle\ q,c,w_1\ \rangle\rangle$
$\langle\langle\ a,w_0,p_0\ \rangle\langle\ q,d,w_2\ \rangle\rangle$
$\langle\langle\ a,w_0,p_0\ \rangle\langle\ q,d,w_3\ \rangle\rangle$
$\langle\langle\ a,w_1,p_0\ \rangle\langle\ q,c,w_1\ \rangle\rangle$
$\langle\langle\ a,w_1,p_0\ \rangle\langle\ q,d,w_2\ \rangle\rangle$
$\langle\langle\ a,w_1,p_0\ \rangle\langle\ q,d,w_3\ \rangle\rangle$
$\langle\langle\ a,w_2,p_0\ \rangle\langle\ q,c,w_1\ \rangle\rangle$
$\langle\langle\ a,w_2,p_0\ \rangle\langle\ q,d,w_2\ \rangle\rangle$
$\langle\langle\ a,w_2,p_0\ \rangle\langle\ q,d,w_3\ \rangle\rangle$

Table 8.7: Sample information states for (8.11)

The first three updates are the same as in (8.10). The first, $[\mathsf{w}\ \mathsf{x}|\mathsf{place}_\mathsf{w}(\mathsf{x})]$, adds two discourse referents to the bottom sequence. The two discourse referents represent worlds and places in those worlds. (If there are no places in a certain world, then a discourse referent for that world will not be included.) The second update, $^\top[\mathsf{x}|\mathsf{x}=\mathsf{andy}]$, adds a discourse referent for Andy to the top sequence. The third, $[\mathsf{live}_{\perp\omega}\langle\top\delta,\perp\delta\rangle]$, checks that the topical individual ($\top\delta$, i.e., Andy) lives in the bottom place ($\perp\delta$, i.e., Chicago or Detroit) in the bottom world ($\perp\omega$, i.e., at-issue worlds, not common ground (top) worlds), and eliminates sequences (rows) where this condition does not hold. None of these updates can eliminate common ground worlds.

The fourth update, $[\mathsf{p}|\mathsf{p} = \perp\boldsymbol{\omega}||]$, which results in c_4, is where (8.11) crucially differs from (8.10). For (8.11), the same proposition is introduced into all rows. In Table 8.7, this is represented by $q = \{w_1, w_2, w_3\}$, which includes all of the bottom worlds from in c_3. This is the proposition that Andy lives *somwhere* – he lives in Chicago in w_1 and in Detroit in w_2 and w_3.

The phenomenon of illocutionary variability exists with other evidentials, as in (8.12) with the conjectural. However, the different evidential contributes a different type of uncertainty.

(8.12) *Tósa'e* **mó**-*hoo'e*-**he-he**
       where   CNJ+3-live-MOD$_A$-Y/N
    (i) 'Given what you infer, where does he live?'
    (ii) 'He lives somewhere, I gather, but I don't know where.

In general, interrogative words in Cheyenne, as in (8.13) and (8.14), behave similar to what have been called indeterminate pronouns Japanese (see Kratzer and Shimoyama 2002). Interpretation (8.9ii) is most likely related to this phenomenon, since the ambiguity in (8.9) is not present in polar interrogatives. In (8.13), the polar interrogative mood marker is combined with an interrogative word.

(8.13) *Tósa'e* *é-hoo'e*-**he** *Andy?*
       where   3-live-Y/N Andy
    'Given your evidence, does Andy live somewhere?'

(8.14) *Tósa'e* *é-sáa-hoo'e-he*-**Ø**   *Andy.*
       where   3-neg-live-MOD$_A$-DIR Andy
    'Andy doesn't live anywhere, I'm sure'

In (8.13), the content interrogative word *Tósa'e* 'where' co-occurs with the polar interrogative mood suffix -*he*. The result is a polar interrogative containing an indefinite 'somewhere'. In (8.14), the content question word *Tósa'e* 'where' occurs with negation, and the result is a negative sentence where the interrogative word functions like a negative polarity item.

The system UC_ω allows an analysis of this data using only what has already been introduced. For example, consider the translation of (8.13) in (8.15). The translation of (8.14) is given below.

(8.15) $\underbrace{[\text{w x}|\text{place}_\text{w}(\text{x})];\, ^\top[\text{x}|\text{x} = \text{andy}];\, [\text{live}_{\perp\omega}\langle\top\delta, \perp\delta\rangle];\, [\text{p}|\text{p} = \, ^?\perp\omega||]}_{\text{(presentation of the at-issue proposition)}};\, \underbrace{^\text{P}[\text{EVI}\top_\omega\langle\text{u}, \perp\Omega\rangle]}_{\text{(not-at-issue restriction)}}$

The first three updates are the same as in (8.10) and (8.11). The key difference is the fourth update, $[\text{p}|\text{p} = \, ^?\perp\omega||]$, which adds the same two propositions to all rows: the proposition that Andy lives somewhere and the complement of that proposition, that he doesn't live anywhere, parallel to the analysis of polar interrogatives given above in Sections 8.3 and 8.4. The not-at-issue restriction is the same as in the polar interrogatives formed with the interrogative mood *-he*.

As an example, consider the following model where there are two places, Chicago (c) and Detroit (d), and three worlds, w_0, w_1 and w_2, all of which I will assume are in the common ground. Chicago is a place in worlds w_0 and w_1, and Detroit is a place in worlds w_1 and w_2. Andy lives in Chicago in world w_1 and in Detroit in world w_2. The addressee has evidence that Andy lives somewhere in w_0 and w_2 and evidence that Andy doesn't live anywhere in w_0 and w_1. Assuming this model, sample information states are given in Table 8.8, the result of updating c_0 with (8.15). I have left out c_0, which contains three sequences representing the common ground $p_0 = \{w_0, w_1, w_2\}$.

The first three updates in (8.15) are the same as in (8.10) and (8.11). The fourth update, $[\text{p}|\text{p} = \, ^?\perp\omega||]$, which results in c_4, is where (8.15) crucially differs from the previous examples. For (8.15), the same two propositions are introduced into all rows, representing the yes answer (Andy lives somewhere, $q = \{w_1, w_2\}$) and the no answer (Andy doesn't live anywhere, $\overline{q} = \{w_0\}$). The not-at-issue restriction requires that, for each row, the most prominent propositional discourse referent in the bottom sequence, $\perp\Omega$, is the proposition that the speaker has evidence for in the topical

c_1	c_2	c_3
$\langle\langle\, w_0,p_0\,\rangle\langle\, c,w_0\,\rangle\rangle$	$\langle\langle\, a,w_0,p_0\,\rangle\langle\, c,w_0\,\rangle\rangle$	
$\langle\langle\, w_0,p_0\,\rangle\langle\, c,w_1\,\rangle\rangle$	$\langle\langle\, a,w_0,p_0\,\rangle\langle\, c,w_1\,\rangle\rangle$	$\langle\langle\, a,w_0,p_0\,\rangle\langle\, c,w_1\,\rangle\rangle$
$\langle\langle\, w_0,p_0\,\rangle\langle\, d,w_1\,\rangle\rangle$	$\langle\langle\, a,w_0,p_0\,\rangle\langle\, d,w_1\,\rangle\rangle$	
$\langle\langle\, w_0,p_0\,\rangle\langle\, d,w_2\,\rangle\rangle$	$\langle\langle\, a,w_0,p_0\,\rangle\langle\, d,w_2\,\rangle\rangle$	$\langle\langle\, a,w_0,p_0\,\rangle\langle\, d,w_2\,\rangle\rangle$
$\langle\langle\, w_1,p_0\,\rangle\langle\, c,w_0\,\rangle\rangle$	$\langle\langle\, a,w_1,p_0\,\rangle\langle\, c,w_0\,\rangle\rangle$	
$\langle\langle\, w_1,p_0\,\rangle\langle\, c,w_1\,\rangle\rangle$	$\langle\langle\, a,w_1,p_0\,\rangle\langle\, c,w_1\,\rangle\rangle$	$\langle\langle\, a,w_1,p_0\,\rangle\langle\, c,w_1\,\rangle\rangle$
$\langle\langle\, w_1,p_0\,\rangle\langle\, d,w_1\,\rangle\rangle$	$\langle\langle\, a,w_1,p_0\,\rangle\langle\, d,w_1\,\rangle\rangle$	
$\langle\langle\, w_1,p_0\,\rangle\langle\, d,w_2\,\rangle\rangle$	$\langle\langle\, a,w_1,p_0\,\rangle\langle\, d,w_2\,\rangle\rangle$	$\langle\langle\, a,w_1,p_0\,\rangle\langle\, d,w_2\,\rangle\rangle$
$\langle\langle\, w_2,p_0\,\rangle\langle\, c,w_0\,\rangle\rangle$	$\langle\langle\, a,w_2,p_0\,\rangle\langle\, c,w_0\,\rangle\rangle$	
$\langle\langle\, w_2,p_0\,\rangle\langle\, c,w_1\,\rangle\rangle$	$\langle\langle\, a,w_2,p_0\,\rangle\langle\, c,w_1\,\rangle\rangle$	$\langle\langle\, a,w_2,p_0\,\rangle\langle\, c,w_1\,\rangle\rangle$
$\langle\langle\, w_2,p_0\,\rangle\langle\, d,w_1\,\rangle\rangle$	$\langle\langle\, a,w_2,p_0\,\rangle\langle\, d,w_1\,\rangle\rangle$	
$\langle\langle\, w_2,p_0\,\rangle\langle\, d,w_2\,\rangle\rangle$	$\langle\langle\, a,w_2,p_0\,\rangle\langle\, d,w_2\,\rangle\rangle$	$\langle\langle\, a,w_2,p_0\,\rangle\langle\, d,w_2\,\rangle\rangle$

c_4	c_5
$\langle\langle\, a,w_0,p_0\,\rangle\langle\, q,c,w_1\,\rangle\rangle$	$\langle\langle\, a,w_0,p_0\,\rangle\langle\, q,c,w_1\,\rangle\rangle$
$\langle\langle\, a,w_0,p_0\,\rangle\langle\, \overline{q},c,w_1\,\rangle\rangle$	$\langle\langle\, a,w_0,p_0\,\rangle\langle\, \overline{q},c,w_1\,\rangle\rangle$
$\langle\langle\, a,w_0,p_0\,\rangle\langle\, q,d,w_2\,\rangle\rangle$	$\langle\langle\, a,w_0,p_0\,\rangle\langle\, q,d,w_2\,\rangle\rangle$
$\langle\langle\, a,w_0,p_0\,\rangle\langle\, \overline{q},d,w_2\,\rangle\rangle$	$\langle\langle\, a,w_0,p_0\,\rangle\langle\, \overline{q},d,w_2\,\rangle\rangle$
$\langle\langle\, a,w_1,p_0\,\rangle\langle\, q,c,w_1\,\rangle\rangle$	
$\langle\langle\, a,w_1,p_0\,\rangle\langle\, \overline{q},c,w_1\,\rangle\rangle$	$\langle\langle\, a,w_1,p_0\,\rangle\langle\, \overline{q},c,w_1\,\rangle\rangle$
$\langle\langle\, a,w_1,p_0\,\rangle\langle\, q,d,w_2\,\rangle\rangle$	
$\langle\langle\, a,w_1,p_0\,\rangle\langle\, \overline{q},d,w_2\,\rangle\rangle$	$\langle\langle\, a,w_1,p_0\,\rangle\langle\, \overline{q},d,w_2\,\rangle\rangle$
$\langle\langle\, a,w_2,p_0\,\rangle\langle\, q,c,w_1\,\rangle\rangle$	$\langle\langle\, a,w_2,p_0\,\rangle\langle\, q,c,w_1\,\rangle\rangle$
$\langle\langle\, a,w_2,p_0\,\rangle\langle\, \overline{q},c,w_1\,\rangle\rangle$	
$\langle\langle\, a,w_2,p_0\,\rangle\langle\, q,d,w_2\,\rangle\rangle$	$\langle\langle\, a,w_2,p_0\,\rangle\langle\, q,d,w_2\,\rangle\rangle$
$\langle\langle\, a,w_2,p_0\,\rangle\langle\, \overline{q},d,w_2\,\rangle\rangle$	

Table 8.8: Sample information states for (8.15)

world $\top\omega$. In other words, it checks that answers are matched with the addressee's evidence. This eliminates rows where the addressee does not have evidence for $\bot\Omega$ in $\top\omega$, but, crucially, does not eliminate any top (common ground) worlds.

The proposed analysis of interrogatives, evidentials, and negation can be combined to account for example (8.14), repeated below. The proposed translation of (8.14) into UC_ω is given in (8.16).

(8.14) *Tósa'e   é-sáa-hoo'e-he-Ø   Andy.*
     where   3-neg-live-MOD$_A$-DIR   Andy

    'Andy doesn't live anywhere, I'm sure.'

(8.16) $\underbrace{[\text{w x}|\text{place}_\text{w}(\text{x})];\,{}^\top[\text{x}|\text{x} = \text{andy}]; [\text{live}_{\perp\omega}\langle\top\delta, \perp\delta\rangle]; [\text{w}|\text{w} \notin \perp\omega||]; [\text{p}|\text{p} = \perp\omega||]}$

                            (presentation of the at-issue proposition)

        $\underbrace{[\text{CRT}_{\top\omega}\langle\text{i}, \perp\Omega\rangle];}$ $\underbrace{[\perp\omega \in \top\omega||];}$ $\underbrace{([\top\omega \in \perp\omega||];}$ $\underbrace{{}^\top[\text{p}|\text{p} = \top\omega||])}$

   (not-at-issue restriction)   (at-issue proposal)   (accept)   (new CG)

This translation combines the analysis of content interrogatives, e.g., (8.10), with the analysis of negation, e.g., (7.21), and the analysis of the direct evidential, e.g., (7.5). These three pieces come together to provide an analysis of (8.14). Without modification, they account for the quantificational variability of the interrogative word and the scope of the direct evidential over negation.

8.6   Summary

In this chapter, I have extended the proposed general structure of speech acts to queries. Queries also involve a presentation component. However, unlike in assertions, there is presentation of more than one proposition, representing the possible answers. Interrogatives in Cheyenne are analyzed as having non-negotiable restrictions, which are presuppositional in queries. This means that the contributed restriction can eliminate certain dependencies, but it cannot reduce the common ground. The structuring relation for queries is a request for an answer, modeled for polar interrogatives equivalence relation on the common ground, and more generally as a cover. Thus, unlike declaratives, there is no proposal to add information to the common ground, and no new common ground discourse referent is introduced (i.e., the acceptance of the declarative proposal).

In this chapter, this proposal was implemented in Update with Centering, improving on the implementation given in Chapter 6. UC_ω allows an explicit representation of the dependency of the evidential on the various answers and an explicit definition of the answerhood conditions for a question. This implementation also allows an analysis of content interrogatives in Cheyenne, which have various interesting properties. When content questions occur with evidentials, they display a property of illocutionary variability: they can be interpreted as a direct question or as a statement of uncertainty. The proposed translation of the later illustrates a benefit of this implementation: it can represent not only queries and assertions, but acts with components of both. The implementation is fine grained enough to be able to state what makes an assertion (introduction of a new common ground discourse referent in the top sequence) and what makes a query (discourse referents for the possible answers in the bottom sequence). On this view, it is natural to assume certain constructions in certain languages may combine both strategies. Finally, the implementation allows a straightforward analysis of Cheyenne question words, whose quantificational force can vary depending on their environment.

Chapter 9

Conclusion

The central claim of this dissertation is that evidentiality and the semantic analysis that it requires tell us something general about the structure of speech acts. This is supported by data from Cheyenne, where the evidentials are part of the illocutionary mood paradigm, suggesting a close connection between these two categories.

I argue that sentences with evidentials grammaticize a distinction between at-issue content and not-at-issue content. The at-issue content is the main point of the sentence and the not-at-issue content is the evidential contribution, which is directly added to the common ground. This distinction is formally implemented as a centering distinction in the modal domain – a distinction between what propositional information is added to the bottom sequence, which tracks what we are talking about (at-issue), and what is added to the top sequence, which tracks the common ground.

This analysis of evidentials implies a more articulated theory of speech acts in general. In particular, I argue that all speech acts have three components: the presentation of the at-issue proposition, a not-at-issue restriction of the common ground, and a proposal that imposes structure on the common ground.

In the analysis proposed in the dissertation, Cheyenne evidentials and illocutionary mood are a natural semantic class. Illocutionary moods mediate between the

at-issue proposition and the common ground. Is the at-issue proposition added to the common ground? Is the possibility of it added? Does it partition the common ground into answers? This contribution is modeled with the proposal component of the speech act, the update that structures the common grounds.

In Cheyenne, in addition to the not-at-issue contribution, evidentials mark different levels of commitment to the at-issue proposition. Declarative sentences with evidentials are all assertions – they are in general the same speech act (cf. Faller 2002). However, the choice of evidential affects the illocutionary force of the sentence. The conjectural commits the speaker less than the direct evidential, and the reportative doesn't commit the speaker at all. By varying the content of the proposal, these different levels of commitment can be accounted for in a systematic way.

The proposed analysis solves several problems that have existed in the literature on evidentials. A satisfactory analysis of the reportative has been difficult to come by. However, on the proposed analysis, it has a natural place. It is semantically the same type of object as the other evidentials, but involves only two of the three components of a speech act – it does not make an explicit proposal. This contrasts with simple English sentences, such as *Dale likes his coffee black*, which also involve only two of the three components of a speech act, but a different two. Such English sentences make an explicit proposal, but they do not contribute a not-at-issue restriction.

This proposal also makes sense of the claim that sentences with the direct evidential are stronger that simple sentences in English. On the proposed account, this corresponds to a strictly smaller common ground. Sentences with direct evidentials make two contributions to the common ground: the not-at-issue restriction and the at-issue proposition (after the proposal is accepted). Basic English sentences make only one contribution to the common ground: the at-issue proposition (after the proposal is accepted).

Finally, on the proposed approach, the crosslinguistic variation between evidential

systems can be accounted for while treating evidentials crosslinguistically as a natural semantic class. While this analysis is illustrated with Cheyenne, a language with obligatory grammatical evidentials that are part of the illocutionary mood paradigm, it can be extended to other languages and other types of evidential systems. In fact, the implementation given in Chapter 5 has already been extended to evidentials in Bulgarian, which display very different behavior from evidentials in Cheyenne, but still share the core properties of evidential systems (Koev 2010b).

The analysis was designed to capture the properties that all evidential systems share crosslinguistically (see Chapter 3) while being fine-grained enough to account for variation. All systems will have the same general three-part structure; however, the content of the not-at-issue restriction or the illocutionary proposal can vary from language to language. For example, in Cheyenne the proposal of the reportative is to take note of the at-issue proposition. However, in a language with epistemic evidentials, the reportative may contribute a different proposal, e.g., to add to the common ground the information that the at-issue proposition is at least a possibility. Thus, I see the proposed framework as potentially allowing one to state all aspects of the meaning of evidentials crosslinguistically in the same representation language.

The potential also exists to extend the proposed analysis to related phenomena, such as evidential parentheticals, adverbs, and evidential uses of embedding verbs in English. Like the extension of the analysis to other types of evidential systems, the analysis of these English phenomena would involve the three speech act components. I predict that the difference in behavior could be captured by varying the content of the not-at-issue restriction and/or the illocutionary proposal. For example, the English sentence *Dale likes his coffee black, I hear*, with normal intonation, may commit the speaker to the possibility that Dale likes his coffee black. If so, the illocutionary proposal for this parenthetical would be to add the possibility of the scope to the common ground, unlike the reportative evidential in Cheyenne, but like

the reportative in languages with epistemic evidentials.

Other phenomenon, such as non-restrictive relative clauses, may also be analyzed within this framework. Consider the following English sentence:

(9.1) Tivi, who is a cat, likes to chase her tail.

The at-issue proposition in (9.1) is the proposition that Tivi likes to chase her tail. The proposed analysis would be as follows. The presentation of the at-issue proposition would introduce a propositional discourse referent for the proposition that Tivi likes to chase her tail into the bottom sequence. The not-at-issue restriction would directly update the common ground with the information that Tivi is a cat. The proposal would be to add the at-issue proposition to the common ground. A rough translation is given in (9.2). To focus on the analysis of the relative clause, I translate the main predicate 'likes to chase her tail' as the unanalyzed *likes.to.chase.her.tail*.

(9.2)
$$\underbrace{^\top[\mathsf{x}|\mathsf{x} = \mathsf{Tivi}]; [\mathsf{w}|\mathsf{likes.to.chase.her.tail}_\mathsf{w}\langle\top\delta\rangle]; [\mathsf{p}|\mathsf{p} = \bot\omega||]}_{\text{(present at-issue proposition } q)};$$

$$\underbrace{[\mathsf{cat}_{\top\omega}\langle\top\delta\rangle]}_{\text{(not-at-issue restriction)}}; \quad \underbrace{[\bot\omega \in \top\omega||]}_{\text{(at-issue proposal)}}; \quad (\underbrace{[\top\omega \in \bot\omega||]}_{\text{(accept)}}; \quad \underbrace{^\top[\mathsf{p}|\mathsf{p} = \top\omega||]}_{\text{(recenter)}})$$

This analysis directly extends the proposed analysis of evidentials, with the only difference being the *kind* of information in the not-at-issue restriction. For evidentials, it is an evidential relation, a relation between a person and the at-issue proposition. For (9.2), the not-at-issue restriction is a predicate of an individual, specifically the subject, Tivi. It does not involve the at-issue proposition and in this way is independent of it. This analysis of non-restrictive relative clauses would also correctly predict that subsequent propositional anaphora can not pick out the proposition that Tivi is a cat. While there can be anaphoric dependencies between the main clause and the relative clause, and subsequent anaphora to things introduced in the relative

clause, the information contributed by the relative clause as a whole, the not-at-issue restriction, is not directly available for propositional anaphora in subsequent discourse.

Non-restrictive relative clauses have been analyzed as contributing conventional implicates (e.g., Potts 2005). In Chapter 3, I discuss conventional implicatures and why I think this category of meaning, at least as defined, is not well-suited for analyzing evidentials. However, empirically there are many similarities between evidentials and the phenomena that have been analyzed as contributing conventional implicatures. I have already shown how the proposed analysis can be extended to non-restrictive relative clauses. It is an open question whether or not the other phenomena typically analyzed as conventional implicature could be given an analysis within the proposed framework. Given this, one might wonder if what I have given is an analysis of conventional implicature. I hesitate to take this view, for various reasons, including the difficulties involved in defining that category of meaning.

Instead, I see the present proposal as dividing the logical space of meaning differently. There is a binary distinction between at-issue and not-at-issue content. There is also a three-way distinction between presupposition, what should be in the common ground before the utterance, assertion, what is contributed to the common ground with the utterance, and implicature, what should be in the common ground after the utterance. In this dissertation, I have pursued the idea that the distinction between at-issue and not-at-issue information crosscuts the category of assertion. This raises several questions. Are the other categories of presupposition and implicature by definition not-at-issue? Or can these categories be crosscut as well? Can these four, or potentially six, categories of meaning be used to account for the full range of meanings expressed by natural language? I do not now know the answers to these questions. However, I hope the framework proposed in this dissertation helps us address these questions in a systematic way.

Appendix A

Proofs

A.1 Derivations for Chapter 5

A.1.1 Definitions

Definition 1 (Evidential Restriction). For a common ground c, a model $\mathcal{M}$, and an $(st)t$ term P, c updated with P is defined as:

$$c[P] = \{w \in c \mid \exists g(\exists p \in D_{st}(\llbracket \lambda v_0.P \rrbracket^{\mathcal{M},g}(w) = \{p\}))\}$$

Definition 2 (Illocutionary Relation). For a common ground c, worlds w, w', a model $\mathcal{M}$, and an $(st)t$ term P, w' P-outranks w in c, written $w' \geq_{c,P} w$, iff:

$$w, w' \in c \ \& \ \llbracket \lambda v_0.\lambda v_1.P \rrbracket^{\mathcal{M}}(w)(w') \neq \varnothing$$

A.1.2 Direct Evidential

(A.1) *É-néméne-∅*   *Floyd*
      3-sing-DIR   Floyd
      'Floyd sang, I'm sure.'

(A.1′) $\lambda p.(p = \lambda w.\mathsf{sing}(w, \mathsf{floyd})) \wedge \mathsf{CRT}(v_0, i, p) \wedge p(v_0) \leq p(v_1)$

A.1.2.1 Details of the Evidential Restriction

$$c_0[(A.1')] \;=\; \{w \in c_0 \mid \exists g(\exists p \in D_{st}(\llbracket \lambda \mathsf{v_0}.(A.1') \rrbracket^{\mathcal{M},g}(w) = \{p\}))\}$$

$$=\; \{w \in c_0 \mid \exists g(\exists p \in D_{st}(\llbracket \lambda \mathsf{v_0}.\lambda \mathsf{p}.(\mathsf{p} = \lambda \mathsf{w}.\mathsf{sing}(\mathsf{w},\mathsf{floyd})) \wedge \mathsf{CRT}(\mathsf{v_0},\mathsf{i},\mathsf{p})$$
$$\wedge\, \mathsf{p}(\mathsf{v_0}) \le \mathsf{p}(\mathsf{v_1}) \rrbracket^{\mathcal{M},g}(w) = \{p\}))\}$$

$$=\; \{w \in c_0 \mid \exists g(\exists p \in D_{st}(\langle \llbracket \lambda \mathsf{p}.(\mathsf{p} = \lambda \mathsf{w}.\mathsf{sing}(\mathsf{w},\mathsf{floyd})) \wedge \mathsf{CRT}(\mathsf{v_0},\mathsf{i},\mathsf{p})$$
$$\wedge\, \mathsf{p}(\mathsf{v_0}) \le \mathsf{p}(\mathsf{v_1}) \rrbracket^{\mathcal{M},g[\mathsf{v_0}/w']} :$$
$$w' \in D_s \rangle(w) = \{p\}))\}$$

$$=\; \{w \in c_0 \mid \exists g(\exists p \in D_{st}(\llbracket \lambda \mathsf{p}.(\mathsf{p} = \lambda \mathsf{w}.\mathsf{sing}(\mathsf{w},\mathsf{floyd})) \wedge \mathsf{CRT}(\mathsf{v_0},\mathsf{i},\mathsf{p})$$
$$\wedge\, \mathsf{p}(\mathsf{v_0}) \le \mathsf{p}(\mathsf{v_1}) \rrbracket^{\mathcal{M},g[\mathsf{v_0}/w]} = \{p\}))\}$$

$$=\; \{w \in c_0 \mid \exists g(\exists p \in D_{st}(\langle \llbracket (\mathsf{p} = \lambda \mathsf{w}.\mathsf{sing}(\mathsf{w},\mathsf{floyd})) \wedge \mathsf{CRT}(\mathsf{v_0},\mathsf{i},\mathsf{p})$$
$$\wedge\, \mathsf{p}(\mathsf{v_0}) \le \mathsf{p}(\mathsf{v_1}) \rrbracket^{\mathcal{M},g[\mathsf{v_0}/w][\mathsf{p}/p']} :$$
$$p' \in D_{st} \rangle = \{p\}))\}$$

$$=\; \{w \in c_0 \mid \exists g(\exists p \in D_{st}(\langle p' = \llbracket \lambda \mathsf{w}.\mathsf{sing}(\mathsf{w},\mathsf{floyd}) \rrbracket^{\mathcal{M}}$$
$$\&\; \llbracket \mathsf{CRT} \rrbracket^{\mathcal{M}}(w)(\llbracket i \rrbracket^{\mathcal{M}})(p') = 1$$
$$\&\; p'(w) \le p'(g(\mathsf{v_1})) : p' \in D_{st} \rangle = \{p\}))\}$$

$$=\; \{w \in c_0 \mid \exists g(\exists p \in D_{st}(p = \llbracket \lambda \mathsf{w}.\mathsf{sing}(\mathsf{w},\mathsf{floyd}) \rrbracket^{\mathcal{M}}$$
$$\&\; \llbracket \mathsf{CRT} \rrbracket^{\mathcal{M}}(w)(\llbracket i \rrbracket^{\mathcal{M}})(p) = 1$$
$$\&\; p(w) \le p(g(\mathsf{v_1}))))\}$$

$$=\; \{w \in c_0 \mid \llbracket \mathsf{CRT} \rrbracket^{\mathcal{M}}(w)(\llbracket i \rrbracket^{\mathcal{M}})(\llbracket \lambda \mathsf{w}.\mathsf{sing}(\mathsf{w},\mathsf{floyd}) \rrbracket^{\mathcal{M}}) = 1$$
$$\&\; \exists g(\llbracket \lambda \mathsf{w}.\mathsf{sing}(\mathsf{w},\mathsf{floyd}) \rrbracket^{\mathcal{M}}(w)$$
$$\le \llbracket \lambda \mathsf{w}.\mathsf{sing}(\mathsf{w},\mathsf{floyd}) \rrbracket^{\mathcal{M}}(g(\mathsf{v_1})))\}$$

$$=\; \{w \in c_0 \mid \llbracket \mathsf{CRT} \rrbracket^{\mathcal{M}}(w)(\llbracket i \rrbracket^{\mathcal{M}})(\llbracket \lambda \mathsf{w}.\mathsf{sing}(\mathsf{w},\mathsf{floyd}) \rrbracket^{\mathcal{M}}) = 1\}$$

$$=\; c_1$$

A.1.2.2 Details of the Illocutionary Relation

$$w \leq_{c_1,(A.1')} w' \quad \text{iff} \quad w, w' \in c_1 \ \& \ [\![\lambda \mathsf{v_0}.\lambda \mathsf{v_1}.(A.1')]\!]^{\mathcal{M}}(w)(w') \neq \varnothing$$

$$\text{iff} \quad w, w' \in c_1 \ \& \ [\![\lambda \mathsf{v_0}.\lambda \mathsf{v_1}.\lambda \mathsf{p}.(\mathsf{p} = \lambda \mathsf{w}.\mathsf{sing}(\mathsf{w}, \mathsf{floyd})) \wedge \mathsf{CRT}(\mathsf{v_0}, \mathsf{i}, \mathsf{p})$$
$$\wedge \mathsf{p}(\mathsf{v_0}) \leq \mathsf{p}(\mathsf{v_1})]\!]^{\mathcal{M}}(w)(w') \neq \varnothing \quad [(A.1')]$$

$$\text{iff} \quad w, w' \in c_1 \ \& \ [\![\lambda \mathsf{p}.(\mathsf{p} = \lambda \mathsf{w}.\mathsf{sing}(\mathsf{w}, \mathsf{floyd})) \wedge \mathsf{CRT}(\mathsf{v_0}, \mathsf{i}, \mathsf{p})$$
$$\wedge \mathsf{p}(\mathsf{v_0}) \leq \mathsf{p}(\mathsf{v_1})]\!]^{\mathcal{M},[\mathsf{v_0}/w][\mathsf{v_1}/w']} \neq \varnothing \qquad [\lambda \times 2]$$

$$\text{iff} \quad w, w' \in c_1 \ \& \ \exists p([\![\lambda \mathsf{p}.(\mathsf{p} = \lambda \mathsf{w}.\mathsf{sing}(\mathsf{w}, \mathsf{floyd})) \wedge \mathsf{CRT}(\mathsf{v_0}, \mathsf{i}, \mathsf{p})$$
$$\wedge \mathsf{p}(\mathsf{v_0}) \leq \mathsf{p}(\mathsf{v_1})]\!]^{\mathcal{M},[\mathsf{v_0}/w][\mathsf{v_1}/w']}(p) = 1) \quad [\exists, \varnothing]$$

$$\text{iff} \quad w, w' \in c_1 \ \& \ \exists p(p = [\![\lambda \mathsf{w}.\mathsf{sing}(\mathsf{w}, \mathsf{floyd})]\!]^{\mathcal{M}}$$
$$\& \ [\![\mathsf{CRT}]\!]^{\mathcal{M}}(w)([\![i]\!]^{\mathcal{M}})(p) = 1$$
$$\& \ p(w) \leq p(w')) \qquad\qquad [\lambda, \ \mathrm{ty}_2]$$

$$\text{iff} \quad w, w' \in c_1 \ \& \ [\![\mathsf{CRT}]\!]^{\mathcal{M}}(w)([\![i]\!]^{\mathcal{M}})([\![\lambda \mathsf{w}.\mathsf{sing}(\mathsf{w}, \mathsf{floyd})]\!]^{\mathcal{M}}) = 1$$
$$\& \ [\![\lambda \mathsf{w}.\mathsf{sing}(\mathsf{w}, \mathsf{floyd})]\!]^{\mathcal{M}}(w)$$
$$\leq [\![\lambda \mathsf{w}.\mathsf{sing}(\mathsf{w}, \mathsf{floyd})]\!]^{\mathcal{M}}(w') \qquad\qquad [=, \exists]$$

$$\text{iff} \quad w, w' \in c_1$$
$$\& \ [\![\lambda \mathsf{w}.\mathsf{sing}(\mathsf{w}, \mathsf{floyd})]\!]^{\mathcal{M}}(w) \leq [\![\lambda \mathsf{w}.\mathsf{sing}(\mathsf{w}, \mathsf{floyd})]\!]^{\mathcal{M}}(w') \quad [w \in c_1]$$

A.1.3 Reportative Evidential

(A.2) *É-némene-**sėstse** Floyd*
     3-sing-RPT.3SG   Floyd
    'Floyd sang, I hear.'

(A.2′) $\lambda p[\,(p = \lambda w.\text{sing}(w, \text{floyd})) \wedge \text{HRD}(v_0, i, p) \wedge v_1 = v_1]$

A.1.3.1 Details of the Evidential Restriction

$$c_0[(A.2')] \;=\; \{w \in c_0 \mid \exists g(\exists p \in D_{st}(\llbracket \lambda v_0.(A.2')\rrbracket^{\mathcal{M},g}(w) = \{p\}))\}$$

$$=\; \{w \in c_0 \mid \exists g(\exists p \in D_{st}(\llbracket \lambda v_0.\lambda p.\,(p = \lambda w.\text{sing}(w, \text{floyd})) \wedge \text{HRD}(v_0, i, p)$$
$$\wedge\, v_1 = v_1 \rrbracket^{\mathcal{M},g}(w) = \{p\}))\}$$

$$=\; \{w \in c_0 \mid \exists g(\exists p \in D_{st}(\langle\llbracket \lambda p.(p = \lambda w.\text{sing}(w, \text{floyd})) \wedge \text{HRD}(v_0, i, p)$$
$$\wedge\, v_1 = v_1\rrbracket^{\mathcal{M},g[v_0/w']}$$
$$:\, w' \in D_s\rangle(w) = \{p\}))\}$$

$$=\; \{w \in c_0 \mid \exists g(\exists p \in D_{st}(\llbracket \lambda p.(p = \lambda w.\text{sing}(w, \text{floyd})) \wedge \text{HRD}(v_0, i, p)$$
$$\wedge\, v_1 = v_1\rrbracket^{\mathcal{M},g[v_0/w]} = \{p\}))\}$$

$$=\; \{w \in c_0 \mid \exists g(\exists p \in D_{st}(\langle\llbracket (p = \lambda w.\text{sing}(w, \text{floyd})) \wedge \text{HRD}(v_0, i, p)$$
$$\wedge\, v_1 = v_1\rrbracket^{\mathcal{M},g[v_0/w][p/p']} : p' \in D_{st}\rangle = \{p\}))\}$$

$$=\; \{w \in c_0 \mid \exists g(\exists p \in D_{st}(p = \llbracket \lambda w.\text{sing}(w, \text{floyd})\rrbracket^{\mathcal{M}}$$
$$\&\; \llbracket \text{HRD}\rrbracket^{\mathcal{M}}(w)(\llbracket i\rrbracket^{\mathcal{M}})(p) = 1$$
$$\&\; g(v_1) = g(v_1)))\}$$

$$=\; \{w \in c_0 \mid \llbracket \text{HRD}\rrbracket^{\mathcal{M}}(w)(\llbracket i\rrbracket^{\mathcal{M}})(\llbracket \lambda w.\text{sing}(w, \text{floyd})\rrbracket^{\mathcal{M}}) = 1$$
$$\&\; \exists g(g(v_1) = g(v_1))\}$$

$$=\; \{w \in c_0 \mid \llbracket \text{HRD}\rrbracket^{\mathcal{M}}(w)(\llbracket i\rrbracket^{\mathcal{M}})(\llbracket \lambda w.\text{sing}(w, \text{floyd})\rrbracket^{\mathcal{M}}) = 1\}$$

$$=\; c_1$$

A.1.3.2 Details of the Illocutionary Relation

(same procedure as above)

$$w \equiv_{c_1, (A.2')} w' \text{ iff } w, w' \in c_1 \ \& \ w' = w'$$

Appendix B

Update with Modal Centering

(UC$_\omega$) (Bittner 2010)

Definition 1 ($\top\bot$-lists, sublists, information states)**.** Given a set $D \neq \varnothing$:

   i. $\langle D \rangle^{n,m} = D^n \times D^m$ is the set of *topic-background lists* ($\top\bot$-lists) of n topical objects in D and m background objects in D.

   ii. For any $\top\bot$-list $i \in \langle D \rangle^{n,m}$, $\top i = i_1$ and $\bot i = i_2$. Thus, $i = \langle \top i, \bot i \rangle$.

   iii. An n, m-information state is any subset of $\langle D \rangle^{n,m}$. $\varnothing$ is the ABSURD STATE.

Definition 2 (UC$_\omega$ types)**.** The set of UC$_\omega$ types Θ is the smallest set such that (i) $t, \omega, \delta \in \Theta$, and (ii) $(ab) \in \Theta$ if $a, b \in \Theta$. The subset $\mathrm{DR}(\Theta) = \{\omega t, \omega, \delta\}$ is the set of discourse referent types within Θ.

Definition 3 (UC$_\omega$ frames)**.** A UC$_\omega$ frame is a set $\{D_a | a \in \Theta\}$ of non-empty pair-wise disjoint sets D_a such that (i) $D_t = \{1, 0\}$, (ii) $D_{ab} = \{f | \varnothing \subset \mathrm{Dom} f \subseteq D_a$ & $\mathrm{Ran} f \subseteq D_b\}$, and (iii) $D_s = \cup_{n,m \geq 0} \langle D \rangle^{n,m}$ where $D = \bigcup_{a \in \mathrm{DR}(\Theta)} D_a$.

Definition 4 (UC$_\omega$ models). A UC$_\omega$ model is a pair $M = \langle \{D_a | a \in \Theta\}, \llbracket \cdot \rrbracket \rangle$ such that $\{D_a | a \in \Theta\}$ is a UC$_\omega$ frame and for all $A \in Con_a$, $\llbracket A \rrbracket \in D_a$.

Definition 5 (UC$_\omega$ syntax). For any type $a \in \Theta$ the set of a-terms, $Term_a$, is defined as follows:

   i. $Con_a \cup Var_a \subseteq Term_a$

   ii. $\lambda u_a(B) \in Term_{ab}$, if $u_a \in Var_a$ and $B \in Term_b$

   iii. $BA \in Term_b$, if $B \in Term_{ab}$ and $A \in Term_a$

   iv. $\neg A, (A \to B), (A \wedge B), (A \vee B) \in Term_t$, if $A, B \in Term_t$

   v. $\forall u_a B, \exists u_a B \in Term_t$, if $u_a \in Var_a$ and $B \in Term_t$

   vi. $(A_a = B_a) \in Term_t$, if $A_a, B_a \in Term_a$

   vii. $(u_a{}^\top \oplus B), (u_a{}^\perp \oplus B) \in Term_s$, if $a \in \mathrm{DR}(\Theta), u_a \in Var_a$, and $B \in Term_s$

   viii. $\top a_n, \perp a_n \in Term_{sa}$, if $a \in \mathrm{DR}(\Theta)$ and $n \geq 1$

   ix. $A\{B\} \in Term_{at}$, if $a \in \mathrm{DR}(\Theta), A \in Term_{sa}$, and $B \in Term_{st}$

   x. $(A; B), (A^\top; B), (A^\perp; B) \in Term_{(st)st}$, if $A, B \in Term_{(st)st}$

Definition 6 (UC$_\omega$ semantics). For any $M = \langle \{D_a | a \in \Theta\}, \llbracket \cdot \rrbracket \rangle$ and g:

   i. $\llbracket A \rrbracket^g = \llbracket A \rrbracket$ if $A \in Con_a$

       $\llbracket u \rrbracket^g = g(u)$ if $u \in Var_a$

   ii. $\llbracket \lambda u_a(B) \rrbracket^g(d) \doteq \llbracket B \rrbracket^{g[u/d]}$ if $d \in D_a$

   iii. $\llbracket BA \rrbracket^g \doteq \llbracket B \rrbracket^g(\llbracket A \rrbracket^g)$

iv. $[\![\neg A]\!]^g \doteq 1 \setminus [\![A]\!]^g$

$[\![A \to B]\!]^g \doteq 1 \setminus ([\![A]\!]^g \setminus [\![B]\!]^g)$

$[\![A \wedge B]\!]^g \doteq [\![A]\!]^g \cap [\![B]\!]^g$

$[\![A \vee B]\!]^g \doteq [\![A]\!]^g \cup [\![B]\!]^g$

v. $[\![\forall u_a A]\!]^g \doteq \bigcap_{d \in D_a} [\![A]\!]^{g[u/d]}$

$[\![\exists u_a A]\!]^g \doteq \bigcup_{d \in D_a} [\![A]\!]^{g[u/d]}$

vi. $[\![A_a = B_a]\!]^g = |\{\langle d, d' \rangle \in D_a \times D_a : d = [\![A]\!]^g \ \& \ d' = [\![B]\!]^g \ \& \ d = d'\}|$

vii. $[\![u_a{}^\top \oplus B]\!]^g \doteq \langle (g(u_a) \oplus \top[\![B]\!]^g), \perp[\![B]\!]^g \rangle$

$[\![u_a{}^\perp \oplus B]\!]^g \doteq \langle \top[\![B]\!]^g, (g(u_a) \oplus \perp[\![B]\!]^g) \rangle$

viii. $[\![\top a_n]\!]^g(i) \doteq ((\top i)_a)_n$ if $i \in D_s$

$[\![\perp a_n]\!]^g(i) \doteq ((\perp i)_a)_n$

ix. $[\![A\{B\}]\!]^g \doteq {}^\chi\{[\![A]\!]^g(j) | j \in {}^{\{\}}[\![B]\!]^g\}$

x. $c[\![A; B]\!]^g \doteq c[\![A]\!]^g[\![B]\!]^g$

$c[\![A^\top; B]\!]^g \doteq \{l \in c[\![A; B]\!]^g | \exists a \forall k \in c[\![A; B]\!]^g \exists j \in c[\![A]\!]^g \exists i \in c \exists d \in D_a :$

$$\top k \geq \top j > \top i \ \& \ (\top j)_1 = d$$

$$\& \ [\![B]\!]^g \neq [\![B[\top a_1/\perp a_1]]\!]^g \ \& \ [\![\top a_1]\!](k) = d\}$$

$c[\![A^\perp; B]\!]^g \doteq \{l \in c[\![A; B]\!]^g | \exists a \forall k \in c[\![A; B]\!]^g \exists j \in c[\![A]\!]^g \exists i \in c \exists d \in D_a :$

$$\perp k \geq \perp j > \perp i \ \& \ (\perp j)_1 = d$$

$$\& \ [\![B]\!]^g \neq [\![B[\perp a_1/\top a_1]]\!]^g \ \& \ [\![\perp a_1]\!](k) = d\}$$

Definition 7 (contexts and defaults). For a model $M = \langle \{D_a | a \in \Theta\}, [\![\cdot]\!] \rangle$,

i. an M-CONTEXT is a pair $\langle p_0, [\![I]\!] \rangle \in D_{\omega t} \times D_\delta$ such that ${}^{\{\}}p_0 \neq \varnothing$ and

$\forall w \in {}^{\{\}}p_0 : [\![I]\!] \in {}^{\{\}}[\![spk]\!](w)$

ii. ${}^{st}p_0 = {}^\chi\{\langle \langle w, p_0 \rangle, \langle \rangle \rangle | w \in {}^{\{\}}p_0\}$ is the p_0-DEFAULT STATE (of information)

Definition 8 (truth). Given an information state c, an $(st)st$ term K introduces the set of primary topics $\top_c K = \{(\top j)_1 | \forall g : j \notin {}^{\{\}}c \ \& \ j \in {}^{\{\}}(c[\![K]\!]^g)\}$

i. K is *true* in c at world w iff $\exists p \in D_{\omega t} : \top_c K = \{p\} \ \& \ w \in {}^{\{\}}p$

ii. K is *false* in c at world w iff $\exists p \in D_{\omega t} : \top_c K = \{p\} \ \& \ w \notin {}^{\{\}}p$

DRT Style Abbreviations for UC$_\omega$ terms

Static relations $(a \in \mathrm{DR}(\Theta))$

$A_a \in B_{at}$	for	BA
$A_a \notin B_{at}$	for	$\neg BA$
$A_{at} \subseteq B_{at}$	for	$A u_a(u \in A \to u \in B)$
$B(A_1, ..., A_n)$	for	$BA_1...A_n$

Local projections, conditions, and updates $(a \in \mathrm{DR}(\Theta), \mathrm{R} \in \{=, \in, \notin, \subseteq\})$

$\top a, \bot a$	for	$\top a_1, \bot a_1$
A_a°, A_{sa}°	for	$\lambda i_s.A, \lambda i_s.Ai$
$B \ \mathrm{R}_i \ A$	for	$\lambda i_s.B^\circ i \ \mathrm{R} \ A^\circ i$
$B_W\langle A_1, ..., An \rangle$	for	$\lambda i_s.B(W^\circ i, A_1^\circ i, ..., A_n^\circ i)$
$[C]$	for	$\lambda I_{st}\lambda j_s.Ij \wedge Cj$
$^\top[u_1...u_n | C]$	for	$\lambda I_{st}\lambda j_s.\exists u_1...u_n \exists i_s(j = (u_1{}^\top \oplus ...(u_n{}^\top \oplus i)) \wedge Ii \wedge Ci)$
$[u_1...u_n	C]$	for	$\lambda I_{st}\lambda j_s.\exists u_1...u_n \exists i_s(j = (u_1{}^\bot \oplus ...(u_n{}^\bot \oplus i)) \wedge Ii \wedge Ci)$

Global updates $(a \in \mathrm{DR}(\Theta), \mathrm{R} \in \{=, \in, \notin, \subseteq\})$

$[A \ \mathrm{R} \ B ||]$	for	$\lambda I_{st}\lambda j_s.Ij \wedge Aj \ \mathrm{R} \ B\{I\}$
$[A|| \ \mathrm{R} \ B ||]$	for	$\lambda I_{st}\lambda j_s.Ij \wedge A\{I\} \ \mathrm{R} \ B\{I\}$
$^\top[u_a | u \ \mathrm{R} \ A ||]$	for	$\lambda I_{st}\lambda j_s.\exists u_a \exists i_s(j = (u^\top \oplus i) \wedge Ii \wedge u \ \mathrm{R} \ A\{I\})$
$[u_a | u \ \mathrm{R} \ A ||]$	for	$\lambda I_{st}\lambda j_s.\exists u_a \exists i_s(j = (u^\bot \oplus i) \wedge Ii \wedge u \ \mathrm{R} \ A\{I\})$
$(J_{(st)st} \ ; K_{(st)st})$	for	$\lambda I_{st}\lambda j_s.(K(JI))j$

Appendix C

Matrices

C.1 Conjunctions

(C.1) i. *É-hó'táheva-**séstse*** *Annie* *naa* *oha* ii. *é-sáa-hó'táheva-he-∅.*
3-win-RPT.3SG Annie and CNTR 3-neg-win-MOD$_A$-DIR
'Annie won, I hear, but I'm certain she didn't.'

(C.2) (C.1) ⤳ $^\top$[x|x = annie]; [w|won$_w$⟨⊤δ⟩]; [p|p = ⊥ω||]; [HRD$_{\top\omega}$⟨i, ⊥Ω⟩];

$\quad$ [w|won$_w$⟨⊤δ⟩]; [w|w ∉ ⊥ω||]; [p|p = ⊥ω||]; [CRT$_{\top\omega}$⟨i, ⊥Ω⟩]; [⊥ω ∈ ⊤ω||]

$\quad$ accepting the proposal: [⊤ω ∈ ⊥ω||];

$\quad$ modal recentering: $^\top$[p|p = ⊤ω||]

Model: Annie won in $\{w_4, w_5\}$

$\quad$ Annie didn't win in $\{w_1, w_2, w_3\}$

$\quad$ The speaker heard that she won in $\{w_1, w_2, w_4\}$

$\quad$ The speaker is certain that she didn't win in $\{w_2, w_3, w_4\}$

Initial Common Ground = $\{w_1, w_2, w_3, w_4\}$

(C.3) Sequence of updates for (C.2)

c_1	c_2	c_3	c_4
$\langle\langle\ a, w_1, p_0\ \rangle\langle\ \ \rangle\rangle$	$\langle\langle\ a, w_1, p_0\ \rangle\langle\ w_4\ \rangle\rangle$	$\langle\langle\ a, w_1, p_0\ \rangle\langle\ q, w_4\ \rangle\rangle$	$\langle\langle\ a, w_1, p_0\ \rangle\langle\ q, w_4\ \rangle\rangle$
	$\langle\langle\ a, w_1, p_0\ \rangle\langle\ w_5\ \rangle\rangle$	$\langle\langle\ a, w_1, p_0\ \rangle\langle\ q, w_5\ \rangle\rangle$	$\langle\langle\ a, w_1, p_0\ \rangle\langle\ q, w_5\ \rangle\rangle$
$\langle\langle\ a, w_2, p_0\ \rangle\langle\ \ \rangle\rangle$	$\langle\langle\ a, w_2, p_0\ \rangle\langle\ w_4\ \rangle\rangle$	$\langle\langle\ a, w_2, p_0\ \rangle\langle\ q, w_4\ \rangle\rangle$	$\langle\langle\ a, w_2, p_0\ \rangle\langle\ q, w_4\ \rangle\rangle$
	$\langle\langle\ a, w_2, p_0\ \rangle\langle\ w_5\ \rangle\rangle$	$\langle\langle\ a, w_2, p_0\ \rangle\langle\ q, w_5\ \rangle\rangle$	$\langle\langle\ a, w_2, p_0\ \rangle\langle\ q, w_5\ \rangle\rangle$
$\langle\langle\ a, w_3, p_0\ \rangle\langle\ \ \rangle\rangle$	$\langle\langle\ a, w_3, p_0\ \rangle\langle\ w_4\ \rangle\rangle$	$\langle\langle\ a, w_3, p_0\ \rangle\langle\ q, w_4\ \rangle\rangle$	
	$\langle\langle\ a, w_3, p_0\ \rangle\langle\ w_5\ \rangle\rangle$	$\langle\langle\ a, w_3, p_0\ \rangle\langle\ q, w_5\ \rangle\rangle$	
$\langle\langle\ a, w_4, p_0\ \rangle\langle\ \ \rangle\rangle$	$\langle\langle\ a, w_4, p_0\ \rangle\langle\ w_4\ \rangle\rangle$	$\langle\langle\ a, w_4, p_0\ \rangle\langle\ q, w_4\ \rangle\rangle$	$\langle\langle\ a, w_4, p_0\ \rangle\langle\ q, w_4\ \rangle\rangle$
	$\langle\langle\ a, w_4, p_0\ \rangle\langle\ w_5\ \rangle\rangle$	$\langle\langle\ a, w_4, p_0\ \rangle\langle\ q, w_5\ \rangle\rangle$	$\langle\langle\ a, w_4, p_0\ \rangle\langle\ q, w_5\ \rangle\rangle$

c_5	c_6	c_7
$\langle\langle a,w_1,p_0 \rangle\langle w_4,q,w_4 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle w_1,w_4,q,w_4 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle \overline{q},w_1,w_4,q,w_4 \rangle\rangle$
	$\langle\langle a,w_1,p_0 \rangle\langle w_2,w_4,q,w_4 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle \overline{q},w_2,w_4,q,w_4 \rangle\rangle$
	$\langle\langle a,w_1,p_0 \rangle\langle w_3,w_4,q,w_4 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle \overline{q},w_3,w_4,q,w_4 \rangle\rangle$
$\langle\langle a,w_1,p_0 \rangle\langle w_5,q,w_4 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle w_1,w_5,q,w_4 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle \overline{q},w_1,w_5,q,w_4 \rangle\rangle$
	$\langle\langle a,w_1,p_0 \rangle\langle w_2,w_5,q,w_4 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle \overline{q},w_2,w_5,q,w_4 \rangle\rangle$
	$\langle\langle a,w_1,p_0 \rangle\langle w_3,w_5,q,w_4 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle \overline{q},w_3,w_5,q,w_4 \rangle\rangle$
$\langle\langle a,w_1,p_0 \rangle\langle w_4,q,w_5 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle w_1,w_4,q,w_5 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle \overline{q},w_1,w_4,q,w_5 \rangle\rangle$
	$\langle\langle a,w_1,p_0 \rangle\langle w_2,w_4,q,w_5 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle \overline{q},w_2,w_4,q,w_5 \rangle\rangle$
	$\langle\langle a,w_1,p_0 \rangle\langle w_3,w_4,q,w_5 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle \overline{q},w_3,w_4,q,w_5 \rangle\rangle$
$\langle\langle a,w_1,p_0 \rangle\langle w_5,q,w_5 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle w_1,w_5,q,w_5 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle \overline{q},w_1,w_5,q,w_5 \rangle\rangle$
	$\langle\langle a,w_1,p_0 \rangle\langle w_2,w_5,q,w_5 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle \overline{q},w_2,w_5,q,w_5 \rangle\rangle$
	$\langle\langle a,w_1,p_0 \rangle\langle w_3,w_5,q,w_5 \rangle\rangle$	$\langle\langle a,w_1,p_0 \rangle\langle \overline{q},w_3,w_5,q,w_5 \rangle\rangle$
$\langle\langle a,w_2,p_0 \rangle\langle w_4,q,w_4 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle w_1,w_4,q,w_4 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle \overline{q},w_1,w_4,q,w_4 \rangle\rangle$
	$\langle\langle a,w_2,p_0 \rangle\langle w_2,w_4,q,w_4 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle \overline{q},w_2,w_4,q,w_4 \rangle\rangle$
	$\langle\langle a,w_2,p_0 \rangle\langle w_3,w_4,q,w_4 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle \overline{q},w_3,w_4,q,w_4 \rangle\rangle$
$\langle\langle a,w_2,p_0 \rangle\langle w_5,q,w_4 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle w_1,w_5,q,w_4 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle \overline{q},w_1,w_5,q,w_4 \rangle\rangle$
	$\langle\langle a,w_2,p_0 \rangle\langle w_2,w_5,q,w_4 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle \overline{q},w_2,w_5,q,w_4 \rangle\rangle$
	$\langle\langle a,w_2,p_0 \rangle\langle w_3,w_5,q,w_4 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle \overline{q},w_3,w_5,q,w_4 \rangle\rangle$
$\langle\langle a,w_2,p_0 \rangle\langle w_4,q,w_5 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle w_1,w_4,q,w_5 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle \overline{q},w_1,w_4,q,w_5 \rangle\rangle$
	$\langle\langle a,w_2,p_0 \rangle\langle w_2,w_4,q,w_5 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle \overline{q},w_2,w_4,q,w_5 \rangle\rangle$
	$\langle\langle a,w_2,p_0 \rangle\langle w_3,w_4,q,w_5 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle \overline{q},w_3,w_4,q,w_5 \rangle\rangle$
$\langle\langle a,w_2,p_0 \rangle\langle w_5,q,w_5 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle w_1,w_5,q,w_5 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle \overline{q},w_1,w_5,q,w_5 \rangle\rangle$
	$\langle\langle a,w_2,p_0 \rangle\langle w_2,w_5,q,w_5 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle \overline{q},w_2,w_5,q,w_5 \rangle\rangle$
	$\langle\langle a,w_2,p_0 \rangle\langle w_3,w_5,q,w_5 \rangle\rangle$	$\langle\langle a,w_2,p_0 \rangle\langle \overline{q},w_3,w_5,q,w_5 \rangle\rangle$
$\langle\langle a,w_4,p_0 \rangle\langle w_4,q,w_4 \rangle\rangle$	$\langle\langle a,w_4,p_0 \rangle\langle w_1,w_4,q,w_4 \rangle\rangle$	$\langle\langle a,w_4,p_0 \rangle\langle \overline{q},w_1,w_4,q,w_4 \rangle\rangle$
	$\langle\langle a,w_4,p_0 \rangle\langle w_2,w_4,q,w_4 \rangle\rangle$	$\langle\langle a,w_4,p_0 \rangle\langle \overline{q},w_2,w_4,q,w_4 \rangle\rangle$
	$\langle\langle a,w_4,p_0 \rangle\langle w_3,w_4,q,w_4 \rangle\rangle$	$\langle\langle a,w_4,p_0 \rangle\langle \overline{q},w_3,w_4,q,w_4 \rangle\rangle$
$\langle\langle a,w_4,p_0 \rangle\langle w_5,q,w_4 \rangle\rangle$	$\langle\langle a,w_4,p_0 \rangle\langle w_1,w_5,q,w_4 \rangle\rangle$	$\langle\langle a,w_4,p_0 \rangle\langle \overline{q},w_1,w_5,q,w_4 \rangle\rangle$
	$\langle\langle a,w_4,p_0 \rangle\langle w_2,w_5,q,w_4 \rangle\rangle$	$\langle\langle a,w_4,p_0 \rangle\langle \overline{q},w_2,w_5,q,w_4 \rangle\rangle$
	$\langle\langle a,w_4,p_0 \rangle\langle w_3,w_5,q,w_4 \rangle\rangle$	$\langle\langle a,w_4,p_0 \rangle\langle \overline{q},w_3,w_5,q,w_4 \rangle\rangle$
$\langle\langle a,w_4,p_0 \rangle\langle w_4,q,w_5 \rangle\rangle$	$\langle\langle a,w_4,p_0 \rangle\langle w_1,w_4,q,w_5 \rangle\rangle$	$\langle\langle a,w_4,p_0 \rangle\langle \overline{q},w_1,w_4,q,w_5 \rangle\rangle$
	$\langle\langle a,w_4,p_0 \rangle\langle w_2,w_4,q,w_5 \rangle\rangle$	$\langle\langle a,w_4,p_0 \rangle\langle \overline{q},w_2,w_4,q,w_5 \rangle\rangle$
	$\langle\langle a,w_4,p_0 \rangle\langle w_3,w_4,q,w_5 \rangle\rangle$	$\langle\langle a,w_4,p_0 \rangle\langle \overline{q},w_3,w_4,q,w_5 \rangle\rangle$
$\langle\langle a,w_4,p_0 \rangle\langle w_5,q,w_5 \rangle\rangle$	$\langle\langle a,w_4,p_0 \rangle\langle w_1,w_5,q,w_5 \rangle\rangle$	$\langle\langle a,w_4,p_0 \rangle\langle \overline{q},w_1,w_5,q,w_5 \rangle\rangle$
	$\langle\langle a,w_4,p_0 \rangle\langle w_2,w_5,q,w_5 \rangle\rangle$	$\langle\langle a,w_4,p_0 \rangle\langle \overline{q},w_2,w_5,q,w_5 \rangle\rangle$
	$\langle\langle a,w_4,p_0 \rangle\langle w_3,w_5,q,w_5 \rangle\rangle$	$\langle\langle a,w_4,p_0 \rangle\langle \overline{q},w_3,w_5,q,w_5 \rangle\rangle$

c_8	c_9
$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_1, w_4, q, w_4\, \rangle\rangle$	
$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_2, w_4, q, w_4\, \rangle\rangle$	$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_2, w_4, q, w_4\, \rangle\rangle$
$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_3, w_4, q, w_4\, \rangle\rangle$	
$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_1, w_5, q, w_4\, \rangle\rangle$	
$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_2, w_5, q, w_4\, \rangle\rangle$	$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_2, w_5, q, w_4\, \rangle\rangle$
$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_3, w_5, q, w_4\, \rangle\rangle$	
$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_1, w_4, q, w_5\, \rangle\rangle$	
$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_2, w_4, q, w_5\, \rangle\rangle$	$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_2, w_4, q, w_5\, \rangle\rangle$
$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_3, w_4, q, w_5\, \rangle\rangle$	
$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_1, w_5, q, w_5\, \rangle\rangle$	
$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_2, w_5, q, w_5\, \rangle\rangle$	$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_2, w_5, q, w_5\, \rangle\rangle$
$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_3, w_5, q, w_5\, \rangle\rangle$	
$\langle\langle\, a, w_4, p_0\, \rangle\langle\, \overline{q}, w_1, w_4, q, w_4\, \rangle\rangle$	
$\langle\langle\, a, w_4, p_0\, \rangle\langle\, \overline{q}, w_2, w_4, q, w_4\, \rangle\rangle$	$\langle\langle\, a, w_4, p_0\, \rangle\langle\, \overline{q}, w_2, w_4, q, w_4\, \rangle\rangle$
$\langle\langle\, a, w_4, p_0\, \rangle\langle\, \overline{q}, w_3, w_4, q, w_4\, \rangle\rangle$	
$\langle\langle\, a, w_4, p_0\, \rangle\langle\, \overline{q}, w_1, w_5, q, w_4\, \rangle\rangle$	
$\langle\langle\, a, w_4, p_0\, \rangle\langle\, \overline{q}, w_2, w_5, q, w_4\, \rangle\rangle$	$\langle\langle\, a, w_4, p_0\, \rangle\langle\, \overline{q}, w_2, w_5, q, w_4\, \rangle\rangle$
$\langle\langle\, a, w_4, p_0\, \rangle\langle\, \overline{q}, w_3, w_5, q, w_4\, \rangle\rangle$	
$\langle\langle\, a, w_4, p_0\, \rangle\langle\, \overline{q}, w_1, w_4, q, w_5\, \rangle\rangle$	
$\langle\langle\, a, w_4, p_0\, \rangle\langle\, \overline{q}, w_2, w_4, q, w_5\, \rangle\rangle$	$\langle\langle\, a, w_4, p_0\, \rangle\langle\, \overline{q}, w_2, w_4, q, w_5\, \rangle\rangle$
$\langle\langle\, a, w_4, p_0\, \rangle\langle\, \overline{q}, w_3, w_4, q, w_5\, \rangle\rangle$	
$\langle\langle\, a, w_4, p_0\, \rangle\langle\, \overline{q}, w_1, w_5, q, w_5\, \rangle\rangle$	
$\langle\langle\, a, w_4, p_0\, \rangle\langle\, \overline{q}, w_2, w_5, q, w_5\, \rangle\rangle$	$\langle\langle\, a, w_4, p_0\, \rangle\langle\, \overline{q}, w_2, w_5, q, w_5\, \rangle\rangle$
$\langle\langle\, a, w_4, p_0\, \rangle\langle\, \overline{q}, w_3, w_5, q, w_5\, \rangle\rangle$	

c_{10}	c_{11}
$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_2, w_4, q, w_4\, \rangle\rangle$	$\langle\langle\, p_1, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_2, w_4, q, w_4\, \rangle\rangle$
$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_2, w_5, q, w_4\, \rangle\rangle$	$\langle\langle\, p_1, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_2, w_5, q, w_4\, \rangle\rangle$
$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_2, w_4, q, w_5\, \rangle\rangle$	$\langle\langle\, p_1, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_2, w_4, q, w_5\, \rangle\rangle$
$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_2, w_5, q, w_5\, \rangle\rangle$	$\langle\langle\, p_1, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_2, w_5, q, w_5\, \rangle\rangle$

C.2 Questions

C.2.1 Polar Questions with Interrogative Mood

(C.4) *É-hó'táheva-**he*** *Andy*
3-win-Y/N   Andy
'Given your evidence, did Andy win?'

(C.5) ✓ *A₁:* *Héehe'e* *é-hó'táheva-**séstse***   ✓ *A₂:* *Héehe'e* *é-hó'táhéva-**Ø***
Yes   3-win-RPT.3SG   Yes   3-win-DIR
'Yes, he won, I hear.'   'Yes, he won, I'm sure.'

(C.6) $\underbrace{^\top[\mathsf{x}|\mathsf{x} = \mathsf{andy}]; [\mathsf{w}|\mathsf{won_w}\langle\top\delta\rangle]; [\mathsf{p}|\mathsf{p} \in {}^?\bot\omega||]}_{\text{(presentation of possible answers)}}; \underbrace{^\mathsf{P}[\mathsf{EVI}_{\top\omega}\langle\mathsf{u}, \bot\Omega\rangle]}_{\text{(not-at-issue restriction)}}$

Model: Andy won in worlds $w_4, w_5, w_6,$ and $w_7,$

the addressee has evidence that Andy won in $w_2, w_3, w_6,$ and $w_7,$

the addressee has evidence that Andy didn't win in $w_1, w_3, w_5,$ and $w_7.$

Initial common ground: $p_0 = \{w_1, w_2, w_3, w_5, w_6, w_7\}.$

(C.7) Sequence of updates for (C.6)

c_1	c_2	c_3	c_4
$\langle\langle a, w_1, p_0 \rangle\langle \; \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle w_4 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle q, w_4 \rangle\rangle$	
		$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$
	$\langle\langle a, w_1, p_0 \rangle\langle w_5 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle q, w_5 \rangle\rangle$	
		$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$
	$\langle\langle a, w_1, p_0 \rangle\langle w_6 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle q, w_6 \rangle\rangle$	
		$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$
	$\langle\langle a, w_1, p_0 \rangle\langle w_7 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle q, w_7 \rangle\rangle$	
		$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_7 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\langle \bar{q}, w_7 \rangle\rangle$
$\langle\langle a, w_2, p_0 \rangle\langle \; \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle w_4 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_4 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_4 \rangle\rangle$
		$\langle\langle a, w_2, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$	
	$\langle\langle a, w_2, p_0 \rangle\langle w_5 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_5 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_5 \rangle\rangle$
		$\langle\langle a, w_2, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$	
	$\langle\langle a, w_2, p_0 \rangle\langle w_6 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_6 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_6 \rangle\rangle$
		$\langle\langle a, w_2, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$	
	$\langle\langle a, w_2, p_0 \rangle\langle w_7 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_7 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\langle q, w_7 \rangle\rangle$
		$\langle\langle a, w_2, p_0 \rangle\langle \bar{q}, w_7 \rangle\rangle$	
$\langle\langle a, w_3, p_0 \rangle\langle \; \rangle\rangle$	$\langle\langle a, w_3, p_0 \rangle\langle w_4 \rangle\rangle$	$\langle\langle a, w_3, p_0 \rangle\langle q, w_4 \rangle\rangle$	$\langle\langle a, w_3, p_0 \rangle\langle q, w_4 \rangle\rangle$
		$\langle\langle a, w_3, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$	$\langle\langle a, w_3, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$
	$\langle\langle a, w_3, p_0 \rangle\langle w_5 \rangle\rangle$	$\langle\langle a, w_3, p_0 \rangle\langle q, w_5 \rangle\rangle$	$\langle\langle a, w_3, p_0 \rangle\langle q, w_5 \rangle\rangle$
		$\langle\langle a, w_3, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$	$\langle\langle a, w_3, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$
	$\langle\langle a, w_3, p_0 \rangle\langle w_6 \rangle\rangle$	$\langle\langle a, w_3, p_0 \rangle\langle q, w_6 \rangle\rangle$	$\langle\langle a, w_3, p_0 \rangle\langle q, w_6 \rangle\rangle$
		$\langle\langle a, w_3, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$	$\langle\langle a, w_3, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$
	$\langle\langle a, w_3, p_0 \rangle\langle w_7 \rangle\rangle$	$\langle\langle a, w_3, p_0 \rangle\langle q, w_7 \rangle\rangle$	$\langle\langle a, w_3, p_0 \rangle\langle q, w_7 \rangle\rangle$
		$\langle\langle a, w_3, p_0 \rangle\langle \bar{q}, w_7 \rangle\rangle$	$\langle\langle a, w_3, p_0 \rangle\langle \bar{q}, w_7 \rangle\rangle$
$\langle\langle a, w_5, p_0 \rangle\langle \; \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle w_4 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle q, w_4 \rangle\rangle$	
		$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$
	$\langle\langle a, w_5, p_0 \rangle\langle w_5 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle q, w_5 \rangle\rangle$	
		$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$
	$\langle\langle a, w_5, p_0 \rangle\langle w_6 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle q, w_6 \rangle\rangle$	
		$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$
	$\langle\langle a, w_5, p_0 \rangle\langle w_7 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle q, w_7 \rangle\rangle$	
		$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_7 \rangle\rangle$	$\langle\langle a, w_5, p_0 \rangle\langle \bar{q}, w_7 \rangle\rangle$
$\langle\langle a, w_6, p_0 \rangle\langle \; \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle w_4 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_4 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_4 \rangle\rangle$
		$\langle\langle a, w_6, p_0 \rangle\langle \bar{q}, w_4 \rangle\rangle$	
	$\langle\langle a, w_6, p_0 \rangle\langle w_5 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_5 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_5 \rangle\rangle$
		$\langle\langle a, w_6, p_0 \rangle\langle \bar{q}, w_5 \rangle\rangle$	
	$\langle\langle a, w_6, p_0 \rangle\langle w_6 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_6 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_6 \rangle\rangle$
		$\langle\langle a, w_6, p_0 \rangle\langle \bar{q}, w_6 \rangle\rangle$	
	$\langle\langle a, w_6, p_0 \rangle\langle w_7 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_7 \rangle\rangle$	$\langle\langle a, w_6, p_0 \rangle\langle q, w_7 \rangle\rangle$
		$\langle\langle a, w_6, p_0 \rangle\langle \bar{q}, w_7 \rangle\rangle$	

$\langle\langle\, a, w_7, p_0\, \rangle\langle\ \rangle\rangle$	$\langle\langle\, a, w_7, p_0\, \rangle\langle\, w_4\, \rangle\rangle$	$\langle\langle\, a, w_7, p_0\, \rangle\langle\, q, w_4\, \rangle\rangle$	$\langle\langle\, a, w_7, p_0\, \rangle\langle\, q, w_4\, \rangle\rangle$
		$\langle\langle\, a, w_7, p_0\, \rangle\langle\, \overline{q}, w_4\, \rangle\rangle$	$\langle\langle\, a, w_7, p_0\, \rangle\langle\, \overline{q}, w_4\, \rangle\rangle$
	$\langle\langle\, a, w_7, p_0\, \rangle\langle\, w_5\, \rangle\rangle$	$\langle\langle\, a, w_7, p_0\, \rangle\langle\, q, w_5\, \rangle\rangle$	$\langle\langle\, a, w_7, p_0\, \rangle\langle\, q, w_5\, \rangle\rangle$
		$\langle\langle\, a, w_7, p_0\, \rangle\langle\, \overline{q}, w_5\, \rangle\rangle$	$\langle\langle\, a, w_7, p_0\, \rangle\langle\, \overline{q}, w_5\, \rangle\rangle$
	$\langle\langle\, a, w_7, p_0\, \rangle\langle\, w_6\, \rangle\rangle$	$\langle\langle\, a, w_7, p_0\, \rangle\langle\, q, w_6\, \rangle\rangle$	$\langle\langle\, a, w_7, p_0\, \rangle\langle\, q, w_6\, \rangle\rangle$
		$\langle\langle\, a, w_7, p_0\, \rangle\langle\, \overline{q}, w_6\, \rangle\rangle$	$\langle\langle\, a, w_7, p_0\, \rangle\langle\, \overline{q}, w_6\, \rangle\rangle$
	$\langle\langle\, a, w_7, p_0\, \rangle\langle\, w_7\, \rangle\rangle$	$\langle\langle\, a, w_7, p_0\, \rangle\langle\, q, w_7\, \rangle\rangle$	$\langle\langle\, a, w_7, p_0\, \rangle\langle\, q, w_7\, \rangle\rangle$
		$\langle\langle\, a, w_7, p_0\, \rangle\langle\, \overline{q}, w_7\, \rangle\rangle$	$\langle\langle\, a, w_7, p_0\, \rangle\langle\, \overline{q}, w_7\, \rangle\rangle$

c_4 (reordered)

$\langle\langle\, a, w_1, p_0\, \rangle\langle\, \overline{q}, w_4\, \rangle\rangle$
$\langle\langle\, a, w_1, p_0\, \rangle\langle\, \overline{q}, w_5\, \rangle\rangle$
$\langle\langle\, a, w_1, p_0\, \rangle\langle\, \overline{q}, w_6\, \rangle\rangle$
$\langle\langle\, a, w_1, p_0\, \rangle\langle\, \overline{q}, w_7\, \rangle\rangle$
$\langle\langle\, a, w_3, p_0\, \rangle\langle\, \overline{q}, w_4\, \rangle\rangle$
$\langle\langle\, a, w_3, p_0\, \rangle\langle\, \overline{q}, w_5\, \rangle\rangle$
$\langle\langle\, a, w_3, p_0\, \rangle\langle\, \overline{q}, w_6\, \rangle\rangle$
$\langle\langle\, a, w_3, p_0\, \rangle\langle\, \overline{q}, w_7\, \rangle\rangle$
$\langle\langle\, a, w_5, p_0\, \rangle\langle\, \overline{q}, w_4\, \rangle\rangle$
$\langle\langle\, a, w_5, p_0\, \rangle\langle\, \overline{q}, w_5\, \rangle\rangle$
$\langle\langle\, a, w_5, p_0\, \rangle\langle\, \overline{q}, w_6\, \rangle\rangle$
$\langle\langle\, a, w_5, p_0\, \rangle\langle\, \overline{q}, w_7\, \rangle\rangle$
$\langle\langle\, a, w_7, p_0\, \rangle\langle\, \overline{q}, w_4\, \rangle\rangle$
$\langle\langle\, a, w_7, p_0\, \rangle\langle\, \overline{q}, w_5\, \rangle\rangle$
$\langle\langle\, a, w_7, p_0\, \rangle\langle\, \overline{q}, w_6\, \rangle\rangle$
$\langle\langle\, a, w_7, p_0\, \rangle\langle\, \overline{q}, w_7\, \rangle\rangle$

$\langle\langle\, a, w_2, p_0\, \rangle\langle\, q, w_4\, \rangle\rangle$
$\langle\langle\, a, w_2, p_0\, \rangle\langle\, q, w_5\, \rangle\rangle$
$\langle\langle\, a, w_2, p_0\, \rangle\langle\, q, w_6\, \rangle\rangle$
$\langle\langle\, a, w_2, p_0\, \rangle\langle\, q, w_7\, \rangle\rangle$
$\langle\langle\, a, w_3, p_0\, \rangle\langle\, q, w_4\, \rangle\rangle$
$\langle\langle\, a, w_3, p_0\, \rangle\langle\, q, w_5\, \rangle\rangle$
$\langle\langle\, a, w_3, p_0\, \rangle\langle\, q, w_6\, \rangle\rangle$
$\langle\langle\, a, w_3, p_0\, \rangle\langle\, q, w_7\, \rangle\rangle$
$\langle\langle\, a, w_6, p_0\, \rangle\langle\, q, w_4\, \rangle\rangle$
$\langle\langle\, a, w_6, p_0\, \rangle\langle\, q, w_5\, \rangle\rangle$
$\langle\langle\, a, w_6, p_0\, \rangle\langle\, q, w_6\, \rangle\rangle$
$\langle\langle\, a, w_6, p_0\, \rangle\langle\, q, w_7\, \rangle\rangle$
$\langle\langle\, a, w_7, p_0\, \rangle\langle\, q, w_4\, \rangle\rangle$
$\langle\langle\, a, w_7, p_0\, \rangle\langle\, q, w_5\, \rangle\rangle$
$\langle\langle\, a, w_7, p_0\, \rangle\langle\, q, w_6\, \rangle\rangle$
$\langle\langle\, a, w_7, p_0\, \rangle\langle\, q, w_7\, \rangle\rangle$

C.2.2 Polar Questions with Interrogative Clitic

(C.8) *Mó=é-hó'táheva-**sėstse** Andy?*
    y/n=3-win-RPT.3SG   Andy
    'Given what you heard, did Andy win?'

(C.9) ✓ *A₁:* *Héehe'e é-hó'táheva-**sėstse***   #A₂: *Héehe'e é-hó'táhéva-**Ø***
        Yes   3-win-RPT.3SG   Yes   3-win-DIR
        'Yes, he won, I hear.'   'Yes, he won, I'm sure.'

(C.10) $\underbrace{^\top[x|x = \mathsf{andy}]; [w|\mathsf{won}_w \langle \top \delta \rangle]; [p|p \in {}^? \bot \omega | |];}_{\text{(presentation of possible answers)}} \underbrace{{}^\mathsf{P}[\mathsf{HRD}_{\top \omega} \langle u, \bot \Omega \rangle]}_{\text{(not-at-issue restriction)}}$

Model: Andy won in worlds $w_4, w_5, w_6,$ and w_7,

  the addressee heard that Andy won in $w_2, w_3, w_6,$ and w_7,

  the addressee heard that Andy didn't win in $w_1, w_3, w_5,$ and w_7.

Initial common ground: $p_0 = \{w_1, w_2, w_3, w_5, w_6, w_7\}$.

(C.11) Sequence of updates for (C.10)

c_1	c_2	c_3	c_4
$\langle\langle\, a, w_1, p_0\, \rangle\langle\ \rangle\rangle$	$\langle\langle\, a, w_1, p_0\, \rangle\langle\, w_4\, \rangle\rangle$	$\langle\langle\, a, w_1, p_0\, \rangle\langle\, q, w_4\, \rangle\rangle$	
		$\langle\langle\, a, w_1, p_0\, \rangle\langle\, \overline{q}, w_4\, \rangle\rangle$	$\langle\langle\, a, w_1, p_0\, \rangle\langle\, \overline{q}, w_4\, \rangle\rangle$
	$\langle\langle\, a, w_1, p_0\, \rangle\langle\, w_5\, \rangle\rangle$	$\langle\langle\, a, w_1, p_0\, \rangle\langle\, q, w_5\, \rangle\rangle$	
		$\langle\langle\, a, w_1, p_0\, \rangle\langle\, \overline{q}, w_5\, \rangle\rangle$	$\langle\langle\, a, w_1, p_0\, \rangle\langle\, \overline{q}, w_5\, \rangle\rangle$
	$\langle\langle\, a, w_1, p_0\, \rangle\langle\, w_6\, \rangle\rangle$	$\langle\langle\, a, w_1, p_0\, \rangle\langle\, q, w_6\, \rangle\rangle$	
		$\langle\langle\, a, w_1, p_0\, \rangle\langle\, \overline{q}, w_6\, \rangle\rangle$	$\langle\langle\, a, w_1, p_0\, \rangle\langle\, \overline{q}, w_6\, \rangle\rangle$
	$\langle\langle\, a, w_1, p_0\, \rangle\langle\, w_7\, \rangle\rangle$	$\langle\langle\, a, w_1, p_0\, \rangle\langle\, q, w_7\, \rangle\rangle$	
		$\langle\langle\, a, w_1, p_0\, \rangle\langle\, \overline{q}, w_7\, \rangle\rangle$	$\langle\langle\, a, w_1, p_0\, \rangle\langle\, \overline{q}, w_7\, \rangle\rangle$
$\langle\langle\, a, w_2, p_0\, \rangle\langle\ \rangle\rangle$	$\langle\langle\, a, w_2, p_0\, \rangle\langle\, w_4\, \rangle\rangle$	$\langle\langle\, a, w_2, p_0\, \rangle\langle\, q, w_4\, \rangle\rangle$	$\langle\langle\, a, w_2, p_0\, \rangle\langle\, q, w_4\, \rangle\rangle$
		$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_4\, \rangle\rangle$	
	$\langle\langle\, a, w_2, p_0\, \rangle\langle\, w_5\, \rangle\rangle$	$\langle\langle\, a, w_2, p_0\, \rangle\langle\, q, w_5\, \rangle\rangle$	$\langle\langle\, a, w_2, p_0\, \rangle\langle\, q, w_5\, \rangle\rangle$
		$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_5\, \rangle\rangle$	
	$\langle\langle\, a, w_2, p_0\, \rangle\langle\, w_6\, \rangle\rangle$	$\langle\langle\, a, w_2, p_0\, \rangle\langle\, q, w_6\, \rangle\rangle$	$\langle\langle\, a, w_2, p_0\, \rangle\langle\, q, w_6\, \rangle\rangle$
		$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_6\, \rangle\rangle$	
	$\langle\langle\, a, w_2, p_0\, \rangle\langle\, w_7\, \rangle\rangle$	$\langle\langle\, a, w_2, p_0\, \rangle\langle\, q, w_7\, \rangle\rangle$	$\langle\langle\, a, w_2, p_0\, \rangle\langle\, q, w_7\, \rangle\rangle$
		$\langle\langle\, a, w_2, p_0\, \rangle\langle\, \overline{q}, w_7\, \rangle\rangle$	
$\langle\langle\, a, w_3, p_0\, \rangle\langle\ \rangle\rangle$	$\langle\langle\, a, w_3, p_0\, \rangle\langle\, w_4\, \rangle\rangle$	$\langle\langle\, a, w_3, p_0\, \rangle\langle\, q, w_4\, \rangle\rangle$	$\langle\langle\, a, w_3, p_0\, \rangle\langle\, q, w_4\, \rangle\rangle$
		$\langle\langle\, a, w_3, p_0\, \rangle\langle\, \overline{q}, w_4\, \rangle\rangle$	$\langle\langle\, a, w_3, p_0\, \rangle\langle\, \overline{q}, w_4\, \rangle\rangle$
	$\langle\langle\, a, w_3, p_0\, \rangle\langle\, w_5\, \rangle\rangle$	$\langle\langle\, a, w_3, p_0\, \rangle\langle\, q, w_5\, \rangle\rangle$	$\langle\langle\, a, w_3, p_0\, \rangle\langle\, q, w_5\, \rangle\rangle$
		$\langle\langle\, a, w_3, p_0\, \rangle\langle\, \overline{q}, w_5\, \rangle\rangle$	$\langle\langle\, a, w_3, p_0\, \rangle\langle\, \overline{q}, w_5\, \rangle\rangle$
	$\langle\langle\, a, w_3, p_0\, \rangle\langle\, w_6\, \rangle\rangle$	$\langle\langle\, a, w_3, p_0\, \rangle\langle\, q, w_6\, \rangle\rangle$	$\langle\langle\, a, w_3, p_0\, \rangle\langle\, q, w_6\, \rangle\rangle$
		$\langle\langle\, a, w_3, p_0\, \rangle\langle\, \overline{q}, w_6\, \rangle\rangle$	$\langle\langle\, a, w_3, p_0\, \rangle\langle\, \overline{q}, w_6\, \rangle\rangle$
	$\langle\langle\, a, w_3, p_0\, \rangle\langle\, w_7\, \rangle\rangle$	$\langle\langle\, a, w_3, p_0\, \rangle\langle\, q, w_7\, \rangle\rangle$	$\langle\langle\, a, w_3, p_0\, \rangle\langle\, q, w_7\, \rangle\rangle$
		$\langle\langle\, a, w_3, p_0\, \rangle\langle\, \overline{q}, w_7\, \rangle\rangle$	$\langle\langle\, a, w_3, p_0\, \rangle\langle\, \overline{q}, w_7\, \rangle\rangle$
$\langle\langle\, a, w_5, p_0\, \rangle\langle\ \rangle\rangle$	$\langle\langle\, a, w_5, p_0\, \rangle\langle\, w_4\, \rangle\rangle$	$\langle\langle\, a, w_5, p_0\, \rangle\langle\, q, w_4\, \rangle\rangle$	
		$\langle\langle\, a, w_5, p_0\, \rangle\langle\, \overline{q}, w_4\, \rangle\rangle$	$\langle\langle\, a, w_5, p_0\, \rangle\langle\, \overline{q}, w_4\, \rangle\rangle$
	$\langle\langle\, a, w_5, p_0\, \rangle\langle\, w_5\, \rangle\rangle$	$\langle\langle\, a, w_5, p_0\, \rangle\langle\, q, w_5\, \rangle\rangle$	
		$\langle\langle\, a, w_5, p_0\, \rangle\langle\, \overline{q}, w_5\, \rangle\rangle$	$\langle\langle\, a, w_5, p_0\, \rangle\langle\, \overline{q}, w_5\, \rangle\rangle$
	$\langle\langle\, a, w_5, p_0\, \rangle\langle\, w_6\, \rangle\rangle$	$\langle\langle\, a, w_5, p_0\, \rangle\langle\, q, w_6\, \rangle\rangle$	
		$\langle\langle\, a, w_5, p_0\, \rangle\langle\, \overline{q}, w_6\, \rangle\rangle$	$\langle\langle\, a, w_5, p_0\, \rangle\langle\, \overline{q}, w_6\, \rangle\rangle$
	$\langle\langle\, a, w_5, p_0\, \rangle\langle\, w_7\, \rangle\rangle$	$\langle\langle\, a, w_5, p_0\, \rangle\langle\, q, w_7\, \rangle\rangle$	
		$\langle\langle\, a, w_5, p_0\, \rangle\langle\, \overline{q}, w_7\, \rangle\rangle$	$\langle\langle\, a, w_5, p_0\, \rangle\langle\, \overline{q}, w_7\, \rangle\rangle$
$\langle\langle\, a, w_6, p_0\, \rangle\langle\ \rangle\rangle$	$\langle\langle\, a, w_6, p_0\, \rangle\langle\, w_4\, \rangle\rangle$	$\langle\langle\, a, w_6, p_0\, \rangle\langle\, q, w_4\, \rangle\rangle$	$\langle\langle\, a, w_6, p_0\, \rangle\langle\, q, w_4\, \rangle\rangle$
		$\langle\langle\, a, w_6, p_0\, \rangle\langle\, \overline{q}, w_4\, \rangle\rangle$	
	$\langle\langle\, a, w_6, p_0\, \rangle\langle\, w_5\, \rangle\rangle$	$\langle\langle\, a, w_6, p_0\, \rangle\langle\, q, w_5\, \rangle\rangle$	$\langle\langle\, a, w_6, p_0\, \rangle\langle\, q, w_5\, \rangle\rangle$
		$\langle\langle\, a, w_6, p_0\, \rangle\langle\, \overline{q}, w_5\, \rangle\rangle$	
	$\langle\langle\, a, w_6, p_0\, \rangle\langle\, w_6\, \rangle\rangle$	$\langle\langle\, a, w_6, p_0\, \rangle\langle\, q, w_6\, \rangle\rangle$	$\langle\langle\, a, w_6, p_0\, \rangle\langle\, q, w_6\, \rangle\rangle$
		$\langle\langle\, a, w_6, p_0\, \rangle\langle\, \overline{q}, w_6\, \rangle\rangle$	
	$\langle\langle\, a, w_6, p_0\, \rangle\langle\, w_7\, \rangle\rangle$	$\langle\langle\, a, w_6, p_0\, \rangle\langle\, q, w_7\, \rangle\rangle$	$\langle\langle\, a, w_6, p_0\, \rangle\langle\, q, w_7\, \rangle\rangle$
		$\langle\langle\, a, w_6, p_0\, \rangle\langle\, \overline{q}, w_7\, \rangle\rangle$	

$\langle\langle\, a, w_7, p_0\, \rangle\langle\ \rangle\rangle$ $\langle\langle\, a, w_7, p_0\, \rangle\langle\ w_4\ \rangle\rangle$ $\langle\langle\, a, w_7, p_0\, \rangle\langle\ q, w_4\ \rangle\rangle$ $\langle\langle\, a, w_7, p_0\, \rangle\langle\ q, w_4\ \rangle\rangle$

$\langle\langle\, a, w_7, p_0\, \rangle\langle\ \overline{q}, w_4\ \rangle\rangle$ $\langle\langle\, a, w_7, p_0\, \rangle\langle\ \overline{q}, w_4\ \rangle\rangle$

$\langle\langle\, a, w_7, p_0\, \rangle\langle\ w_5\ \rangle\rangle$ $\langle\langle\, a, w_7, p_0\, \rangle\langle\ q, w_5\ \rangle\rangle$ $\langle\langle\, a, w_7, p_0\, \rangle\langle\ q, w_5\ \rangle\rangle$

$\langle\langle\, a, w_7, p_0\, \rangle\langle\ \overline{q}, w_5\ \rangle\rangle$ $\langle\langle\, a, w_7, p_0\, \rangle\langle\ \overline{q}, w_5\ \rangle\rangle$

$\langle\langle\, a, w_7, p_0\, \rangle\langle\ w_6\ \rangle\rangle$ $\langle\langle\, a, w_7, p_0\, \rangle\langle\ q, w_6\ \rangle\rangle$ $\langle\langle\, a, w_7, p_0\, \rangle\langle\ q, w_6\ \rangle\rangle$

$\langle\langle\, a, w_7, p_0\, \rangle\langle\ \overline{q}, w_6\ \rangle\rangle$ $\langle\langle\, a, w_7, p_0\, \rangle\langle\ \overline{q}, w_6\ \rangle\rangle$

$\langle\langle\, a, w_7, p_0\, \rangle\langle\ w_7\ \rangle\rangle$ $\langle\langle\, a, w_7, p_0\, \rangle\langle\ q, w_7\ \rangle\rangle$ $\langle\langle\, a, w_7, p_0\, \rangle\langle\ q, w_7\ \rangle\rangle$

$\langle\langle\, a, w_7, p_0\, \rangle\langle\ \overline{q}, w_7\ \rangle\rangle$ $\langle\langle\, a, w_7, p_0\, \rangle\langle\ \overline{q}, w_7\ \rangle\rangle$

c_4 (reordered)

$\langle\langle\, a, w_1, p_0\, \rangle\langle\ \overline{q}, w_4\ \rangle\rangle$

$\langle\langle\, a, w_1, p_0\, \rangle\langle\ \overline{q}, w_5\ \rangle\rangle$

$\langle\langle\, a, w_1, p_0\, \rangle\langle\ \overline{q}, w_6\ \rangle\rangle$

$\langle\langle\, a, w_1, p_0\, \rangle\langle\ \overline{q}, w_7\ \rangle\rangle$

$\langle\langle\, a, w_3, p_0\, \rangle\langle\ \overline{q}, w_4\ \rangle\rangle$

$\langle\langle\, a, w_3, p_0\, \rangle\langle\ \overline{q}, w_5\ \rangle\rangle$

$\langle\langle\, a, w_3, p_0\, \rangle\langle\ \overline{q}, w_6\ \rangle\rangle$

$\langle\langle\, a, w_3, p_0\, \rangle\langle\ \overline{q}, w_7\ \rangle\rangle$

$\langle\langle\, a, w_5, p_0\, \rangle\langle\ \overline{q}, w_4\ \rangle\rangle$

$\langle\langle\, a, w_5, p_0\, \rangle\langle\ \overline{q}, w_5\ \rangle\rangle$

$\langle\langle\, a, w_5, p_0\, \rangle\langle\ \overline{q}, w_6\ \rangle\rangle$

$\langle\langle\, a, w_5, p_0\, \rangle\langle\ \overline{q}, w_7\ \rangle\rangle$

$\langle\langle\, a, w_7, p_0\, \rangle\langle\ \overline{q}, w_4\ \rangle\rangle$

$\langle\langle\, a, w_7, p_0\, \rangle\langle\ \overline{q}, w_5\ \rangle\rangle$

$\langle\langle\, a, w_7, p_0\, \rangle\langle\ \overline{q}, w_6\ \rangle\rangle$

$\langle\langle\, a, w_7, p_0\, \rangle\langle\ \overline{q}, w_7\ \rangle\rangle$

$\langle\langle\, a, w_2, p_0\, \rangle\langle\ q, w_4\ \rangle\rangle$

$\langle\langle\, a, w_2, p_0\, \rangle\langle\ q, w_5\ \rangle\rangle$

$\langle\langle\, a, w_2, p_0\, \rangle\langle\ q, w_6\ \rangle\rangle$

$\langle\langle\, a, w_2, p_0\, \rangle\langle\ q, w_7\ \rangle\rangle$

$\langle\langle\, a, w_3, p_0\, \rangle\langle\ q, w_4\ \rangle\rangle$

$\langle\langle\, a, w_3, p_0\, \rangle\langle\ q, w_5\ \rangle\rangle$

$\langle\langle\, a, w_3, p_0\, \rangle\langle\ q, w_6\ \rangle\rangle$

$\langle\langle\, a, w_3, p_0\, \rangle\langle\ q, w_7\ \rangle\rangle$

$\langle\langle\, a, w_6, p_0\, \rangle\langle\ q, w_4\ \rangle\rangle$

$\langle\langle\, a, w_6, p_0\, \rangle\langle\ q, w_5\ \rangle\rangle$

$\langle\langle\, a, w_6, p_0\, \rangle\langle\ q, w_6\ \rangle\rangle$

$\langle\langle\, a, w_6, p_0\, \rangle\langle\ q, w_7\ \rangle\rangle$

$\langle\langle\, a, w_7, p_0\, \rangle\langle\ q, w_4\ \rangle\rangle$

$\langle\langle\, a, w_7, p_0\, \rangle\langle\ q, w_5\ \rangle\rangle$

$\langle\langle\, a, w_7, p_0\, \rangle\langle\ q, w_6\ \rangle\rangle$

$\langle\langle\, a, w_7, p_0\, \rangle\langle\ q, w_7\ \rangle\rangle$
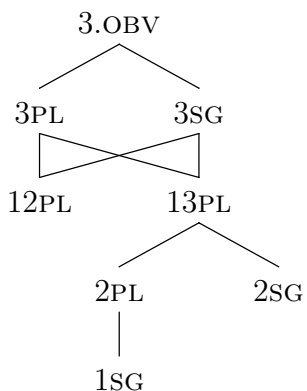
Appendix D

Evidentials: Paradigms and Other Uses

D.1 Evidential Paradigms

D.1.1 Reportative Paradigm

The Cheyenne reportative evidential agrees in person, number, obviation, and animacy with the subject of an intransitive verb and an argument of transitive verbs. For transitive verbs, the agreement depends on which argument is higher on the person hierarchy given below, repeated from §4.3.2.

(D.1) Reportative Agreement Person Hierarchy

```
                    3.OBV
                   /     \
              3PL           3SG
                 \         /
              12PL           13PL
                           /      \
                        2PL        2SG
                         |
                        1SG
```

When the object is inanimate, the reportative invariably agrees with the object. To date, I have not found or elicited examples of the reportative evidential used with transitive verbs with inanimate subjects, though such forms should be possible. A list of the different forms of the reportative evidential is given in (D.2) along with their glosses; note that certain forms are homophonous.

(D.2) Forms of the Cheyenne reportative

-máse	-RPT.1SG.A, -RPT.2SG.A
-mánėse	-RPT.1PL.A
-mánėse	-RPT.1PL.A
-mėse	-RPT.2PL.A
-sėstse	-RPT.3SG.A
-sesto	-RPT.3PL.A, -RPT.3OBV.A
-nėse	-RPT.SG.B (subject position)
-nėsestótse	-RPT.PL.B (subject position)
-nóse, -se	-RPT.SG.B (object position)
-nósestótse, -sestótse	-RPT.PL.B (object position)

Throughout the dissertation I have left off the '.A' for the animate forms, as the person specification can be seen as indicating animacy.

Paradigms illustrating these forms are given over the next couple of pages. The first table, in (D.3), gives the paradigm for intransitive predicates with animate subjects. The next table, in (D.4), gives the paradigm for intransitive predicates with inanimate subjects, which can be either singular or plural. The reportative form, in the right column, is contrasted with the unmarked (direct) form, in the left column.

(D.3) Animate subjects of intransitive predicates

Direct (Null) Evidential (Leman 1980b; p.27)	Reportative Evidential (Leman 1980b; p.38)
Ná-néméne-Ø 1-sing-DIR 'I sang'	Ná-némene-**màse** 1-sing-RPT.1SG 'I sang, they say'
Ná-némene-me-Ø 1-sing-PL-DIR 'We (excl.) sang'	Ná-némené-**mánėse** 1-sing-RPT.1PL 'We (excl.) sang, they say'
Né-némene-ma-Ø 2-sing-1PL.INCL-DIR 'We (incl.) sang'	Né-némené-**mánėse** 2-sing-RPT.1PL 'We (incl.) sang, they say'
Né-néméne-Ø 2-sing-DIR 'You sang'	Né-némene-**màse** 2-sing-RPT.2SG 'You sang, they say'
Né-némene-me-Ø 2-sing-PL-DIR 'You (pl.) sang'	Né-némene-**mėse** 2-sing-RPT.2PL 'You (pl.) sang, they say'
É-néméne-Ø 3-sing-DIR 'He sang'	É-némene-**sėstse** 3-sing-RPT.3SG 'He sang, they say'
É-némen-ó'o-Ø 3-sing-3PL.A-DIR 'They sang'	É-némené-**sesto** 3-sing-RPT.3PL 'They sang, they say'
É-némen-óho-Ø 3-sing-OBV-DIR 'He/they (obv.) sang'	É-némené-**sesto** 3-sing-RPT.3OBV 'He/they (obv.) sang, I hear'

(D.4) Inanimate subjects of intransitive predicates

Direct (Null) Evidential (Leman 1980b; p.27)	Reportative Evidential (Leman 1980b; p.38)
é-má'o-Ø 3-be.red$_B$-DIR 'It's red'	é-ma'ó-**nėse** 3-be.red$_B$-RPT.SG.B 'It's red, they say'
é-ma'o-nėstse-Ø 3-be.red$_B$-PL.B-DIR 'They're red'	é-ma'ó-**nėsestòtse** 3-be.red$_B$-RPT.PL.B 'They're red, I hear'

The table in (D.5) gives the paradigm for transitive verbs with animate 3rd person singular (proximate) objects and various animate subjects. The reportative agrees with the 3rd person object except when the subject is 3rd person obviative. No form is given with a plural proximate object.

(D.5) Animate subjects, animate 3rd person singular (proximate) object

Direct (Null) Evidential (Leman 1980b; p.55)	Reportative Evidential (Leman 1980b; p.81)
Ná-vóóm-o-∅ 1-see$_A$-SO-DIR 'I saw him'	Ná-vóom-o-**sėstse** 1-see$_A$- SO-RPT.3SG 'I saw him, they say'
Ná-vóom-ó-ne-∅ 1-see$_A$-SO-1PL-DIR 'We (excl) saw him'	Ná-vóom-ó-ne-**sėstse** 1-see$_A$-SO-1PL-RPT.3SG 'We (excl) saw him, they say'
Né-vóom-o-ne -∅ 2-see$_A$-SO-1PL-DIR 'We (incl) saw him'	Né-vóom-ó-nė-**sėstse** 2-see$_A$-SO-1PL-RPT.3SG 'We (incl) saw him, they say'
Né-vóóm-o-∅ 2-see$_A$-SO-DIR 'You saw him'	Né-vóom-o-**sėstse** 2-see$_A$-SO-RPT.3SG 'You saw him, they say'
Né-vóom-ó-vo-∅ 2-see$_A$-SO-2PL-DIR 'You (pl.) saw him'	Né-vóom-ó-vo-**sėstse** 2-see$_A$-SO-2PL-RPT.3SG 'You (pl.) saw him, they say'
É-vóom-ahtse-∅ 3-see$_A$-*ahte*-DIR 'He saw himself'	É-vóom-ȧhtse-**sėstse** 3-see$_A$-*ahte*-RPT.3SG 'He saw himself, they say'
É-vóom-aa'e-∅ 3-see$_A$-OS.OBV-DIR 'He/they (obv.) saw him' –	É-vóom-aé-**sesto** 3-see$_A$- OS.OBV-RPT.3OBV 'He/they (obv.) saw him, I hear' –

For the inverse of this paradigm – where there is a constant third person proximate subject and various animate objects – the reportative will agree with the subject except when the the object is third person obviative.

The table in (D.6) gives the paradigm for transitive verbs with first person subjects and various animate objects. The reportative agrees with the object in each case. No

form is given with a plural first person object. However, in that case, the reportative still agrees with the object.

(D.6) First person animate subject, animate objects

Direct (Null) Evidential (Leman 1980b; p.55)	Reportative Evidential (Leman 1980b; p.81)
Ná-vóom-ahtse-**Ø** 1-see$_A$-*ahte*-DIR 'I saw myself' – –	Ná-vóom-ȧhtse-**mȧse** 1-see$_A$-*ahte*-RPT.1SG 'I saw myself, they say' – –
Né-vóom-ȧtse-**Ø** 2-see$_A$-1:2-DIR 'I saw you' Né-vóom-atse-me-**Ø** 2-see$_A$-1:2-2PL-DIR 'I saw you (pl.)'	Né-vóom-atse-**mȧse** 2-see$_A$-1:2-RPT.2SG 'I saw you, they say' Né-vóom-atse-**mėse**[1] 2-see$_A$-1:2-RPT.2PL 'I saw you (pl.), they say'
Ná-vóóm-o-**Ø** 1-see$_A$-SO-1PL-DIR 'I saw him' Ná-vóom-am-ó-ho-**Ø** 1-see$_A$-RM-SO-OBV-DIR 'I saw him (obv.)' Ná-vóom-o-oʹo-**Ø** 1-see$_A$-SO-1PL-DIR 'I saw them'	Ná-vóom-o-**sėstse** 1-see$_A$-SO-RPT.3SG 'I saw him, they say' Ná-vóom-am-ó-**sesto** 1-see$_A$-RM-SO-RPT.3OBV 'I saw him (obv.), they say' Ná-vóom-ó-**sesto** 1-see$_A$-SO-RPT.3PL 'I saw them, they say'

For the inverse of this paradigm – where there is a constant first person object and various animate subjects – the reportative will invariably agree with the subject.

The table in (D.7) gives the paradigm for transitive verbs with an inanimate singular object and various animate subjects. The reportative agrees with the inanimate object in each case.

---

[1]This is an example where both the person prefix and the reportative agree with the second person argument: here, the object.

(D.7) Animate subjects, inanimate singular object

Direct (Null) Evidential (Leman 1980b; p.87)	Reportative Evidential (Leman 1980b; p.96)
Ná-vóóht-a-∅ 1-see_B-OB-DIR 'I saw it' Ná-vóóht-á-nóne-∅ 1-see_B-OB-1PL-DIR 'We (excl.) saw it'	Ná-vóóht-á-**nȯse** 1-see_B-OB-RPT.B.SG 'I saw it, they say' Ná-vóóht-á-nónė-**se** 1-see_B-OB-1PL-RPT.B.SG 'We (excl.) saw it, they say'
Né-vóóht-a-none-∅ 2-see_B-OB-1PL-DIR 'We (incl.) saw it' Né-vóóht-a -∅ 2-see_B-OB-DIR 'You saw it' Né-vóóht-á-nóvo-∅ 2-see_B-OB-2PL-DIR 'You (pl.) saw it'	Né-vóóht-á-nónė-**se** 2-see_B-OB-1PL-RPT.B.SG 'We (incl.) saw it, they say' Né-vóóht-á-**nȯse** 2-see_B-OB-RPT.B.SG 'You saw it' Né-vóóht-á-**nóvȯ-se** 2-see_B-OB-2PL-RPT.B.SG 'You (pl.) saw it'
É-vóóht-a-∅ 3-see_B-OB-DIR 'He saw it' É-vóóht-o-tse-∅ 3-see_B-OB-OBV-DIR 'He (obv.) saw it' É-vóóht-á-nóvo-∅ 3-see_B-OB-3PL-DIR 'They saw it'	É-vóóht-á-**nȯse** 3-see_B-OB-RPT.B.SG 'He saw it, they say' É-vóóht-ó-tsé-**nȯse** 3-see_B-OB-OBV-RPT.B.SG 'He (obv.) saw it, they say' É-vóóht-á-nóvȯ-**se** 3-see_B-OB-3PL-RPT.B.SG 'They saw it, they say'

In every case in (D.7), the reportative agrees with the inanimate singular object. For morpho-phonological reasons, the inanimate singular form of the reportative alternates between *nȯse* and *se*. The reportative also invariably agrees with the object when it is a plural inanimate. The forms of the reportative which agree with plural inanimate objects are *-nȯsestȯtse* (for singular subjects) and *-sestȯtse* (for plural subjects). These forms can be seen as the addition of *-stȯtse* to the reportative forms in (D.7).

D.1.2 Conjectural Paradigm

There are only two forms of the conjectural evidential: Mó-hé-hé and Mó-hané-hé. The former is used with animate subjects and the later with inanimate subjects – transitivity of the verb does not play a role. See Section 2.4 for a discussion of the components of the conjectural evidential.

(D.8) Animate subjects and objects

Direct (Null) Evidential (Leman 1980b)	Conjectural Evidential (Leman 1980b)
Ná-néméne-∅ 3-sing-DIR 'I sang'	**Mó**-ná-némenė-**he-he** CNJ-1-sing-MOD_A-Y/N 'I sang, I suppose'
é-némene-o'o-∅ 3-sing-3PL-DIR 'They sang'	**Mó**-némenė-**he**-vo-**he** CNJ-sing-MOD_A-3PL-Y/N 'They sang, I suppose'
Ná-vóóm-atsé-me-∅ 1-see_A-1:2-PL-DIR 'I saw you (pl)'	**Mó**-né-vóóm-atsė-**he**-me-**he** CNJ-1-see_A-1:2-MOD_A-PL-Y/N 'I saw them (inan), I suppose'
É-vóóm-ae-vo-ho-∅ 3-see_A-OS-3PL-OBV-DIR 'He (obv) saw them'	**Mó**-vóóm-ae-**he**-vo-vo-**he** CNJ-see_A-OS-MOD_A-3PL-OBV-Y/N 'He (obv) saw them, I suppose'

(D.9) Inanimate subjects or objects

Direct (Null) Evidential (Leman 1980b; p.27)	Conjectural Evidential (Leman 1980b; p.38)
é-má'o-∅ 3-be.red_B-DIR 'It's red'	**Mó**-ma'ó-**hane-he** CNJ-be.red_B-MOD_B-Y/N 'It's red, I suppose'
é-ma'o-nėstse-∅ 3-be.red_B-PL.B-DIR 'They're red'	**Mó**-ma'ó-**hane**-votse-**he** CNJ-be.red_B-MOD_B-PL.B-Y/N 'They're red, I suppose'
Ná-vóóht-a-∅ 1-see_B-OB-DIR 'I saw it'	**Mó**-ná-vóóht-ȯ-**he-he** CNJ-1-see_B-b-MOD_A-Y/N 'I saw it, I suppose'
Ná-vóóht-a-nȯtse-∅ 1-see_B-OB-B.PL-DIR 'I saw them (inan)'	**Mó**-ná-vóóht-ȯ-**he**-notse-**he** CNJ-1-see_B-OB-MOD_A-B.PL-Y/N 'I saw them (inan), I suppose'

For morpho-phonological reasons, with plural inanimate subjects or objects, the final suffix of the conjectural is neutralized. This process also happens in questions with plural inanimate subjects and objects, e.g., *é-ma'o-nevotse* 'Are they red?', cf. *é-má'o-he* 'Is it red?'. This provides further evidence to support the hypothesis that the final suffix of the conjectural evidential is the polar interrogative mood marker.

D.1.3 Narrative Paradigm

The narrative evidential is only compatible with sentences with third person subjects and is typically used in conjunction with the remote past tense. With the default (null) tense (present/recent past), the narrative evidential indicates surprise, or something that was unexpected.

(D.10) Forms of the Cheyenne narrative evidential (all third person)

-hoono	-NAR.SG.A
-hoo'o	-NAR.PL.A
-neho	-NAR.SG.B (subject position)
-nėhoonȯtse	-NAR.PL.B (subject position)
-noho	-NAR.PL.B (object position)
-nȯhoonȯtse	-NAR.PL.B (object position)

With transitive verbs, if the object is inanimate, the narrative will agree with the object. The following two tables give examples of the narrative evidential with intransitive verbs with inanimate subjects and transitive verbs with inanimate objects.

(D.11) Inanimate subjects of intransitive predicates

Direct (Null) Evidential (Leman 1980b; p.43)	Narrative Evidential (Leman 1980b; p.53)
é-má'o-**Ø** 3-be.red$_B$-DIR 'It's red'	é-h-ma'ó-**neho** 3-PST-be.red$_B$-NAR.SG.B 'It was red, it's told'
é-ma'o-nėstse-**Ø** 3-be.red$_B$-PL.B-DIR 'They're red'	é-h-ma'ó-**nėhoonȯtse** 3-PST-be.red$_B$-NAR.PL.B 'They were red, it's told'

(D.12) Inanimate objects of transitive predicates

Direct (Null) Evidential (Leman 1980b; p.87)	Narrative Evidential (Leman 1980b; p.53)
é-h-vóóht-a-**∅** 3-PST-saw$_B$-OB-DIR 'He saw it'	é-h-vóoht-a-**noho** 3-PST-see$_B$-OB-NAR.SG.B 'He saw it, it's told'
é-h-vóoht-a-nȯtse-**∅** 3-PST-saw.$_B$-OB-PL.B-DIR 'He saw them (inan)'	é-h-vóoht-a-**nȯhoonȯtse** 3-PST-see$_B$-OB-NAR.PL.B 'He saw them' it's told'
é-h-vóóht-á-nóvo-**∅** 3-PST-saw.$_B$-OB-3PL.A-DIR 'They saw it'	é-h-vóoht-a-novo-**ho** 3-PST-see$_B$-OB-3PL-NAR.SG.B 'They saw it, it's told'
é-h-vóoht-a-novȯ-tse-**∅** 3-PST-saw.$_B$-OB-3PL.A-PL.B-DIR 'They saw them (inan)'	é-h-vóoht-a-novȯ-**hoonȯtse** 3-PST-see$_B$-OB-3PL-NAR.PL.B 'They saw them (inan), it's told'

Like the reportative evidential, but unlike the conjectural evidential, the narrative evidential is compatible with standard negation, as in (D.13).

(D.13) Inanimate subjects of negative intransitive predicates

Direct (Null) Evidential (Leman 1980b; p.43)	Narrative Evidential (Leman 1980b; p.53)
é-sáa-ma'ó-háne-**∅** 3-neg-be.red$_B$-MOD-DIR 'It's red'	é-s-sáa-ma'ó-hané-he-**neho** 3-PST-neg-be.red$_B$-MOD$_B$-NAR.SG.B 'It's red, it's told'
é-sáa-ma'ó-hane-hȯtse-**∅** 3-be.red$_B$-MOD-PL.B-DIR 'They're red'	é-s-sáa-ma'ó-háne-he-**nȧhoonȯtse** 3-PST-neg-be.red$_B$-MOD$_B$-NAR.PL.B 'They're red, it's told'

D.2   Other Uses of Cheyenne Evidentials

D.2.1   Evidential Indefinites

Another way that questions and evidentials interact in Cheyenne is the reportatives can appear on certain interrogative nouns. The result is ambiguous – it can either be interpreted as an evidential question or as a statement of uncertainty with a non-specific indefinite, as in (D.14).

(D.14) *Nevá'e-sėstse   tsé-hó'tåheva-stse*   (Fisher et al. 2006)
  who-RPT.3SG   DEP-won-<u>DEP</u>.3SG.A
  i. 'Given what you heard, who won?'
  ii. 'Someone won, I wonder who.'

This is the phenomenon that I described above as illocutionary variability (see Section 2.6.3). With certain questions (when and where questions), the evidential occurs on the verb (see Section 2.6.3); with other questions (who, what, which, why), the evidential occurs on the interrogative noun. The indefinite interpretation indicates that the identity is unknown to the speaker. Such indefinites are often used in ghost stories.

(D.15) Animate (Fisher et al. 2006)

Question Word	Reportative Evidential
névááhe who.SG	nevá'e-sėstse who-RPT.3SG nevá'ė-sesto who-RPT.3OBV
neváaseo'o who-AN.PL	nevá'ė-sesto who-RPT.3PL

(D.16) Inanimate (Fisher et al. 2006)

Question Word	Reportative Evidential
hénová'e what	hénová'é-nėse what-RPT.3SG.B hénová'é-tsé-nėse what-OBV-RPT.3SG.B
hénová'e-o'ȯtse what-PL	hénová'é-nėsestȯtse what-RPT.3PL
hénáá'e what	hénáá'é-nėse what-RPT.3SG.B

(D.17) Other indefinites (Fisher et al. 2006)

Singular	Obviative	Plural
vo'ėstane person.SG	vo'ėstanóho person.OBV	
hová'éhe something.PL		hová'eh-ȯtse something-INAN.PL

Another word for 'someone' is *vo'éstane*, which can also mean 'person' and 'noone' (when used in negative contexts). It is currently unclear exactly what the meaning and distribution difference between *vo'éstane* and *nevá'e-séstse* is, and whether or not the reportative indefinites are interpreted as 'noone' in negative contexts. Preliminary evidence suggests that other evidentials may also be able to occur on interrogative nouns, with the illocutionary variability effect described above.

D.2.2   With *nėse-*

The bound stem *nėse-* 'be the one' requires an evidential – it can not be inflected like a normal noun or verb.

(D.18) Evidentials with the bound root *nėse-* (Fisher et al. 2006)

Conjectural
mó-nėsé-hane-vó-he 'It was him (obv), I take it.' (1987:270)
hotȧhtse mó-nėsé-hané-he né=hetane 'Here, that must have been him, that man' (1987:270)

Reportative
nėse-sėstse 'he (is) reportedly the one'
nėsésesto 'they were reportedly the ones'

Narrative
nėsé-hoo'o 'He is the one, they say'
nėsé-hoono 'They are the ones, they say'

Appendix E

Cheyenne Question Words

In Cheyenne, content questions are not formed with the interrogative mood suffix, which is used in polar questions. Instead, there are interrogative roots, which can be both nominal an verbal. The interrogative nouns are similar to English WH-words, e.g., *who, what* and *when.* Interrogative verbs are bound roots that are inflected like all other Cheyenne verbs. This means that they can take the full range of verbal morphology, including the interrogative mood suffixes and evidentials. The example below illustrates one such verbal root:

(E.1) *É-néevá'a-ve-Ø*
        3-who.be-DIR
        'Who is he?'

E.1   Interrogative Nouns

The list below has been compiled from interrogative nouns mentioned in Leman (1980b) and Fisher et al. (2006).

Interrogative Words	Meaning
névááhe	'who'
néváaááhe	'who (emphatic)'
névááso	'who'
neváase-o'o	'who-PL'
neváas-óho	'who-OBV'
névaaááso	'who (emphatic)'
táaso, táase	'which$_B$.SG'
táasévoonėstse	'which$_B$.PL'
táasévoo'e	'which$_A$.SG'
táasévoone	'which$_A$.PL'
hénáá'e	'what'
hénaa'etse	'what'
hénová'e	'what'
hénová'ehȯtse	'what.PL'
hénová'etotse	'what'
hénáá'e + hése-	'why', lit. 'what reason' (what + verbal prefix *hése-*)
hénová'e + hése-	'why', lit. 'what reason' (what + verbal prefix *hése-*)
vé'-hé-	'why (rhetorical)'
tósa'e-	'where'
tóne'še	'when'

E.2 Interrogative Verbs

Interrogative verbs in Cheyenne appear to be complex verbal stems, formed in one of three ways:

- with the prefix hová'e- 'what kind' and a bound (incomplete) verbal root

- with the prefix óxȯ- and a verb related to speech

- with the prefix *tones-* (allomorphs: *toneš-*, *tonet-*, *tone'-*) 'how' and one or more bound roots

However, not all of the bound roots that appear with the questioning prefixes appears in other constructions.

I have so far found only one exception to the above generalization: *-néevá'e-ve* 'who be'. This appears to be formed with the verbalizing suffix *-ve* 'to be' and a

version of the word for 'who' (*néváahe*). However, at the present time I am not sure whether or not the same is true of other question words. Included below is a list of some interrogative verbs that appear in the Cheyenne Dictionary (Fisher et al. 2006).

Interrogative Verb	Meaning
-hová'éšeenotseve	'be what kind of tree (or bush)'
-hová'eve	'be what kind'
-hová'evé'ho'eve	'be what kind of non-Indian'
-hová'evenótseve	'be from what tribe'
-hová'evóehné	'bear what gender of child'
-hová'eéšeeve	'be what day today'
-néevá'e-ve	'who be'
-óxòhenove	'what be said'
-óxòhesané	'what say'
-óxòhestá	'what say about s.t.'
-óxòhestohe	'what/how called'
-óxòhet	'what say to s.o.'
-óxòheve	'what say'
-tóne'éhahe	'be how old'
-tóne'éhoése	'how high is s.o.'
-tóne'éhohtá	'how long be gone'
-tóne'ého'oése	'hang how high (animate)'
-tóne'ého'oésta	'hang how high (inanimate)'
-tóne'éhoma'o'e	'how far distant'
-tóne'éhoo'e	'how long stay'
-tóne'éhotoo'e	'how deep. of a hole'
-tóne'énehe	'how taste'
-tóne'éno'e	'how taste'
-tóne'esó	'be how long; be how far away'
-tóne'èstahe	'how tall'
-tóne'èstó'ohe	'how high (of something growing)'
-tóne'éšeohe	'how long travel'

Interrogative Verb	Meaning
-tóne'éšeóó'e	'stand how long'
-tóne'éšeše	'lie how long'
-tóne'óesané	'how do something'
-tóne'óestsé	'what do to s.t.'
-tóne'oet	'what do to s.o'
-tóne'óhová	'where escape'
-tóne'ohtsé	'how go; which direction'
-tóne'oohe	'where go'
-tóne'otse	'where go, where lead; what happen to s.o'
-tóne'ov	'how do something to s.o.'
-tóne'xóvananeta	'how much weigh'
-tóne'xóvátam	'how much regard s.o.'
-tóne'xove	'what time'
-tóne'xóvetanó	'how think'
-tóne'xóvomóhtahe	'how feel'
-tónésétam	'how regard s.o., how think about s.o.'
-tónésetsestá	'how regard s.t.'
-tónésévone	'how sound'
-tónesó	'how be'
-tónésóotse	'what happen'
-tónesta	'be of what quality; what be like; how be'
-tónéstàhevónó'é	'what kind'
-tónéstàhevónó'eve	'what kind'
-tónésta'é	'how long hair'
-tónéstá'tov	'how treat s.o.'
-tónéstáotse	'what become; what happen (to s.o.)'
-tónéstoha	'how many (inanimate) are there'
-tónés-tóha'ónéto	'what number in sequence'
-tónés-tóhavóno'eve	'what kind (of work, etc.)'
-tónés-tóheaénamá	'how old'
-tónés-tóheeno'tsé	'camp for how many nights'
-tónés-tóheéše'hamá	'how many months, how old, or how far along in pregnancy'
-tónéstóheohtsé	'how many go (only pl. subjects)'
-tónéstóhnóehné	'bear how many children'
-tónéstóhnóohe	'have how many relatives'
-tónéstóneehe	'be what size of stringlike entity'
-tónéstoxe	'how many (animate) are there (only pl subjects)'
-tónéšéahtám	'how sound to s.o.'
-tónéšéa'e	'how feel in texture'
-tónéšéata	'how feel in texture'
-tónéše-éšeeve	'how be the day (esp. today)'
-tónéšéh	'do what to s.o.; how need s.o.'
-tónéšéhasené	'have how many seeds up in the seed-in-basket game'

Interrogative Verb	Meaning
-tónéšéhéne'ena	'how know'
-tónéše'šeme	'how sound'
-tónéšé'tá	'how do to s.t., what do to s.t.'
-tónéšé'tov	'how do to s.o., what do to s.o.'
-tónéšeméa'xe	'how smell'
-tónéšeméeotse	'how smell'
-tónéšemenoo'éxáne	' what color eyes'
-tónéšéne	'how be the face'
-tónéšénee'e	'what kind of face'
-tónéšenoné	'how sing'
-tónéšenóno'e	'how look; how appear'
-tónéšenóohe	'how look; how appear'
-tónéšenóohee'e	'what does s.o. look like sitting'
-tónéšeše	'how lie'
-tónéšetanó	'how feel mentally (or emotionally)'
-tónéšetsestá	'what think about s.t.'
-tónéšévé	'what do'
-tónéševéhe	'how named, named how'
-tónéšévétanó	'what want to do'
-tónéševo'e'ov	'how inflict injury on s.o., how chase'
-tónéšévone	'how sound'
-tónetaa'emenoo'é	'what size (of berry-shaped objects)'
-tónetaa'ene'ho'tá	'how big be a room'
-tónetaa'óneehe	'how big around (of a ropelike entity)'
-tónetaa'ótoo'e	'how deep (of a hole)'
-tónetaeta	'how sized, of what size'
-tónetáho'he	'how cooked; cooked how'
-tónetáho'tá	'how cooked'
-tónetáhtóohe	'how sound; how howl'
-tónetanó	'how want to do'
-tónetao'ó	'what size; be of some size'
-tónetátamáno'e	'how be the environment'
-tónetoe'tó	'how hang; cling'
-tónetoem	'how count s.o., how price s.o.'
-tónetoém	'how related to s.o.'
-tónetoeme	'how priced, what cost'
-tónetoéstomo'he	'of what personality, how act'
-tónetoéstomó'he'tov	'how act toward'
-tónetoéstóné	'how much charge'
-tónetóhomo'he	'how dance'
-tónetóhoo'e	'how swim; wade'
-tónetóhtáheve	'how designed; how colored'
-tónetóhtáhéve'éxané	'have eyes of what color'

Interrogative Verb	Meaning
-tónetóhtáho'tá	'how colored from heat (or sun)'
-tónetó'a'xe	'what say'
-tónetó'ané	'what talk about; how say something?'
-tóneto'eétahe	'what do'
-tóneto'emaohe	'how sentenced, what sentence'
-tónetó'ėsėhahtá	'how big feet'
-tóneto'omeeotse	'how affected by tragedy suddenly'
-tóneto'omenehe	'what tragedy happened to'
-tóneto'otsé'tov	'how have use for s.o.'
-toneto'tá	'how sit'
-tóneto'xevá	'how vow, vow something'
-tónetóma'é	'how painted'
-tónetóma'o'e	'what kind of ground'
-tónetoma'tá	'how s.t. feel (to someone)'
-tónetomóhtahe	'how feel (physically)'
-tónetomóhtȧhéotse	'how come to feel physically'
-tónetónotó	'how thick'
-tónetónová	'what talk about'
-tónetonóvá	'how hang drymeat'
-tonétóohtsé	'turn cold'
-tónetoo'e	'how sit'
-tónetóo'xevá	'how announce'
-tónetótaa'emenoo'é	'what size (only of plural, berry-shaped subjects)'
-tónetótaa'ónéstse	'be of what size'
-tónetotse'ohe	'what work'
-tónetová	'how furred; what hair'
-tónetóxe'ohe	'how be written'

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