

Quantificational and Illocutionary Variability in Cheyenne*

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1. Introduction

In many languages, certain forms can vary in their quantificational force, depending on the grammatical context they appear in. Such forms have been called indeterminate pronouns for, e.g., Japanese (Shimoyama 2001, Kratzer and Shimoyama 2002). Cheyenne (Algonquian) has a large class of indeterminates, including both nouns and verbs. The default interpretation of Cheyenne indeterminates is interrogative, but, depending on their syntactic environment, their quantificational force can vary to take on existential, negative polarity, free choice, and other interpretations. Environments that condition these interpretations include in the scope of negation, modals, reduplication, and particles similar to English *any*, as well as in the scope of the illocutionary mood markers, including the polar interrogative and imperative markers, and evidentials.

When indeterminates occur in a sentence with an evidential in Cheyenne, the sentence is ambiguous between an evidential content question and a statement of uncertainty. That is, the illocutionary force of the sentence can vary, depending on the context. This illocutionary variability is tied to the indeterminates: polar interrogatives, which are not formed with an indeterminate, are not ambiguous.

In this paper, I discuss the quantificational variability of Cheyenne indeterminates: the variety of interpretations they can receive and the grammatical contexts that condition these interpretations. Building on analyses of indeterminates in other languages, such as Kratzer and Shimoyama (2002), I present a Hamblin-style analysis of Cheyenne indeterminates. The proposal builds on the analysis of declaratives and interrogatives argued for in Murray (2010). This analysis can account for the quantificational variability of indeter-

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minates in the scope of propositional operators as well as the scope of illocutionary mood markers. The analysis is formalized in an independently motivated update semantics (Update with Centering, [Bittner 2011](#)), which automatically provides the required alternatives.

I also discuss the illocutionary variability of Cheyenne sentences that contain both indeterminates and evidentials: the variety of interpretations they can receive and the discourse contexts that condition these interpretations. The illocutionary variability of Cheyenne sentences can be accounted for by combining the analysis of indeterminates proposed in this paper with the analysis of evidentials developed in [Murray \(2010\)](#).

This paper is structured as follows. Section Two presents background information on Cheyenne. This includes an overview of the types of indeterminates, since there are both interrogative and non-interrogative indeterminates, as well as an overview of the evidential system. In Section Three, I discuss quantificational variability in Cheyenne, providing detailed examples of the various quantificational interpretations of the interrogative indeterminates, the environments that they occur in, and an informal overview of the analysis. In Section Four, I formalize a [Hamblin \(1973\)](#) style analysis in an update semantics, which provides a natural framework for the analysis of indeterminates. Section Five details several examples of illocutionary variability, variation in illocutionary force when interrogative indeterminates occur with an evidential, and sketches the analysis.

2. Background on Cheyenne

Cheyenne is a Plains Algonquian language spoken in Montana and Oklahoma. There are approximately 1000 speakers of the language, most of whom are over 50 years old. Data presented in this paper is from my fieldwork as well as a grammar ([Leman 1980b](#)), a dictionary ([Fisher et al. 2006](#)), and collections of texts ([Leman 1980a, 1987, Croft 1988](#)). For all data, I provided the morphological analysis, glosses, and translations.

There are several grammatical features of Cheyenne that are important to the discussion of indeterminates. First, Cheyenne is a polysynthetic language. The verb is templatic, with at least nine fixed slots ([Murray 2010](#)). The last suffixal slot contains an evidential or an illocutionary mood marker, which are in complementary distribution. All main (independent) clauses in Cheyenne are marked with either an illocutionary mood marker or an evidential, all of which are declarative. There are four evidentials, illustrated below in (1): the direct, the reportative, the narrative, and the conjectural (or inferential). The direct evidential in Cheyenne is unmarked. I label this as an evidential because unmarked sentences in Cheyenne commit the speaker to having direct evidence for the scope of the evidential, and are infelicitous when the speaker does not have such evidence. The reportative, also called the attributive, is used primarily for second hand reports: information conveyed to the speaker with the direct evidential. The narrative, also called the preterite or mediate, is a specialized reportative used for legends and folktales. It typically occurs with the distant past marker; in the present tense, it can have a surprisal interpretation.

(1) Cheyenne Evidentials¹ (Leman 1980b)

Direct	Reportative
É-hoo'koho-Ø.	É-hoo'kóhó-nése.
3-rain-DIR	3-rain-RPT.SG.B
'It's raining, I'm sure ² .'	'It's raining, I hear.'
'Given my experience,...'	
Narrative	Conjectural
É-h-hoo'kóhó-neho.	Mó-hoo'kóhó-hane-he.
3-PST-rain-NAR.SG.B	CNJ.3-rain-MOD _B -CNJ
'Long ago, it rained, it is said.'	'It's raining, I take it.'

Lastly, the conjectural, also called the inferential or the dubitative, is morphologically complex, consisting of a prefix and two suffixes, the last of which fills the mood slot. It is typically used for inferences or guesses based on direct evidence, but can also be used for third hand reports and may be a general indirect evidential.

In complementary distribution to the evidentials are illocutionary mood markers. There are four, which are illustrated below in (2).

(2) Cheyenne Illocutionary Mood Markers (Leman 1980b)

Polar Interrogative	Hortative
Né-nemene-he?	Némene-ha!
2-sing-INT	sing-HRT.3SG
'Did you (sg.) sing?'	'Let him/her sing!'
Imperative	Delayed Imperative
Néméné-stse!	Némene-o'o!
sing-IMP.2SG	sing-IMP.DEL.2SG
'(You (sg.)) sing (now)!'	'(You (sg.)) sing (later on)!'

The polar interrogative is used only for polar questions; content (wh-) questions are formed differently, as discussed below. The hortative is used to urge action, similar to a command, but only has third person and first person plural forms. Lastly, there are two imperatives:

¹In the Cheyenne orthography, ' is a glottal stop, š is IPA ʃ, dotted vowels, e.g., ó, are voiceless, and accented vowels, e.g., ó, are high pitch. Glosses: A animate, B inanimate, CNJ conjectural, DEL delayed, DEP dependent clause, DIR direct, HRT hortative, IMP imperative, INCL inclusive, INT polar interrogative, MOD modal agreement, NAR narrative, OBV obviative, PL plural, PROS prospective, PST distant past, RPT reportative, SG singular.

²Evidentials mark information source (Aikhenvald 2004), such as direct (visual, sensory, ...) or indirect (reportative, inferential, ...). They do not necessarily encode degree of certainty or reliability (cf., e.g., Chafe and Nichols 1986). As such, my translation of the Cheyenne direct evidential as the parenthetical "I'm sure" is misleading. However, there is no good episodic translation of the direct evidential: **It's raining, I witnessed*. The parenthetical *I find* is a good translation, but is not acceptable in episodic sentences: **It's raining, I find*. The alternative in (1), *given my experience, ...*, is better but still awkward. Thus, I will omit a parenthetical in the translations of the direct evidential unless it is necessary to disambiguate interpretations.

the immediate imperative, used for actions that are to take place immediately after the speech event, and the delayed imperative, used for actions to take place later or sometime.

Polar questions can also be formed with an interrogative clitic, as in (3). Because this type of question is formed with a clitic, the question contains an evidential. Thus, questions formed with this clitic and questions formed with the mood suffix are used in different contexts (see Murray 2010).

- (3) **Mó**=né-néméne-Ø?
int=2-sing-DIR
 ‘Did you (sg.) (really) sing?’

This clitic can also attach to nouns, for example the demonstrative *hé'tóhe* ‘this one’, as in **Mó**=*hé'tóhe* ‘(Do you mean) this one (inan)?’

Content questions are not formed with an illocutionary mood suffix. Instead, they are formed with an interrogative word, which can be either a noun or a verb, as in (4).

- (4) Examples of Cheyenne Content Questions (Fisher et al. 2006)

Interrogative Noun	Interrogative Verb
Tóne'se é-ho'eohtse-Ø? when 3-arrive-DIR ‘When did he arrive?’	É-tóněševe -o'o-Ø? 3-what.do-3PL-DIR ‘What are they doing?’

There are five interrogative nouns, some of which have inflected forms: *névááhe* ‘who’, *tásévo'o* ‘which_A.SG’, *hénáá'e* ‘what’, *tóne'se* ‘when’, and *tósa'e* ‘where’. ‘Why’ questions are formed with *hénáá'e* plus a verbal prefix *hése-* meaning roughly ‘because’ or ‘reason’. There are hundreds of interrogative verbs, which are morphologically complex, formed with a questioning verbal prefix and a bound verbal root.

In (4), both content questions are formed with independent verbs. This is true for all interrogative verbs as well as ‘when’ and ‘where’ questions. However, ‘who’, ‘what’, and ‘which’ questions are formed with dependent verbs, as in (5).

- (5) **Névááhe** tsé-néméně-stse? (Fisher et al. 2006)
 who-SG DEP-sing-DEP.3SG.A
 ‘Who is singing?’

Interrogative nouns that take dependent verbs do not participate in quantificational or illocutionary variability. For this reason, in this paper I will discuss only ‘when’ and ‘where’ questions as well as questions formed with the interrogative verbs.

The interrogative nouns *tóne'se* ‘when’ and *tósa'e* ‘where’ and the interrogative verbs in Cheyenne are indeterminates. Their default interpretation is interrogative, so I will call them interrogative indeterminates. For example, consider the pair in (6).

- (6) a. **Tósa'e** é-tséhe'ohtse-Ø? default interrogative interpretation
 where 3-go.there-DIR
 'Where is he going?'
- b. **Tósa'e** é-sáa-tséhe'òhtsé-he-Ø. negative polarity interpretation
 where 3-neg-go.there-MOD_A-DIR
 'He's not going anywhere.'

This type of indeterminate has a range of interpretations in addition to the interrogative and the negative polarity interpretations illustrated above in (6). These various interpretations and the environments that condition them are discussed in detail in §3, below.

Cheyenne also has non-interrogative indeterminates. These do not have a possible interrogative interpretation. For example, Cheyenne *vo'éstane* can mean 'person' or 'people' (definite or generic), 'someone', 'no one', 'everyone', or 'anyone', depending on the context. Similar variation occurs for Cheyenne *hová'éhe* 'thing'.

Despite this range of interpretations, because there is no interrogative interpretation non-interrogative indeterminates do not show illocutionary variability. Therefore, in the remainder of the paper, I will focus on the interrogative indeterminates.

When a Cheyenne sentence contains both an interrogative indeterminate and an evidential, the sentence's illocutionary force can vary, depending on the discourse context. It can either be interpreted as a direct question or as a statement of uncertainty. For example, consider (7), which contains a indeterminate verb and the reportative evidential.

- (7) É-**tóněšévé**-sèsto
 3-what.do-RPT.3PL
 (i) 'Given what you heard, what are they doing?'
 (ii) 'They're doing something, I wonder what.'

Interpretation (7i) is direct question whose answer is expected to be based on reportative evidence. Interpretation (7ii) is not a direct question, but a statement of uncertainty. This example, and illocutionary variability in general, will be discussed in detail in §5.

3. Quantificational Variability

Quantificational variability is the variation in the quantificational force of a linguistic form, depending on the grammatical context it appears in. Indefinites, for example, display quantificational variability effects under quantificational adverbs (Lewis 1975, Kamp 1981, Heim 1982, a.o.). In (8) and (9), from Lewis (1975), the indefinite *a quadratic equation* varies in its quantificational force depending on the adverb it occurs with, so that the (a) sentences below mean the same as their (b) sentences.

- (8) a. A quadratic equation never has more than two solutions.
 b. No quadratic equation has more than two solutions.
- (9) a. A quadratic equation usually has two different solutions.
 b. Most quadratic equations have two different solutions.

Lewis (1975) reports that (8a) means (8b) and that (9a) means (9b). In (8a), the indefinite occurs with the adverb *never*; this combination is equivalent to ‘no quadratic equation’ in (8b). Similarly, in (9a), the indefinite occurs with the adverb *usually*, equivalent to ‘most quadratic equations’ in (9b).

A similar phenomenon occurs in Japanese with a class of forms called indeterminates (Shimoyama 2001, Kratzer and Shimoyama 2002). In Japanese, question words like ‘who’ and ‘which’ can have interrogative, existential, universal, negative polarity, and free choice interpretations, depending on their environment. For example, consider the two sentences in (10), from Shimoyama (2001, p.2).

- (10) a. Yoko-wa dono hon-o yomimasita ka?
 Yoko-TOP which book-ACC read Q
 ‘Which book did Yoko read?’
- b. Yoko-wa dono hon-mo yonda.
 Yoko-TOP which book-MO read
 ‘Yoko read every book.’

In (10), the phrase *dono hon-* ‘which book’ can have an interrogative interpretation with the question particle *ka*, as in (10a), or a universal interpretation with the particle *-mo*, as in (10b). That is, depending on the environment, *dono* can have an interrogative or a universal interpretation, in addition to others.

Cheyenne has a large class of indeterminates, including both nouns and verbs, as introduced in §2. Cheyenne indeterminates can have interrogative, existential, negative polarity, free choice, and other interpretations, in a variety of grammatical environments. For example, consider the various interpretations of Cheyenne *-tóněšéve* in (11) below.

- (11) a. É-tóněšéve-Ø? (Fisher et al. 2006), default interrogative interpretation
 3-what.do-DIR
 ‘What is he doing?’
- b. É-sáa-tóněšévé-he-Ø. negative polarity interpretation
 3-neg-what.do-MOD_A-DIR
 ‘He’s not doing anything.’
- c. Héá’e é-tóněšéve-Ø. existential interpretation
 maybe 3-what.do-DIR
 ‘Maybe he is doing something.’

- d. Nóhásóháma é-tóněšéve-Ø. free choice interpretation
 any 3-what.do-DIR
 ‘He just does anything.’

The default interpretation of Cheyenne interrogative indeterminates is interrogative, as in (11a). When indeterminates occur with negation, as in (11b), the interpretation is a negative existential, translated into English best as in (11b) with a negative polarity item (cf. ‘he’s doing nothing’). In (11c), the indeterminate occurs with a modal; the resulting force of the indeterminate is existential. Free choice interpretations are also possible, as in (11d), where the indeterminate occurs with the particle *nóhásóháma* ‘any’. In the analysis proposed below in Section 4, an indeterminate is assigned a single meaning. The variability is due to the interaction of these indeterminates with their grammatical environment.

The remainder of this section contains detailed examples of the various interpretations of Cheyenne indeterminates and the environments that condition those interpretations.

Interrogative indeterminates are interrogative by default: there is no question particle or illocutionary mood suffix for forming content questions in Cheyenne. Consider the following examples in (12); examples above are (4), (6a), and (11a).

- (12) a. **Tósa'e** é-hoo'e-Ø Andy?
 where 3-live-DIR Andy
 ‘Where does Andy live?’
- b. **É-tóněstáotse-Ø?** (Fisher et al. 2006)
 3-what.become-DIR
 ‘What did he become?’
- c. **É-óxòhevoo'o-Ø?** (Fisher et al. 2006)
 3-what.say-DIR
 ‘What did he say?’

Interrogative verbs can occur with interrogative nouns. When they do, it is interpreted as one (modified) question, as in (13b).

- (13) a. **É-tónetóhoo'e-Ø?** (Fisher et al. 2006)
 3-how.swim-DIR
 ‘How is he swimming?’
- b. **Tósa'e** é-tónetóhoo'e-Ø? (Fisher et al. 2006)
 where 3-how.swim-DIR
 ‘Which way (direction) is he swimming?’

Because content questions are not formed with an illocutionary mood suffix, they can occur with mood markers or evidentials (see also §5). For example, in (14), indeterminates occur with the polar interrogative mood marker and in (15) an indeterminate occurs with the imperative mood marker.

- (14) a. **Tósa'e** é-hoo'e-he Andy? (cf. (12a))
 where 3-live-INT Andy
 ‘Does Andy live somewhere?’
- b. **É-tóněšéve**-he? (cf. (11a))
 3-what.do-INT
 ‘Is he doing something?’
- (15) **Tóněšévè**-stse! (cf. (11a))
 what.do-IMP.2SG
 ‘Do something!’

When indeterminates occur with mood markers, the indeterminate has an existential interpretation. Existential interpretations of indeterminates also occur with modals, as in (11c) above. Example (16) below is an example with a modal and two indeterminates, each of which get an existential interpretation.

- (16) Héá'e **tósa'e** táháóhe né-to'sè-**toneto'omenèhe**-ma-Ø. (Croft 1988)
 maybe where there 2-PROS-what.happen.to-1PL.INCL-DIR
 ‘Maybe somewhere there something’s going to happen to us.’

When negated, indeterminates have a negative polarity interpretation, as in (6b) and (11b) above and the examples in (17) below.

- (17) a. **Tósa'e** é-sáa-hoo'e-he-Ø Andy. (cf. (12a) and (14a))
 where 3-neg-live-MOD_A-DIR Andy
 ‘Andy doesn’t live anywhere.’
- b. **É-sáa'-óxòhé**-he-Ø. (Fisher et al. 2006) (cf. (12c))
 3-neg-what.say-MOD_A-DIR
 ‘He didn’t say anything.’

Negative polarity interpretations also occur with the strong denial construction, as in (18), which is formed with a combination of two prefixes (*ne'šé-* and *hé-*) and with negative commands, which are formed with the prohibitive prefix *vé'e-*, as in (19).

- (18) Ná-ne'šé-hé-**oxòhe**-he-Ø! (Fisher et al. 2006) (cf. (12c))
 1-denial-purp-what.say-MOD_A-DIR
 ‘I didn’t say ANYTHING!’
- (19) Né-vé'e-**óxòheve**! (Fisher et al. 2006) (cf. (12c))
 2-prohib-what.say
 ‘Don’t say anything!’

Free choice interpretations of indeterminates occur with the particle *Nóhásòháma*, as in (11d) above and in (20) below.

- (20) Nóhásóháma é-něše-óxóhevoo'o-Ø. (Fisher et al. 2006) (cf. (12c))
 any 3-continue-what.say-DIR
 ‘He just says anything.’

In dependent clauses, indeterminates can be interpreted as embedded questions, as in (21a), free relatives, as in (21b), or existentials, as in (21c), depending on the particular embedding construction.

- (21) a. Vo'ėstan-óho é-sáa-héne'enóe-he-ho **tósa'e** tsé-x-hoo'è-se.
 person-OBV 3-neg-know-MOD_A-OBV where DEP-PST-be.at-DEP.3SG.A
 ‘No one knew where she was.’ (Leman 1987, p.110)
- b. **Tósa'e** tsé-'-ée-hestsevóxé-vóse homa'e
 where DEP-PST-around-have.den-DEP.3PL.A beaver
 ‘Wherever the beavers had lodges...’ (Leman 1987, p.275)
- c. **Tósa'e** tsé-stáhóseé-a'hasó'heohé-vóse
 where DEP-again-stop.ride.horse-DEP.3PL
 ‘When they stopped again somewhere, ...’

Example (21a) is also an example of a non-interrogative indeterminate, *vo'ėstane*, which takes on a negative polarity interpretation in this example. See §2 for a brief discussion of non-interrogative indeterminates.

Lastly in this section, I would like to turn to a few examples that are somewhat difficult to classify. The interrogative nouns *tóne'še* ‘when’ and *tósa'e* ‘where’ can be reduplicated, as in (22) below.

- (22) a. to-**tósa'e** b. to-**tóne'še** (Fisher et al. 2006)
 REDUP-where REDUP-when
 ‘here and there’ ‘now and then’/ ‘from time to time’

When reduplicated, these interrogative nouns have a sort of occasional or enduring quantification: ‘where’ becomes ‘here and there’ and ‘when’ becomes ‘from time to time’. There is also an emphatic version of the interrogative noun *tóne'še* ‘when’, given in (23), below.

- (23) tá'-máhove-**tóne'še** (Fisher et al. 2006)
 emphatic-tired.of?-when
 ‘finally’

The emphatic version of *tóne'še* ‘when’ seems to combine an emphatic prefix and a prefix meaning ‘tired of’. However, there is only one textual example that I am aware of, in Croft (1988), and I have not yet been able to test this type of construction.

In summary, Cheyenne has both nominal and verbal interrogative indeterminates. These have a range of interpretations, including interrogative, existential, negative polarity,

and free choice, among others. In the next section, I propose a Hamblin (1973) style analysis of these constructions where indeterminates are interpreted in situ and no specialized composition rules are needed.

4. A Hamblin Analysis in an Update Semantics

Hamblin (1973) proposed that question words like English *who* and *what* denote sets of individuals³, “namely, the set of humans and the set of non-humans, respectively” (p.48). For Hamblin (1973), sentences denote sets of propositions: indicative sentences denote singleton sets while interrogative sentences denote sets representing the possible semantic answers. Names and predicates denote singleton sets of their standard denotations, and function application applies pointwise, so that if either the subject or the predicate is multimembered (e.g., *who*), the resulting set of propositions will be multimembered.

This proposal has been adopted for analyses of indeterminates in several languages, including Bengali (Ramchand 1997) and Japanese (Shimoyama 2001, Kratzer and Shimoyama 2002). Indeterminates in these languages are taken to denote sets of individuals. These sets of alternatives combine with other elements in the sentence until they find an operator that selects them, such as a generalized or propositional quantifier. The alternative structure is provided by the denotations of lexical items and the composition rules.

In this section, I propose a similar Hamblin (1973) style analysis of indeterminates formulated in an update semantics, which automatically supplies the desired alternatives. The goal of the section is to show that this independently motivated system has the desired alternative structure built in. Thus, it provides a natural framework for an analysis of phenomena such as indeterminates.

4.1 Introduction to the Framework

Below, I use the analysis of declaratives and interrogatives developed in Murray (2010, Chapters 7 and 8, respectively) set within the framework Update with Centering (Bittner 2011). Update with Centering (UC) is an update semantics with centering based anaphora; it models information (propositions, what is added to the common ground) as well as discourse reference, which are ranked to account for changing attention (see, e.g., Grosz et al. 1995, for more on grammatical centering). I use a fragment, UC_{ω} , with discourse referents for individuals (type δ), worlds (type ω), and propositions (type Ω).

Information states in UC_{ω} are sets of sequences of referents. States are plural (see van den Berg 1996, Brasoveanu 2007) and anaphora is sequence based (like Dekker 1994). Each sequence is structured into two sub-sequences: one for currently topical (\top) referents

³Later in the paper, Hamblin (1973) redefines these as quantificational instead of interrogative proper nouns. However, the analysis proposed in this paper can account for his motivation for doing so.

and one for currently backgrounded (\perp) referents. An entire sequence, is a pair of these two sub-sequences: $\langle \top, \perp \rangle$. I use the top sequence to model the current state of information, the context set, while the bottom sequence models information being talked about, considered. For example, take the information states in (24) below, depicted as matrices.

(24) Two sample UC_ω information states: context set $p_0 = \{w_0, w_1\}$

c	c'
$\langle \langle w_0, p_0 \rangle \langle \rangle \rangle$	$\langle \langle w_0, p_0 \rangle \langle e, w_0 \rangle \rangle$
	$\langle \langle w_0, p_0 \rangle \langle d, w_0 \rangle \rangle$
	$\langle \langle w_0, p_0 \rangle \langle d, w_1 \rangle \rangle$
$\langle \langle w_1, p_0 \rangle \langle \rangle \rangle$	$\langle \langle w_1, p_0 \rangle \langle e, w_0 \rangle \rangle$
	$\langle \langle w_1, p_0 \rangle \langle d, w_0 \rangle \rangle$
	$\langle \langle w_1, p_0 \rangle \langle d, w_1 \rangle \rangle$

In state c in (24), each top sequence contains a world and a proposition. The worlds taken together as a column, $\{w_0, w_1\}$, are the current context set, the intersection of the common ground, which represents the live candidates for the actual world (Stalnaker 1978). This is represented here by the proposition p_0 . Each bottom sequence in c is empty. This state could represent the initial discourse state, assuming the given context set. The state c' is the result of updating c with the update $[w \times |place_w \langle x \rangle]$, assuming two possible places, Detroit (d) and Edinburgh (e). This update introduces two discourse referents into the bottom sequence, a world and the places that exist in that world. In w_0 , there are two places (d and e), while in w_1 , there is only one place (d). Each bottom world and place is introduced for each world in the context set, ensuring that no artificial dependencies are introduced. Plus, eventually we will want to eliminate worlds in the context set, which will mean getting rid of all rows containing that world in the top sequence, and we do not want to accidentally lose information. (See Murray (2010) for further details.)

It may already be possible to see how this system is well-suited for an analysis of indeterminates. In fact, the above update $[w \times |place_w \langle x \rangle]$ is how I analyze the Cheyenne indeterminate *tósa'e* ‘where’. In this system, which incorporates plural information states into an update system, all alternatives are already represented in each information state. We have both row-wise information – the alternatives by world – and the column-wise information, which represents all combined possibilities.

One last general note. The distinction between the top and the bottom sequence is crucial. I make use of this distinction to implement the difference between at-issue and not-at-issue information: not-at-issue information directly updates the context set (top worlds) while at-issue information is mediated through the bottom sequence (bottom worlds).

Let’s now look at an example of the analysis of a complete English sentence, from Murray (2010, Chapter 7). This analysis was developed to account for evidentials and parentheticals, but it can also handle basic English sentences. All sentences are analyzed into three components: the presentation of the at-issue proposition, the addition of any not-at-

issue content (if any), and a proposal of what to do with the at-issue content (illocutionary relation). For declaratives, the illocutionary relation contributed is the proposal to add the at-issue content to the context set; this is accepted and a new context set is introduced. For interrogatives, the illocutionary relation divides the information state into possible answers. Consider English declarative (25), below, and its formal representation in (25').

(25) Andy won.

(25') $\overbrace{[\top[x|x = \text{andy}]; [w|w_{\text{on } w} \langle \top \delta \rangle]; [p|p = \perp \omega]]]}_{\text{(present at-issue proposition)}}; \underbrace{[\perp \omega \in \top \omega]}_{\text{(at-issue proposal)}}; \overbrace{[\top \omega \in \perp \omega]; [\top [p|p = \top \omega]]]}_{\text{(accept/new context set)}}$

The first two updates build the at-issue proposition, that Andy won, by introducing a discourse referent for Andy (a) and for the worlds in which he ($\top \delta$) won (w_0, w_2 , and w_3). The third update introduces a discourse referent for this at-issue proposition (q), which is the collection of worlds in the bottom world column ($\perp \omega$). There is no not-at-issue information in this example, so there is no direct update of the context set. The fourth update represents the proposal to update the context set ($\top \omega$) with the at-issue proposition, the fifth does so, and the sixth introduces a new discourse referent for the new context set. These updates are illustrated below in (26), given an initial input state c_0 where $p_0 = \{w_0, w_1, w_2\}$.

(26) Update sequence for (25') given input state c_0

c_0	c_1	c_2	c_3
$\langle\langle w_0, p_0 \rangle\rangle$	$\langle\langle a, w_0, p_0 \rangle\rangle$	$\langle\langle a, w_0, p_0 \rangle \langle w_0 \rangle\rangle$	$\langle\langle a, w_0, p_0 \rangle \langle q, w_0 \rangle\rangle$
		$\langle\langle a, w_0, p_0 \rangle \langle w_2 \rangle\rangle$	$\langle\langle a, w_0, p_0 \rangle \langle q, w_2 \rangle\rangle$
		$\langle\langle a, w_0, p_0 \rangle \langle w_3 \rangle\rangle$	$\langle\langle a, w_0, p_0 \rangle \langle q, w_3 \rangle\rangle$
$\langle\langle w_1, p_0 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle \langle w_0 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle \langle q, w_0 \rangle\rangle$
		$\langle\langle a, w_1, p_0 \rangle \langle w_2 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle \langle q, w_2 \rangle\rangle$
		$\langle\langle a, w_1, p_0 \rangle \langle w_3 \rangle\rangle$	$\langle\langle a, w_1, p_0 \rangle \langle q, w_3 \rangle\rangle$
$\langle\langle w_2, p_0 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle \langle w_0 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle \langle q, w_0 \rangle\rangle$
		$\langle\langle a, w_2, p_0 \rangle \langle w_2 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle \langle q, w_2 \rangle\rangle$
		$\langle\langle a, w_2, p_0 \rangle \langle w_3 \rangle\rangle$	$\langle\langle a, w_2, p_0 \rangle \langle q, w_3 \rangle\rangle$
c_4	$(c_5 + c_6)$		
$\langle\langle a, w_0, p_0 \rangle \langle q, w_0 \rangle\rangle$	$\langle\langle p_1, a, w_0, p_0 \rangle \langle q, w_0 \rangle\rangle$		
$\langle\langle a, w_0, p_0 \rangle \langle q, w_2 \rangle\rangle$	$\langle\langle p_1, a, w_0, p_0 \rangle \langle q, w_2 \rangle\rangle$		
$\langle\langle a, w_1, p_0 \rangle \langle q, w_0 \rangle\rangle$			
$\langle\langle a, w_1, p_0 \rangle \langle q, w_2 \rangle\rangle$			
$\langle\langle a, w_2, p_0 \rangle \langle q, w_0 \rangle\rangle$	$\langle\langle p_1, a, w_2, p_0 \rangle \langle q, w_0 \rangle\rangle$		
$\langle\langle a, w_2, p_0 \rangle \langle q, w_2 \rangle\rangle$	$\langle\langle p_1, a, w_2, p_0 \rangle \langle q, w_2 \rangle\rangle$		

In the output state c_6 , the context set is $p_1 = \{w_0, w_2\}$, which has been updated from $p_0 = \{w_0, w_1, w_2\}$. World w_1 was eliminated from the context set in c_4 because it is not a world in which Andy won. This analysis captures both the truth conditional contribution

of (25) and its anaphoric potential as well as the effect of asserting the at-issue proposition.

This type of analysis was developed in Murray (2010) to account for the truth-conditional but not-at-issue content contributed by evidentials. To illustrate, Cheyenne (27) is a sentence containing a direct evidential and (27') is its formal representation.

(27) É-hó'táhéva-Ø Andy
 3-win-DIR Andy
 'Andy won, I'm sure.'

(27') $\underbrace{\top[x|x = \text{andy}]; [w|w \text{ won}_w \langle \top \delta \rangle]; [p|p = \perp \omega]}_{\text{(present at-issue proposition)}}; \underbrace{[\text{DIR}_{\top \omega} \langle i, \perp \Omega \rangle]}_{\text{(not-at-issue restriction)}};$
 $\underbrace{[\perp \omega \in \top \omega]}_{\text{(at-issue proposal)}}; \underbrace{[\top \omega \in \perp \omega]; \top [p|p = \top \omega]}_{\text{(accept/new context set)}}$

The only difference between Cheyenne (27') and English (25') is the not-at-issue evidential restriction, the fourth update in (27'). This update requires that the speaker (i) has direct evidence for the at-issue proposition ($\perp \Omega$) in the speech world, represented by the worlds in the context set ($\top \omega$). This update directly eliminates worlds in the context set, without introducing anything into the bottom sequence. This is illustrated in (28), assuming that the speaker has direct evidence that Andy won only in worlds w_1 and w_2 . Because the first three updates for (27') are the same as for (25'), for space reasons I start this example at c_3 .

(28) Update sequence for (27') given input state c_3 , repeated from (26)

c_3	c'_4	c'_5	$(c'_6 + c'_7)$
$\langle \langle a, w_0, p_0 \rangle \langle q, w_0 \rangle \rangle$			
$\langle \langle a, w_0, p_0 \rangle \langle q, w_2 \rangle \rangle$			
$\langle \langle a, w_0, p_0 \rangle \langle q, w_3 \rangle \rangle$			
$\langle \langle a, w_1, p_0 \rangle \langle q, w_0 \rangle \rangle$	$\langle \langle a, w_1, p_0 \rangle \langle q, w_0 \rangle \rangle$		
$\langle \langle a, w_1, p_0 \rangle \langle q, w_2 \rangle \rangle$	$\langle \langle a, w_1, p_0 \rangle \langle q, w_2 \rangle \rangle$	$\langle \langle a, w_1, p_0 \rangle \langle q, w_2 \rangle \rangle$	
$\langle \langle a, w_1, p_0 \rangle \langle q, w_3 \rangle \rangle$	$\langle \langle a, w_1, p_0 \rangle \langle q, w_3 \rangle \rangle$		
$\langle \langle a, w_2, p_0 \rangle \langle q, w_0 \rangle \rangle$	$\langle \langle a, w_2, p_0 \rangle \langle q, w_0 \rangle \rangle$		
$\langle \langle a, w_2, p_0 \rangle \langle q, w_2 \rangle \rangle$	$\langle \langle a, w_2, p_0 \rangle \langle q, w_2 \rangle \rangle$	$\langle \langle a, w_2, p_0 \rangle \langle q, w_2 \rangle \rangle$	$\langle \langle p_1, a, w_2, p_0 \rangle \langle q, w_2 \rangle \rangle$
$\langle \langle a, w_2, p_0 \rangle \langle q, w_3 \rangle \rangle$	$\langle \langle a, w_2, p_0 \rangle \langle q, w_3 \rangle \rangle$		

State c'_4 illustrates the direct update of the context set: world w_0 is directly eliminated, because it is not a world where the speaker has direct evidence that q , that Andy won. The remaining updates proceed as in (26), but since all rows with w_0 in the top sequence have been eliminated, the output state is different. Here, the output context set is $p_1 = \{w_2\}$. Under this analysis, the Cheyenne sentence with the direct evidential (27) is stronger than the English counterpart (25) in that it contributes more information. However, they are parallel in that they have the same at-issue proposition as well as the same illocutionary relation, the proposal to add the at-issue proposition to the context set.

The last aspect of the analysis of Murray (2010) that is needed for the analysis of indeterminates is the treatment of negation and polar questions. The first two updates of (27') and (25'), $\top[x|x = \text{andy}]; [w|w \text{ won}_w \langle \top \delta \rangle]$, were used to construct the proposition that Andy won by introducing the worlds where he won into the bottom sequence, as in c_2 , repeated below in (29). Building on this, negation takes the complement of that proposition, the column of worlds, while polar questions take both that proposition and its complement.

(29)	c_2 $\langle \langle a, w_0, p_0 \rangle, \langle w_0 \rangle \rangle$ $\langle \langle a, w_0, p_0 \rangle, \langle w_2 \rangle \rangle$ $\langle \langle a, w_0, p_0 \rangle, \langle w_3 \rangle \rangle$ $\langle \langle a, w_1, p_0 \rangle, \langle w_0 \rangle \rangle$ $\langle \langle a, w_1, p_0 \rangle, \langle w_2 \rangle \rangle$ $\langle \langle a, w_1, p_0 \rangle, \langle w_3 \rangle \rangle$ $\langle \langle a, w_2, p_0 \rangle, \langle w_0 \rangle \rangle$ $\langle \langle a, w_2, p_0 \rangle, \langle w_2 \rangle \rangle$ $\langle \langle a, w_2, p_0 \rangle, \langle w_3 \rangle \rangle$	<p>Negation: take the complement of the column of bottom worlds and make that the at-issue proposition: $[w w \notin \perp \omega]; [p p = \perp \omega]$</p> <p>Polar Questions: take the column of bottom worlds and its complement: $[p p \in^? \perp \omega]$</p>
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Thus, an English polar question *Did Andy win?* is analyzed as the following sequence of three updates: $\top[x|x = \text{andy}]; [w|w \text{ won}_w \langle \top \delta \rangle]; [p|p \in^? \perp \omega]$. The last update constructs a set of two propositions, setting up the possible answers.

4.2 Analysis of Indeterminates

Following Hamblin (1973) and analyses of indeterminates in other languages, I take indeterminates in Cheyenne to denote sets of individuals. However, within UC_ω , this effect can be achieved with an update directly parallel to updates we have already seen. For example, the Cheyenne indeterminate *tósa'e* can be represented with the update in (30).

$$(30) \quad Tósa'e \rightsquigarrow [w \ x | \text{place}_w \langle x \rangle]$$

The update in (30) has the same form as previous updates. Our update for *Andy*, for example, is $\top[x|x = \text{andy}]$. This update is an instruction to add to the top sequence of a row all individuals that are equal to the individual assigned to $\llbracket \text{andy} \rrbracket$. Similarly, the update in (30) is an instruction to add to the bottom sequence of a row all worlds and all places that exist in those worlds. Maximization is built in to the definition of update. In this framework, there is no need to lift the denotation to a set of the standard denotation. The architecture of the update system, the definition of update, automatically provides the needed alternatives.

Let's return to the Cheyenne indeterminate examples. Take the three in (31), below.

$$(31) \quad \begin{array}{l} \text{a. } Tósa'e \text{ é-hoo'e-}\emptyset \text{ Andy?} \\ \text{where 3-live-DIR Andy} \\ \text{'Where does Andy live?'} \end{array} = (12a)$$

- b. **Tósa'e** é-hoo'e-he Andy? = (14a)
 where 3-live-INT Andy
 ‘Does Andy live somewhere?’
- c. **Tósa'e** é-sáa-hoo'e-he-Ø Andy. = (17a)
 where 3-neg-live-MOD_A-DIR Andy
 ‘Andy doesn’t live anywhere.’

Example (31a) is interrogative, the default interpretation of the indeterminates. Example (31b) is one of the contexts where the indeterminate gets an existential interpretation, in the scope of the polar interrogative mood marker. Lastly, in (31c) the indeterminate is in the scope of negation, receiving a negative polarity interpretation. In the remainder of this section, I will provided a detailed analysis of these three examples. The other interpretations, e.g., existential under modals and free choice, can be handled similarly.

The analyses of the three sentences in (31) share the first three updates, so I will focus first there, in (32). The first of the three updates is the contribution of the indeterminate. The second is the familiar update contributed by the name ‘Andy’. The third update, the contribution of the predicate ‘live’, is parrallel to our previous verb ‘won’ except that it is transitive. It checks for each row that the (topmost) individual in the top sequence lives in the individual (place) in the bottom sequence in the bottom world in that row.

$$(32) \quad [w \times | \text{place}_w \langle x \rangle]; {}^\top [x | x = \text{andy}]; [\text{live}_{\perp \omega} \langle \top \delta, \perp \delta \rangle]$$

To illustrate these updates, and to better see how quantificational variability works in this system, consider the example information states in (33). Take an input state c_0 where $p_0 = \{w_0, w_1, w_2\}$. For this example, let’s assume Edinburgh (e) is a place in worlds w_0 and w_1 and Detroit is a place in worlds w_1 and w_2 . Let’s also assume that Andy lives in Edinburgh in w_0 , in Detroit in w_1 , but doesn’t live anywhere in w_2 . Information state c_1 is the result of updating with the indeterminate update in (32), c_2 the result of the Andy update, and c_3 the result of the verbal update.

(33) Updating c_0 with (32)

c_0	c_1	c_2	c_3
$\langle \langle w_0, p_0 \rangle \rangle$	$\langle \langle w_0, p_0 \rangle \langle e, w_0 \rangle \rangle$	$\langle \langle a, w_0, p_0 \rangle \langle e, w_0 \rangle \rangle$	$\langle \langle a, w_0, p_0 \rangle \langle e, w_0 \rangle \rangle$
	$\langle \langle w_0, p_0 \rangle \langle e, w_1 \rangle \rangle$	$\langle \langle a, w_0, p_0 \rangle \langle e, w_1 \rangle \rangle$	
	$\langle \langle w_0, p_0 \rangle \langle d, w_1 \rangle \rangle$	$\langle \langle a, w_0, p_0 \rangle \langle d, w_1 \rangle \rangle$	$\langle \langle a, w_0, p_0 \rangle \langle d, w_1 \rangle \rangle$
	$\langle \langle w_0, p_0 \rangle \langle d, w_2 \rangle \rangle$	$\langle \langle a, w_0, p_0 \rangle \langle d, w_2 \rangle \rangle$	
$\langle \langle w_1, p_0 \rangle \rangle$	$\langle \langle w_1, p_0 \rangle \langle e, w_0 \rangle \rangle$	$\langle \langle a, w_1, p_0 \rangle \langle e, w_0 \rangle \rangle$	$\langle \langle a, w_1, p_0 \rangle \langle e, w_0 \rangle \rangle$
	$\langle \langle w_1, p_0 \rangle \langle e, w_1 \rangle \rangle$	$\langle \langle a, w_1, p_0 \rangle \langle e, w_1 \rangle \rangle$	
	$\langle \langle w_1, p_0 \rangle \langle d, w_1 \rangle \rangle$	$\langle \langle a, w_1, p_0 \rangle \langle d, w_1 \rangle \rangle$	$\langle \langle a, w_1, p_0 \rangle \langle d, w_1 \rangle \rangle$
	$\langle \langle w_1, p_0 \rangle \langle d, w_2 \rangle \rangle$	$\langle \langle a, w_1, p_0 \rangle \langle d, w_2 \rangle \rangle$	
$\langle \langle w_2, p_0 \rangle \rangle$	$\langle \langle w_2, p_0 \rangle \langle e, w_0 \rangle \rangle$	$\langle \langle a, w_2, p_0 \rangle \langle e, w_0 \rangle \rangle$	$\langle \langle a, w_2, p_0 \rangle \langle e, w_0 \rangle \rangle$
	$\langle \langle w_2, p_0 \rangle \langle e, w_1 \rangle \rangle$	$\langle \langle a, w_2, p_0 \rangle \langle e, w_1 \rangle \rangle$	
	$\langle \langle w_2, p_0 \rangle \langle d, w_1 \rangle \rangle$	$\langle \langle a, w_2, p_0 \rangle \langle d, w_1 \rangle \rangle$	$\langle \langle a, w_2, p_0 \rangle \langle d, w_1 \rangle \rangle$
	$\langle \langle w_2, p_0 \rangle \langle d, w_2 \rangle \rangle$	$\langle \langle a, w_2, p_0 \rangle \langle d, w_2 \rangle \rangle$	

In the information state c_3 , we have all the alternatives that we need for the various interpretations of the indeterminate. The entire column of bottom worlds ($\perp\omega||$) represents the proposition that Andy lives somewhere, here $\{w_0, w_1\}$. This can be the proposition in the scope of the modal, yielding an existential interpretation. The polar question takes this proposition $\{w_0, w_1\}$ (that Andy lives somewhere) and its complement, $\{w_2\}$ (that Andy doesn't live anywhere), providing the two needed alternatives for the polar question, where the interpretation is also existential. Negation also operates on this bottom column proposition, taking its complement $\{w_2\}$, yielding a negative polarity interpretation.

The content interrogative interpretation is not formed by looking at the entire column of bottom worlds ($\perp\omega||$), but instead that column sorted by places. That is, the content interrogative looks at the sub-states where the bottom individual ($\perp\delta$, a place) is the same ($\perp\omega||_{\perp\delta}$). It collects together all of the worlds where Andy lives in Edinburgh, here the singleton $\{w_0\}$, and also collects together all of the worlds where Andy lives in Detroit, here the singleton $\{w_1\}$. These propositions together form the set of semantic answers for the content interrogative: $\{\{w_0\}, \{w_1\}\}$, or $\{\{w : \text{Andy lives in Edinburgh in } w\}, \{w : \text{Andy lives in Detroit in } w\}\}$. This particular example is quite simplistic, to keep the illustration simple, but the analysis generalizes to more realistic, more complex examples.

The formal representation of each Cheyenne sentence in (31) is given below in (34). These translations correspond to the informal descriptions of the analysis given in the two paragraphs above.

$$(34) \quad \begin{array}{l} \text{a. } (31\text{a}) \rightsquigarrow [w \ x | \text{place}_w \langle x \rangle]; \top [x | x = \text{andy}]; [\text{live}_{\perp\omega} \langle \top\delta, \perp\delta \rangle]; [p | p = \perp\omega ||_{\perp\delta}] \\ \text{b. } (31\text{b}) \rightsquigarrow [w \ x | \text{place}_w \langle x \rangle]; \top [x | x = \text{andy}]; [\text{live}_{\perp\omega} \langle \top\delta, \perp\delta \rangle]; [p | p \in ? \perp\omega] \\ \text{c. } (31\text{c}) \rightsquigarrow [w \ x | \text{place}_w \langle x \rangle]; \top [x | x = \text{andy}]; [\text{live}_{\perp\omega} \langle \top\delta, \perp\delta \rangle]; [w | w \notin \perp\omega]; \\ [p | p = \perp\omega]; [\text{DIR}_{\top\omega} \langle i, \perp\Omega \rangle]; [\perp\omega \in \top\omega]; [\top\omega \in \perp\omega]; \top [p | p = \top\omega] \end{array}$$

In (34a), the fourth update introduces a different propositional discourse referent for each possible semantic answer to the question in (31). This update could also be used to analyze English content questions. The direct evidential has been omitted in the translation in (34a); the interaction between evidentials and indeterminates will be discussed below in Section 5. In (34b), the fourth update is the polar interrogative update introduced in (29), which is used in Murray (2010) to analyze polar questions in both Cheyenne and English. In (34c), there are several additional updates. The fourth is the contribution of negation, introduced in (29) and motivated in Murray (2010). The remaining updates are the updates associated with a declarative sentence with a direct evidential, as introduced in (27): introducing the at-issue proposition (fifth), the evidential not-at-issue restriction (sixth), and the proposal/update of the context set (seventh, eighth, and ninth).

In summary, each of the interpretations of the Cheyenne indeterminates can be straightforwardly accounted for within the UC_{ω} analysis of declaratives and interrogatives proposed in Murray (2010). With reference to a structure like (33), the existential interpretation takes the bottom column of worlds as a whole; this interpretation is conditioned

by various illocutionary moods and modals. The negative polarity interpretation takes the complement of the bottom column of worlds. The polar interrogative interpretation takes both the bottom column and the complement of the bottom column. The content interrogative sorts the bottom column by the individuals introduced by the indeterminate, introduces a proposition for each, and forms the set of possible answers from these propositions.

This analysis is similar in spirit to previous Hamblin (1973) style analyses of indeterminates (e.g., Ramchand 1997, Shimoyama 2001, Kratzer and Shimoyama 2002). However, in the analysis proposed in this paper, there is no need for free variables, covert “wh” style movement, or alternative expansion. There is no lifting of denotations to sets of standard denotations, no special composition rules. The proposed analysis even addresses the quantificational concern in Hamblin (1973) because each individual in the indeterminate set is introduced relative to a world. All of these benefits are a result of the architecture of the update system, the definition of update, which automatically supplies the required alternative structure.

5. Illocutionary Variability

Section 3 discussed the phenomenon of quantificational variability, when a certain form can vary in its quantificational force depending on the grammatical context that it occurs in. Illocutionary variability is when a form can vary in its illocutionary force depending on the context that it occurs in. In Cheyenne, when a sentence contains both an interrogative indeterminate and an evidential, there are two possible interpretations: an interrogative interpretation and a declarative interpretation, a statement of uncertainty.

The first interpretation, illustrated in (35i), is a direct question that restricts the possible answers to the evidential specified in the question. Here, the indeterminate is interpreted interrogatively. This interpretation is the same as the interpretation of polar questions that contain an evidential (see (36) and Murray 2010).

- (35) **Tóne'she** é-ho'eohtse-sèstse.
 when 3-arrive-RPT.3.AN.SG
 (i) ‘Given what you heard, when did he arrive?’
 (ii) ‘He arrived sometime, I wonder when.’ / ‘I wonder when he arrived.’

The second interpretation, given in (35ii), is not a direct question – it is a statement of uncertainty. The indeterminate has an existential interpretation here, as with modals and illocutionary mood markers. While (35ii) might still invite an answer, like many uncertainty statements do, it is not a direct question. A similar phenomenon is reported for questions containing evidentials in, e.g., Wanka Quechua (Aikhenvald 2004), Lillooet Salish, Thompson Salish, and Gitksan (Matthewson 2010, Littell et al. 2010, Peterson 2010).

Both an indeterminate and an evidential are required for illocutionary variability: with polar questions, there is no variability. Example (36), a polar question formed with the interrogative clitic *mó=*, only has the question of a report interpretation, as in (35i).

- (36) **Mó=é-nemene-sèstse** Floyd?
int=3-sing-RPT.3SG Floyd
 ‘Given what is said, did Floyd sing?’
 # ‘I wonder if Floyd sang.’, # ‘Floyd sang or didn’t, I wonder which.’

There is also no illocutionary variability when an indeterminate already has a non-interrogative interpretation, as when it occurs with negation, as in (37).

- (37) **Tósa'e** é-sáa-hoo'e-he-sèstse Andy.
 where 3-neg-live-MOD_A-RPT.3SG Andy
 ‘Andy doesn’t live anywhere, I’m told.’

Illocutionary variability also occurs with the conjectural evidential, as in (38), and the narrative evidential, each contributing different varieties of uncertainty. With the conjectural, the statement of uncertainty is not a statement of wondering, but instead that the speaker does not, or could not, know, as in (38ii).

- (38) **Tóne'še** Mó-ho'eohtse-he-he
 when CNJ.3-arrive-MOD_A-CNJ
 (i) ‘Given what you infer, when did he arrive?’
 (ii) ‘He arrived sometime, I take it, but I don’t know when’

However, the interaction of the direct evidential with the indeterminates is less clear. I have not been able to find or elicit any examples where sentences like (39), below, display any illocutionary variability.

- (39) **Tóne'še** é-ho'eohtse-Ø?
 when 3-arrive-DIR
 ‘(Given your direct evidence,) when did he arrive?’

There are a few examples in texts where sentences like (39) are translated like ‘he arrived sometime’, with an existential interpretation of the indeterminate. However, they do not seem to be statements of uncertainty. Additional research on these constructions is needed.

While it is relatively clear what contexts condition quantificational variability, what conditions illocutionary variability? When do we get interpretation (35ii) vs. interpretation (35i)? Discourse context conditions this variability, as shown by the story in (40). I constructed the story below, entitled *É-tóněšévè-sesto*, in Cheyenne and also tested the target Cheyenne sentences in contexts presented in English. For ease of presentation here, I present the context sentences in English and only the target sentences in Cheyenne.

(40) Two white people, Dale and Ed, are on the Cheyenne reservation for the first time. They are walking along a road, and see people off in the distance. Ed says to Dale:

- a. **É-tóněšévè-sesto.**
 3-what.do-RPT.3PL
 # ‘Given what you heard, what are they doing?’
 ‘They’re doing something, I wonder what.’

A Cheyenne man comes along on a horse, riding in the direction of the group of people. Dale flags him down, walks over to him, and asks him:

- b. **É-tóněšévè-o'o-Ø?**
 3-what.do-3PL-DIR
 ‘What are they doing?’

Ed hears this question, but not the answer. When Dale returns, Ed says to him:

- c. **É-tóněšévè-sesto?**
 3-what.do-RPT.3PL
 ‘Given what you heard, what are they doing?’
 # ‘They’re doing something, I wonder what.’

Dale replies:

- d. **É-hámòhtséhne-sèsto.**
 3-set.up.camp-RPT.3PL
 ‘[He says] they are setting up camp.’

In (40), there are two instances of the sentence *É-tóněšévè-sesto*. However, neither is ambiguous in context. In (40a), Ed does not expect Dale to have an answer, and the interpretation is as a statement of wondering. In (40c), Ed does expect Dale to have an answer, and expects that answer to be based on reportative evidence.

Combining the analysis of Cheyenne indeterminates presented above in Section 4 with the analysis of evidentials from Murray (2010) allows an analysis of illocutionary variability in terms of ambiguity, briefly discussed in Murray (2010, Chapter 8). One representation of the evidential question is parallel to those discussed in Section 4, e.g., (31a). The other representation is a declarative sentence with an existentially interpreted indeterminate, similar to standard evidential declaratives. With the conjectural, the evidential can still be interpreted as part of the statement (‘They’re doing something, I take it’). However, the reportative remains a puzzle, since the speaker does not have reportative evidence for anything in, e.g., (40a). Perhaps the speaker is reporting that he has a question, and not directly asking that question, but it is unclear how this meaning would relate to the standard reportative meaning. See Murray (2010, Chapter 8) for further discussion of such an example.

However the statement of uncertainty interpretation is represented, one should ask a more general question. Is an ambiguity analysis appropriate? Preliminary results indicate that no intonational difference between (40a), the statement, and (40c), the question is necessary. The context conditions the interpretation. It would seem preferable to have a single representation of the sentence that is interpreted differently given different input contexts. Perhaps this is parallel to the issue of descriptive vs performative speech acts, or direct vs indirect speech acts, where a single representation is desirable but has been difficult to formulate. In the presented analysis of quantificational variability, there was a single representation for the indeterminate and the grammatical context contributed to the various interpretations. Ideally, it would be the same for illocutionary variability: there would be a single representation of the sentence and the discourse context would contribute to the various interpretations. However desirable, I do not know if such an analysis is possible.

6. Conclusions

Cheyenne has several types of indeterminates, with varying ranges of interpretations. This paper has proposed a Hamblin (1973) style analysis of the interrogative indeterminates. The proposed analysis can account for their various interpretations and the grammatical contexts that condition these interpretations, including an existential interpretation with illocutionary mood markers. However, I have not discussed the non-interrogative indeterminates or the interrogative nouns that do not show quantificational variability effects. Given the grounding of various analyses of indeterminates in a theory of questions (Hamblin 1973), it is somewhat of a puzzle why some indeterminates might not have a question interpretation.

Sentences containing both an interrogative indeterminate and an evidential display illocutionary variability, a variation in illocutionary force. This variation is conditioned by the discourse context, e.g., whether the hearer can be expected to answer. This seems to show that the interpretation of a sentence can depend on its context of interpretation not only for its content, but also its force. However, further analysis is needed, including intonational studies and further crosslinguistic comparison.

Lastly, I hope this paper can be seen as contributing to the arguments for exploring different types of formal representation systems for analyzing natural language. An update semantics like Update with Centering (Bittner 2011) automatically provides alternatives. A system developed in Update with Centering to analyze evidentials and the semantic contribution of illocutionary mood (Murray 2010) provided key components of the analysis of indeterminates, such as an analysis of interrogatives, declaratives, and negation. Though not designed for a Hamblin (1973) style analysis of indeterminates, this existing architecture already provides such an analysis.

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