

Positive Polarity and Exhaustivity in Sinhala:
a study of its implications for grammar

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Abstract

This thesis investigates the implications of positive polarity for grammar. The empirical focus is on two positive polarity particles in Sinhala, an Indo-Aryan language spoken in Sri Lanka. Sinhala has two particles *-hari* and *-də* that systematically appear across disjunction, indefinite and question constructions. Traditionally, these particles have been called Q-particles (i.e. Hagstrom (1998); Cable (2010); Slade (2011); a.m.o). They have so far been analyzed in terms of either Q-question/-uantifier operators (Kishimoto (2005)) or choice function variables (cf. Hagstrom (1998); Cable (2010); Slade (2011)). This thesis presents new data pertaining to the distribution and interpretation of disjunctions and indefinites formed with the two particles in contexts of negation, modals, quantifiers and intensional operators, that none of the previous accounts has captured. It proposes to analyze the grammar of the two particles based on their positive polarity character associated with exhaustivity (cf. Spector (2014); Nicolae (2017)). It claims that we can account for a wide range of grammatical phenomena such as ignorance inferences, scope or non/specificity effects, free/no choice implicatures and de re/dicto readings of *-hari* and *-də* disjunctions/indefinites in matrix and overt modal/quantifier contexts based on a distribution requirement (DR) derived by way of exhaustification with respect to alternatives of a disjunction or indefinite.

The thesis casts its proposal in a hybrid system of lexical (cf. Levinson (2000); Chierchia (2004)) and grammatical (cf. Fox (2007); Chierchia et al. (2012)) approaches borrowing insights from both approaches. It also utilizes a hybrid framework of Hamblin semantics (cf. Hamblin (1973); Kratzer and Shimoyama (2002); Alonso-Ovalle (2006)) to keep domain alternatives separated and application of an alternative sensitive exhaustivity (*Exh*) operator (cf. the grammatical approach) to derive implicatures. Obligatory exhaustivity is treated as a morphological requirement/ lexical property of the particles *-hari* and *-də* represented by an uninterpretable exhaustivity [*unExh*] feature. Then, this lexical property is factored into the grammar by way of the *Exh* operator carrying an equivalent interpretable exhaustivity [*inExh*] feature placed in the syntactic structure of a *-hari* or *-də* disjunction/indefinite construction at LF. “Inclusivity” and “exclusivity” components of the particles *-hari* and *-də* that have consequences for distribution requirements are derived by way of different morpho-syntactic requirements of the particles *-hari* and *-də*. Thus, this thesis proposes a fully compositional/grammatical account all the way from the bottom to the top in the derivations.

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Dedication

To all my teachers

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List of abbreviations

AdvP	Adverb Phrase
CC	Conceptual Cover
DE	Downward Entailing
DP	Determiner Phrase
DR	Distribution Requirement
Exh	Exhaustivity
FC	Free-choice
II	Ignorance Implicatures
LF	Logical Form
LRI	Lack of Relevant Identification
NPI	Negative Polarity Item
PP	Prepositional Phrase
PP	Positive Polarity
PPI	Positive Polarity Item
QI	Quantity Implicature
UE	Upward Entailing

Chapter 1

Background and Introduction

1.1 Introduction

At least since the seminal work of Klima (1964) and those of Baker (1970) and Ladusaw (1980), the study of polarity sensitivity has been very significant in linguistic inquiry. It is one of those grammatical phenomena that interface with at least three modules of grammar: syntax, semantics and pragmatics. For instance, the polarity system in English with polarity sensitive items such as *any* or *some* which carry different syntactic licensing conditions interfaces with such phenomena as free-choice effects or ignorance implicatures in contexts of modals as well as with different scope configurations in contexts of DP quantifiers. The polarity system in Sinhala (an Indo-Aryan language spoken in Sri Lanka) was found particularly intriguing and called for investigation. Thus, it seemed a worthwhile effort to investigate polarity phenomena and their wider implications for grammar in this thesis.

This thesis investigates one aspect of the polarity system, namely, positive polarity and its implications for grammatical phenomena with empirical focus on positive polarity items in Sinhala. It focuses on two positive polarity particles *-hari* and *-də* that systematically appear across disjunction, indefinite and question constructions. It is observed that disjunction and indefinite sentences formed with the two particles give rise to a variety of effects: scalar and ignorance implicatures; different types of scope or non/specificity effects in context of the universal quantifier; free choice and no choice effects in contexts of modals and *de-re/dicto* readings in contexts of attitude verbs. This thesis seeks to account for these grammatical phenomena based on the positive polarity character of the two particles.

As is common for any introductory chapter of a thesis, this chapter sets the background to the many things discussed, argued or claimed in light of the two positive polarity par-

ticles *-hari* and *-də* in Sinhala. Section 1.2 offers an overview of the polarity system in general. Section 1.3 presents a brief overview of the Sinhala language. Section 1.4 provides an overview of the form and distribution of the two particles *-hari* and *-də*. Section 1.5 critically reviews some of the existing accounts of the two particles and presents some of the challenges that these accounts face. Section 1.6 analyses the distribution of the two particles in contexts of negation, the universal quantifier, modals and intensional operators and presents different types of implicatures/inferences that the disjunctions and indefinites formed with the two particles give rise to.¹ Section 1.7 discusses the theoretical background, assumptions and tools to be used in the derivations. Section 1.8 presents the central claims and the structure of the thesis.

1.2 An overview of polarity system and positive polarity

A polarity sensitive item (PSI) in a language is a lexical item that can only be used with respect to either positive/affirmative or negative polarity. Polarity sensitive items are of two types: positive polarity items (PPIs) and negative polarity items (NPIs). Items that are used (licensed) only in the scope of negation are called negative polarity items and items that are used (licensed) only in positive environments (that escape semantic scope of negation) are called positive polarity items (cf. Baker (1970); Ladusaw (1980); Horn (1989); Szabolcsi (2004); Giannakidou (2008); Spector (2014)).

In the next two sections, I introduce the terminology with well-known examples from the literature. First, I briefly introduce NPIs and their implications. Second, I introduce the behavior and grammar of PPIs in detail as this thesis is mainly concerned with positive polarity, exhaustivity and their implications for grammar.

1.2.1 Negative polarity items

Downward entailing (DE) operators such as negation license NPIs. Some of the most common NPIs in English are *any*, *ever*, *at all* and *yet*.² For example, as shown in (1), *any teacher* is only licensed in the environment of negation. And as shown in (2), *ever* is also only licensed in the environment of negation.³

¹I use the term ‘inferences’ interchangeably with ‘implicatures’ to mean the same. Also, see Spector (2014) where he uses a more neutral term ‘inferences’ to refer to implicatures.

²Operators such as negation that reverse entailment patterns are called downward-entailing operators or monotone decreasing operators. This will be discussed in detail in the next page.

³There are counter examples to this behavior of NPIs. See Giannakidou (2008) for an analysis. But since NPIs are not the main focus in this thesis, I will not discuss them here.

- (1) a. John didn't meet any teacher.
b. *John met any teacher.
- (2) a. John didn't ever meet a teacher.
b. *John ever met a teacher.

At the same time, as shown in (3), *any teacher* can only be interpreted in the scope of negation.

- (3) a. John didn't meet any teacher.
b. $\neg \exists x. \text{teacher}(x) \wedge \text{met}(j, x)$
c. $\# \exists x. \text{teacher}(x) \wedge \neg \text{met}(j, x)$

Items such as *no* indicating negation that reverse entailment patterns or reverse the relation of semantic strength among expressions are called downward-entailing (DE) operators or monotone decreasing operators (cf. Spector (2013)). They create DE contexts. Some other DE contexts include the restrictor and nuclear scope of quantifiers such as *no*, *few*, etc., restrictor of universal quantifiers, antecedent of conditional sentences, etc. Downward entailing expressions are expressions that license inferences from supersets to subsets (cf. Chierchia (2013)). For example, the negative particle *no* in English is downward entailing because *No man walks* (superset) entails that *No father walks* (subset) or *John didn't meet any girl* in (1) entails that *John didn't meet Maala*. Thus, a negative polarity item is licensed in the scope of a downward entailing operator as in (1).

The counterpart of negative polarity items (NPIs) is positive polarity items (PPIs). In the next section, I offer a detailed overview of PPIs in language and grammar.

1.2.2 Positive polarity items

PPIs are items that are licensed only in affirmative contexts. Some of the most common PPIs in English are *some*, *someone*, *somewhere*, *already*, *still* (cf. Szabolcsi (2004)). For example, as shown in (4), *still* is only licensed in a positive environment. And as shown in (5), *already* is also only licensed in an affirmative context.

- (4) a. John still believed it.
b. *John didn't still believe it.
- (5) a. John has already seen the doctor.
b. *John hasn't already seen the doctor.

PPIs do not like to be in the semantic scope of negation. If placed inside of the syntactic

scope of negation, they escape the scope and are interpreted outside of the scope of negation. For example, as shown in (6), *some girl* is not interpreted as claiming that John did not meet any girl. It is only interpreted as there is a particular girl that John did not meet. Thus, *some* is interpreted outside of scope of negation.

- (6) a. John didn't meet some girl.
- b. $\neg \exists x. \text{girl}(x) \wedge \text{met}(j, x)$
- c. $\exists x. \text{girl}(x) \wedge \neg \text{met}(j, x)$

Items that are not licensed under downward entailing operators are treated as positive polarity items. At least since Baker (1970), PPIs have been discussed as a separate class of polarity items. And, since Szabolcsi (2004), they have gained more attention and are widely studied today (cf. Spector (2014)). Following is an introduction to how PPIs are treated and analyzed today.

PPIs can be characterized in terms of properties such as anti-licensing, locality of anti-licensing and rescuing (Szabolcsi, 2004; Spector, 2014). This is illustrated below with English PPI *some* and French PPIs *ou* and *soit-soit* (or).

Anti-licensing: This means that PPIs can not be interpreted under the immediate scope of local (non-embedded) sentential negation. Thus, only a wide scope interpretation with respect to negation is available. For example *some professor* in (7) in English can not be interpreted as claiming that John did not meet any professor. It only means that there is some professor that John did not meet. As Spector (2014) shows, as in (8), a narrow scope reading for the French disjunction *ou* with respect to negation is not available and thus a PPI. That is, (8) does not mean that Marie did not invite any of Lea or Jean for dinner, but she did not invite one of them for dinner.

- (7) John did not meet some professor.
- (8) Marie n'a pas invité Léa ou Jean à dîner.
 "Marie did not invite Lea or Jean for dinner." (Spector, 2014)

Rescuing: Most PPIs are acceptable in the scope of an even number of DE entailing operators. In other words, the narrow scope interpretation can be rescued with a second DE operator. For example, the narrow scope interpretation for *some professor* in (7) in English can be recovered under another negation or in a downward entailing context. For French, as Spector (2014) shows, *ou* in (10) can well receive a narrow scope interpretation.

- (9) If John did not meet some professor, he would be in trouble.

- (10) Il est peu probable que Paul n’ait pas invité Pierre ou Julie à dîner.
 “It is unlikely that Paul did not invite Pierre or Julie for dinner.”
 [Understood as it is likely that Paul invited either Pierre or Julie for dinner.]
 (Spector, 2014)

Locality of Anti-licensing: Most PPIs are acceptable in the scope of an extra-clausal negation. For example, *some professor* in (11) in English can be interpreted that John did not meet any professor. And, as Spector (2014) notes, as in (12), a narrow scope reading for the French disjunction *ou* is available under extra-clausal negation. That is (12) does mean that the speaker thinks that Marie did not invite any of Pierre or Julie for dinner.

- (11) I do not think John met some professor.
 (12) Je ne pense pas que Marie ait invité Pierre ou Julie à diner.
 “I dont think that Marie invited Pierre or Julie for dinner.” (Spector, 2014)

Spector (2014) claims that anti-licensing of *ou* is a local phenomenon as the narrow scope interpretation can be recovered under extra-clausal negation. He also notes that the conjunctive interpretation of *ou* can be rescued with another negation. Following this, he argues that French *ou* is a very mild PPI. At the same time, for *soit-soit*, he notes that the narrow scope interpretation can not be recovered even with extra-clausal negation. Thus, locality of anti-licensing does not hold for *soit-soit* as shown in (13).

- (13) *Je ne pense pas que Jacques ait invité soit Anne soit Paul à dîner.
 “I dont think that Jacques invited SOIT Anne SOIT PAUL for dinner.”
 [Under a narrow-scope interpretation for disjunction] (Spector, 2014)⁴

Spector, however, notes that it can be rescued with another negation or a downward entailing operator as shown in (14).

- (14) Je n’emmène jamais Marie au cinéma sans qu’elle ait demandé la permission soit à son père soit à sa mère.
 ‘I never bring Marie to the movies without that she have-subjunctive asked permission SOIT from her father SOIT from her mother.’ Spector (2014)

Thus, he argues that *soit-soit* is a strong PPI as the locality of anti-licensing can not be applied and its conjunctive interpretation can only be rescued.

⁴The meaning of SOIT-SOIT could be similar to that of English *either-or*. This requires more investigation. I am glossing SOIT-SOIT as in Spector (2014). See also Nicolae (2017) that follows the same convention.

Drawing insights from the behavior of PPIs in language as discussed above, in this thesis, I present a novel analysis of the particles *-hari* and *-də* in Sinhala in terms of their positive polarity behavior. These particles have so far been treated in terms of either Q-particles or choice function variables (i.e. Kishimoto (2005); Hagstrom (1998); Cable (2010); Slade (2011); among many others), but their polarity structure has not been discussed. In this thesis, I present evidence that some of these previous accounts have overlooked crucial empirical facts related to the distribution of the two particles in contexts of disjunctions and indefinites. I argue that when these particles are analyzed as PPIs, that serves to better account for not only their systematic occurrence in a number of constructions such as disjunctions and indefinites, but also to make sense of a wide range of phenomenon such as ignorance effects, no-choice and free-choice readings in the contexts of modals, specificity and non-specificity readings in the contexts of the universal quantifier and intensional operators based on the PP behavior of the two particles.

Before we get into analysis of complex data in the Sinhala language, we need to have a knowledge of some important facts of Sinhala as a language. In the following section, I offer a brief introduction of the Sinhala language.

1.3 An overview of the Sinhala language

The Sinhala (or Sinhalese) language is an Indo-Aryan language, a member of the Indo-European family of languages. It is one of the official languages of Sri Lanka and is the mother tongue of the majority of the people constituting about 74 percent of its population, which is about 20 million. Sinhala has a diglossia with differences in colloquial and written forms of language. Written form (literary Sinhala) is the standard dialect and is based on strictly prescriptive grammar (i.e. subject-verb agreement with respect to number and gender) that has evolved from grammatical traditions of languages such as Sanskrit. The formal/literary variety of Sinhala is used in public speaking, radio programs, NEWS broadcasting and in writing of formal documents. Gair (1998) claims “This is the language of virtually all written communication, and it differs grammatically and lexically from the spoken varieties, collectively referred to as Spoken Sinhala.”. The colloquial variety is found in people’s day-to-day speech or in informal contexts. Gair (1998) claims “Colloquial Sinhalese finds its life in speaking, it is acquired simply by growing up where it is spoken”. Grammatical phenomena such as subject-verb agreement is not found in colloquial Sinhala.

This study is based on the particles *-hari* and *-də* used in disjunction and indefinite

constructions in colloquial Sinhala, which is the natural form of the Sinhala language. The two particles are also used in disjunctions and indefinites in formal Sinhala. However, formal Sinhala uses the two particles in sentences with subject-verb agreement while colloquial Sinhala uses the two particles in sentences without subject verb agreement. Formal Sinhala also makes use of the item *ho* as a disjunction marker. But, this thesis does not discuss it.

In the next section, I offer some descriptive facts of the form and distribution of the particles *-hari* and *-də* in the constructions of disjunctions, indefinites and questions before I present the descriptive facts of their PP behavior in section 1.6.2. Although I present data for disjunctions, indefinites and questions, this thesis will only interpret disjunctions and indefinites. Questions remain for future work.

1.4 Form and distribution of the particles *-hari* and *-də*

Sinhala uses two particles: *-hari* and *-də* systematically across disjunction, indefinite and question constructions. They are usually called Q-particles (i.e. Kishimoto (2005); Hagstrom (1998); Cable (2010); Slade (2011); among many others). Following is a presentation of some descriptive facts of their form and distribution in the constructions of disjunctions, indefinites and questions.⁵

1.4.1 The particles *-hari* and *-də* in disjunctions

Disjunctions in colloquial Sinhala are formed with the particles *-hari* and *-də* combining disjuncts (or individual alternatives) as shown in the following examples.

- | | | | | |
|------|----|---|----|---|
| (15) | a. | tee-hari koopy-hari
tea-hari coffee-hari
“tea or coffee” | b. | tee-də koopy-də
tea-də coffee-də
“tea or coffee” |
| (16) | a. | Giita-hari Maala-hari
Giita-hari Maala-hari
“Giita or Maala” | b. | Giita-də Maala-də
Giita-də Maala-də
“Giita or Maala” |
| (17) | a. | methənə-hari athənə-hari
here-hari there-hari
“here or there” | b. | methənə-də athənə-də
here-də there-də
“here or there” |

⁵It has to be noted that the meanings of these constructions given in English translations are preliminary and rough approximations to be refined later when new insights are added.

- (18) a. adə-hari hetə-hari
today-hari tomorrow-hari
“today or tomorrow”
- b. adə-də hetə-də
today-də tomorrow-də
“today or tomorrow”

In sentential constructions, they appear in positions where their respective counterpart DPs, PPs, or AdvPs appear. Nominal disjunctions appear in positions respecting the SOV pattern in Sinhala. For example, as seen in (19), a nominal disjunction functioning as an object appears in the pre-verbal position respecting the SOV pattern in Sinhala.

- (19) a. John Giita-hari Maala-hari hamu-un-a.
John Giita-hari Maala-hari meet-PAST-A
“John met Giita or Maala.”⁶
- b. John Giita-də Maala-də hamu-un-a, mamə danne næ kawə-də kiyəla.
John Giita-də Maala-də meet-PAST-A I know not who-də COMP
“John met Giita or Maala, I do not know who/which.”⁷

Adverbial disjunctions appear in positions respecting the S(Adv)OV pattern in Sinhala.

- (20) a. John iiye-hari adə-hari Giita hamu-un-a.
John yesterday-hari today-hari Giita meet-PAST-A
“John met Giita yesterday or today”
- b. John iiye-də adə-də Giita hamu-un-a.
John yesterday-də today-də Giita meet-PAST-A
“John met Giita yesterday or today.”

The particles *-hari* and *-də* are used to combine disjuncts at individual phrase level (i.e. individual alternatives). They can not be used to combine disjuncts at clausal (TP) level (propositional alternatives) as shown in (21).

- (21) *John gedərə innəwa-hari/-də eyaa gihilla-hari/-də.
John at home stay-hari/-də he left-hari/-də
“Intended: John is either at home or he has left.”

Sinhala has the disjunction marker *næthnam* similar to ‘if not’ that is used at clause level to combine disjuncts. An instance of this is given in (22).

⁶In a declarative sentence, the verb is marked with the clause final morpheme/particle *-a* (glossed as -A) in Sinhala, as seen in the example here. In a focus or question construction, the verb is marked with the clause final morpheme/particle *-e* (glossed as -E). See Ananda (2011) for a detailed account of the use of the two morphemes in the two types of constructions.

⁷Many speakers of Sinhala report that a declarative disjunction construction with the particle *-də* is odd (i.e. compared to a *-də* disjunction in an alternative question as in (36)). But, they accept that given the right intonation, a particular context and a sentence similar to ‘I don’t know what/which’ following it, it is acceptable as in the example here. I will not be systematic about presenting ‘I don’t know what/which’ in all the examples.

- (22) John gedəɾə innəwa, nəθnam, eyaa gihilla.
 John at home stay if-not he left
 “John is at home, if not/otherwise he has left.”

Standard Sinhala also makes use of a different disjunction *ho*. This is only found in written or spoken varieties of formal/standard Sinhala.

- (23) John iiye ho adə Giita hamu-un-e-yə.
 John yesterday or today Giita meet-PAST-AGR
 “John met Giita yesterday or today”

This thesis focuses on the disjunctions (and indefinites) formed with the particles *-hari* and *-də* used in colloquial Sinhala.

As mentioned, the two particles *-hari* and *-də* are also employed in indefinite constructions. In the next section, I show their distribution in indefinite constructions.

1.4.2 The particles *-hari* and *-də* in indefinites

As is the case with many languages of the world (cf. Haspelmath (1997)), Sinhala employs three types of indefinites: plain indefinites; indefinite pronouns; and complex indefinites. These are discussed in detail next.

1.4.2.1 Plain indefinites

Plain indefinites in Sinhala are formed by adding the particle *-ek/ak* to a noun root as shown in (24).

- | | | | | |
|------|----|--------------------------------|----|-----------------------------------|
| (24) | a. | poth-ak
book-ak
“a book” | b. | laməy-ek
child-ek
“a child” |
| (25) | a. | ball-ek
dog-ek
“a dog” | b. | putuw-ak
chair-ak
“a chair” |

The examples in (26) shows how they are distributed in sentences.

- (26) a. John poth-ak gattha.
 John book-ak bought
 “John bought a book.”
- b. John guruwəriy-ak bənda.
 John teacher-ak married
 “John married a teacher.”

Thus, regular indefinites are formed without the use of the particles *-hari* and *-də*.

1.4.2.2 Indefinite pronouns

Indefinites similar to indefinite pronouns are formed by adding the two particles *-hari* and *-də* to wh-words (indeterminate pronouns (IDPs)) as shown in (27).⁸

- | | | | | |
|------|----|---|----|---|
| (27) | a. | kauru-hari
who-hari
“somebody” | b. | kau-də
who-də
“somebody” ⁹ |
| (28) | a. | monəwa-hari
what-hari
“something” | b. | monəwa-də
what-də
“something” |
| (29) | a. | kohe-hari
where-hari
“somewhere” | b. | kohe-də
where-də
“somewhere” |

Their distribution in sentences is given in (30).

- | | | |
|------|----|---|
| (30) | a. | John monəwa-hari kanəw-a.
John what-hari eat-A.
“John is eating something.” |
| | b. | John monəwa-də kanəw-a.
John what-də eat-A
“John is eating something.” |

Thus, indefinite pronouns in Sinhala make use of the particles *-hari* and *-də* attached to IDPs. These are also known as wh-indefinites.

1.4.2.3 Complex indefinites

The two particles attached to IDPs can also be used with regular indefinites like *kell-ek* ‘a girl’ to form a complex indefinite like *kauru-hari kell-ek* ‘some girl’ as shown in the examples below.

⁸Kuroda (1965) uses the term indeterminate pronouns (IDPs) to refer to wh-words in Japanese similar to those in Sinhala. I will use this neutral term to refer to wh-words in Sinhala most of the time (cf. also Kratzer and Shimoyama (2002)). The particles *-ek/ak* can not be used with the IDPs on their own. The plain indefinites formed with the particles *-ek/ak* can be used with IDPs to form complex indefinites as shown the next section.

⁹The difference between *kau-* and *kauru-* is only related to phonology. As it is seen here, we do not observe such a difference with respect to *monəwa* or *kohe*.

- | | | | | |
|------|----|--|----|--|
| (31) | a. | kawru-hari kell-ek
who-hari girl-INDF
“some girl” | b. | kaw-də kell-ek
who-də girl-INDF
“some girl” |
| (32) | a. | kawru-hari guruwəriy-ak
who-hari teacher-INDF
“some teacher” | b. | kaw-də guruwəriy-ak
who-də teacher-INDF
“some teacher” |
| (33) | a. | mokak-hari poth-ak
what-hari book-INDF
“some book” | b. | mokak-də poth-ak
what-də book-INDF
“some book” |

The examples in (34) show their uses in sentences.

- (34)
- | | |
|----|--|
| a. | John mokak-hari poth-ak gattha.
John what-hari book-ak bought
“John bought some book.” |
| b. | John mokak-də poth-ak gattha.
John what-də book-ak bought
“John bought some book.” |

Thus, the particles *-hari* and *-də* attached to IDPs are combined with regular indefinites to form complex indefinites in Sinhala.

1.4.3 The particles *-hari* and *-də* in questions

Constituent and polar questions in Sinhala are formed with the particles *-də* in Sinhala. Based on the type of question (i.e. constituent, Yes/No or alternative), the type and the size of the alternative that the particle *-də* attaches to vary. This is discussed in the following.¹⁰

1.4.3.1 Questions with alternatives and alternative questions

With alternatives, *-hari* can only be used in an inclusive sense to be answered with a Yes or No as in (35). On the other hand, *-də* can only be used in an exclusive sense to be answered with an alternative as in (36).

- (35)
- | |
|-------------------------------------|
| oyaa maalu-hari mas-hari kanəwa-də? |
| you fish-hari meat-hari eat-də |
| “Do you eat fish or meat?” |

INTUITION: When a speaker asks the question, the hearer has to answer the

¹⁰As mentioned earlier, I am presenting the data associated with questions here to show the systematic occurrence of the particles *-hari* and *-də* in all disjunction, indefinite and question constructions in Sinhala. An investigation of the two particles as PPIs in questions is outside the scope of this thesis. I will take this up for investigation in future work.

question with a ‘Yes’ or ‘No’. If the answer is ‘Yes’, the hearer can subsequently indicate preference for one of the options or depending on the context for both. If the answer is ‘No’ it is an indication of saying ‘No’ to both at once.

- (36) oyaa maalu-də mas-də kann-e?
 you fish-də meat-də eat-E
 “Is it fish or meat that you eat?”¹¹

INTUITION: When a speaker asks this question, the hearer is expected to choose only one of the options. Also, the hearer has to indicate the preference by naming only one of the two.

In these examples, we can observe that the particle *-hari* as a disjunction serves to form a Yes/No question with alternatives with the particle *-də* appearing clause finally. On the other hand, the particle *-də* as a disjunction serves to form an alternative question.

1.4.3.2 Yes/NO questions

A Yes/No question makes use of only the particle *-də*.

- (37) A: John tee biiwa-də?
 John tea drank-də
 “Did John drink tea?”
 B: ow, eyaa tee biiwa/ næ eyaa tee biiwe næ.
 Yes, he drank tea./ No, he did not drink tea.
- (38) *John tee biiwa-hari?
 John tea drank-hari.
 “Did John drink tea?”

Thus, the particle *-də* appearing clause finally serves to form a Yes/No question. However, even when *-hari* appears clause finally, it does not serve to form a question.

1.4.3.3 Wh- questions

Only the particle *-də* is used to form a wh-question. As seen in (39), the indefinites formed with the particle *-də* are used in wh-questions.

¹¹The particle *-e* appears clause finally in a focus, constituent or alternative question construction in Sinhala. In a constituent question, the particle *-də* is used attached to the wh-constituent. In an alternative question, the particle *-də* is used attached to the alternatives and the particle *-e* appears clause finally. The particle *-e* is not used in a Yes/No question. The particle *-də* appears clause finally in a Yes/No question. See Ananda (2011) for a detailed account of the use of the two particles in question constructions.

- (39) a. John monəwa-də biiw-e?
 John what-də drank-E.
 “What did John drink?”
- b. *John monəwa-hari biiw-e?
 John what-hari drank-E.
 “What did John drink?”

Thus, the facts presented above show that questions make use of the particle *-də* in Sinhala.

At least since Gair (1986), the particle *-də* has been analyzed in the form of a Q(-uestion) operator, a choice function variable and many more (cf. Gair 1998, Kariyakarawana 1998, Hagstrom 1998; Kishimoto 2005; Cable 2010, among many others). Slade (2011) was the first to analyze the syntax and semantics of both the particles *-hari* and *-də* and attempted to offer a uniform analysis of the two particles. Next, I critically review some of the most relevant previous accounts capturing the various ways that the two particles have been treated.

1.5 Existing accounts and challenges to them

The semantics/functions (especially of the particle *-də*) have mostly been analyzed in terms of either Q(-uestion) Operators (i.e. Kishimoto (2005)) or Choice Functions (i.e. Hagstrom (1998); Cable (2010); Slade (2011); among many others). In this thesis, I do a brief critical review of these accounts. For the most part, I show that previous accounts have overlooked or misrepresented some important facts related to the two particles and have not given them the reasonably due treatment. Part of the goal of this thesis is to make a contribution to the literature by providing a better characterization of the complete set of facts. Thus, I do not offer a formal criticism of existing accounts. My focus is to better study, analyze and bring out the grammar of these particles by focusing on new data and linking them to current debates on exhaustivity and positive polarity.

1.5.1 Hagstrom (1998)

In his thesis, Hagstrom (1998) made a very important contribution to the analysis of the particles *-ka* in Japanese and *-də* in Sinhala (which he called Q particles), being the first to treat them in terms of both syntax and semantics. He compared the Japanese particle *-ka* with the Sinhala particle *-də*. He argued that the particle *-ka* in Japanese overtly moves to the clause final position (assumed to be C) in a question while the particle *-də* in Sinhala undergoes covert syntactic movement from a clause-internal position to a clause-peripheral position. He supported his arguments by testing the movement operations in

contexts that involve syntactic islands and interventions.

Hagstrom also observed that indefinites can be formed by attaching the Q morpheme (*-də*) to a wh-word. For both indefinites and questions formed with the particle *-də*, he proposed a semantic account based on choice functions. He argued that wh-words denote sets of individuals and the Q morpheme represents an existential quantifier over choice function variables.

This was challenged by Cable (2010) who argued that the way the Q particles in the two languages behave is different and categorized Japanese as a ‘Q-adjunction’ language and Sinhala as a ‘Q-projection’ language. This will be discussed in section 1.5.3.

One of the problems for Hagstrom’s analysis is that the systematic occurrence of the particles *-də* and *-ka* in disjunctions in the two languages has been overlooked. The challenge for his analysis is to examine how an account based on a choice function framework is able to account for their systematic occurrence not only in the indefinite and question constructions, but also in the constructions of disjunction. Slade (2011) took up this challenge, which will be discussed in Section 1.5.4.

1.5.2 Kishimoto (2005)

Kishimoto (2005) argues that ordinary wh-phrases combined with the particle *-də* associate with a Q-element. This Q-element is assumed to be a scope assigner whose scope is determined by the LF position of the Q-element. He argues that the Q-element may undergo movement in overt or covert syntax (at LF) in order to fix scope.

This analysis is basically syntactic and would need to be extended to account for interpretations. At the same time, his analysis is limited to the questions formed with the particle *-də*. It would be important to study the syntax and semantics of the particles *-də* in the constructions of disjunctions and indefinites to have a sense of the bigger picture before making claims about the particle based on evidence from its use in a domain limited to questions.

1.5.3 Cable (2010)

Quite contrary to the two accounts above, Cable (2010) compares the particle *-də* in Sinhala with the particle *-sá* in Tlingit and analyses the particle *-də* as a choice function variable. While Hagstrom (1998) attempted to compare the particle *-də* in Sinhala with the particle *-ka* in Japanese, Cable (2010) argued that the behavior of the two particles

in the two languages is different. He analyzed Japanese *-ka* as a particle that instigates ‘Q-adjunction’ and Sinhala *-də* as a particle that projects Q. While Kishimoto (2005) argued for a syntactic movement of a Q-element, Cable (2010) analyzed the particle *-də* as a choice function variable.

Cable makes a generalization for Japanese, Tlingit and Sinhala claiming that the particles used in yes/no questions are different from the particles used in wh-questions or wh-indenites based on the surface differences between the particle *-gé* used in Yes/No questions in Tlingit and the particles *-sá* used in wh-questions and wh-indenites in Tlingit. However, his proposal missed some empirical facts related to the particle *-də* in Sinhala (and the particle *-ka* in Japanese). For instance, as we observed above in Section 1.4, the particle *-də*, uniformly occurs in disjunction, indefinite and question constructions in Sinhala. But, Cable (2010) did not take into account the distribution of the particle *-də* (or *-hari*) in disjunction constructions. At the same time, Cable (2010) offers generalizations of the particle *-də* in Sinhala by analyzing the grammar of the particle *-də* in indefinites in matrix clauses. I show that it is also important to investigate what kind of effects indefinites with the particle *-də* generate in embedded contexts such as negation, the universal quantifier and modals to make sound generalizations with respect to the grammar of the particle *-də*.

1.5.4 Slade (2011)

Both a synchronic and a diachronic analysis of the particles *-hari* and *-də* were first carried out in Slade (2011). From a diachronic perspective, detailing the historical development of the two particles, Slade notes that the particle *-də* appeared in Yes/No and Wh-questions in old Sinhala and classical Sinhala from very early days. He notes that the use of *-də* in indefinites is a recent development in modern Sinhala. He also brings in evidence to show that the use of *-hari* in indefinites in Sinhala is a recent development.

From a synchronic perspective, a comprehensive syntactic and semantic analysis of both the particles *-hari* and *-də* was also first carried out in Slade (2011). His thesis takes into account the systematic occurrence of the particles *-hari* and *-də* in all disjunction, indefinite and question constructions. He analyses these particles as uniformly denoting variables over choice functions.

Slade’s analysis of the particles *-hari* and *-də* in terms of uniformly introducing variables over choice functions treats the semantics of both particles in the same way. He claims that truth conditionally there is no difference in the sentences involving the two

types of particles (Slade (2011) p.115 and p.247). .

- (40) a. Sanath monawə-hari gatt-a.
Sanath what-hari buy-PAST-A.
“Sanath bought something.”
b. Sanath monawə-də gatt-a.
Sanath what-də buy-PAST-A.
“John bought something.” (Slade (2011), p.115).

However, as we will see in the next section, the semantics of the sentences with the two particles are different. When the two particles *-hari* and *-də* appear in disjunction constructions the differences are very transparent. The disjunction sentences with the two particles *-hari* and *-də* generate readings akin to inclusive and exclusive meanings of the disjuncts/alternatives in the domain. The same semantic effects are observed of the alternatives in the domain of indefinites. Moreover, as observed in the contexts of negation, modals, and the universal quantifier, the disjunctions and indefinites formed with the two particles give rise to different kinds of readings such as free-choice and no-choice readings, specificity and non-specificity effects, etc. A semantic analysis should optimally take these differences into account.

Against this background, I take up the challenge of accounting for the empirical facts that have so far eluded the attention or a proper analysis in previous accounts. Accordingly, I offer a new analysis for the two particles that accounts not only for their systematic occurrence in a variety of constructions such as disjunctions and indefinites, but also for the differences in the readings of the sentences with the two particles in embedded contexts of negation, modals, quantifiers, and intensional operators.

This thesis mainly focuses on the constructions and environments that both the particles *-hari* and *-də* appear in. Part of this restriction has to do with the goal of comparing and contrasting the distribution and interpretation of the two particles in such homogeneous contexts. The other had to do with the scope of the thesis. Including an analysis of the particle *-də* that appears in questions was outside the scope of the thesis. As we discussed above, Hagstrom assumed that it is the same particle *-də* that appears in indefinites and questions in Sinhala and accounted for the differences based on movement operations and a choice function based analysis. Cable assumed that it is the same particle *-də* that appears in indefinites and questions, but assumed that the particle *-də* that appears in Yes/No and Wh-questions is only homophonous. Slade assumed that it is the same particle *-də* that appears in indefinites and questions in Sinhala and accounted for the differences in functions based on the presence/absence of Q-related dependencies. Even

though we observe that the particle *-də* systematically occurs in all disjunction, indefinite and question constructions, we are not sure yet about the role/grammar of the particle *-də* in questions. We are not yet sure whether it is the same particle that appears in all the constructions of disjunctions, indefinites and questions. This needs thorough and serious investigations and remains for future work.

The empirical background for this is discussed in detail in the next section.

1.6 New insights drawn from re-observation of data

Disjunctions and indefinites formed with the particles *-hari* and *-də* in contexts such as negation, modals, quantifiers and intensional operators give rise to a variety of effects or implicatures such as positive polarity effects, ignorance inferences, free/no choice effects, different scope or non/specificity effects and de-re/dicto readings of the disjunctions and indefinites. The goal of this thesis is to account for these implicatures interpreting recent proposals in the literature. It proposes a new account based on the differences in the PP behavior of the two particles. These are shown to be linked with the inclusivity and exclusivity requirements/possibilities associated with the two particles.

In the following sections, I present new data pertaining to the use of the two particles in the contexts of negation, modals, quantifiers and intensional operators to draw new insights to better account for the semantics of these particles.¹²

1.6.1 Exclusivity and inclusivity requirements/possibilities

When we observe the meanings of the indefinite expressions made with the particles *-hari* and *-də* as in (41-a) and (41-b), on the surface their meanings or the truth conditions appear to be the same as also seen in their English translations (i.e. that any of (41-a) and (41-b) will be true as long as John met somebody).¹³

- (41) a. John kaawə-hari hamu-un-a.
 John who-hari meet-PAST-A.
 ‘John met somebody.’
 b. John kaawə-də hamu-un-a.
 John who-də meet-PAST-A.
 ‘John met somebody.’

¹²The judgements reported in this thesis respond to my intuitions as a native speaker and also to the intuitions of numerous native speakers that I have consulted on the basis of the detailed contexts as illustrated in the examples.

¹³As we saw in section 1.5.4, Slade (2011) claims that their truth conditions are the same.

However, a closer examination shows that their semantics are crucially different. In order to prove this, I will begin with insights drawn from their disjunctive counterparts.

Observe the meanings of the disjunction expressions made with the particles *-hari* and *-də* in (19-a) and (19-b) (repeated here as (42-a) and (42-b))

- (42) a. John Giita-hari Maala-hari hamu-un-a.
John Giita-hari Maala-hari meet-PAST-A
“John met Giita or Maala.”
- b. John Giita-də Maala-də hamu-un-a.
John Giita-də Maala-də meet-PAST-A
“John met Giita or Maala. ”

On the surface, their meanings are the same as also seen in their English translations. Again, it might be tempting to think that, their truth conditions are the same (i.e that any of (42-a) and (42-b) will be true as long as John met at least one of Giita or Maala). However, a closer examination of their meanings in different contexts shows that they are different.

In Sinhala, the disjunction sentence with *-hari* as in (42-a) will be true in a situation where John met one of Giita or Maala or even both. As shown in (43), the fact that it can be continued with “even both” shows that an inclusive reading is true of the *-hari* disjunction sentence.

- (43) a. John Giita-hari Maala-hari hamu-un-a.
John Giita-hari Maala-hari meet-PAST-A
“John met Giita or Maala.”
- b. æththətəmə, eyaa ee dennawəma-th hamu-un-a
in fact he those two-EMPH meet-PAST-A
“In fact, he even met both.”

On the other hand, the disjunction expression with *-də* as in (42-b) will be true only in a situation where John met exactly one of Giita or Maala. As shown in (44), the fact that it can not be continued with “even both” shows that only an exclusive reading is true of the *-də* disjunction.

- (44) a. John Giita-də Maala-də hamu-un-a.
John Giita-də Maala-də meet-PAST-A
“John met Giita or Maala.”
- b. #æththətəmə, eyaa ee dennawəma-th hamu-un-a
in fact he those two-EMPH meet-PAST-A
“In fact, he even met both.”

Now, let's go back to the meanings of the indefinite expressions made with the particles *-hari* and *-də* in (41-a) and (41-b) repeated here as (45-a) and (45-b).

- (45) a. John kaawə-hari hamu-un-a.
 John who-hari meet-PAST-A.
 ‘John met somebody.’
 b. John kaawə-də hamu-un-a.
 John who-də meet-PAST-A.
 ‘John met somebody.’

As we observed earlier, on the surface, their meanings appear to be the same as also seen in their English translations. However, now, building on the insights drawn from the truth conditions of the particles in *-hari* and *-də* disjunction sentences, we can take a closer look. The indefinite expression with *-hari* in (45-a) will be true in a situation where John met at least one of the individuals in the context for the indefinite. Suppose, we have Giita, Maala, and Siita in the context for the indefinite. The indefinite expression in (45-a) will be true in a situation where John met at least one of Giita, Maala or Siita or even two of them or all of them. This shows that an “inclusive” reading is true of a *-hari* indefinite. On the other hand, the indefinite expression with *-də* in (45-b) will be true only in a situation where John met exactly one of the individuals in the context for the indefinite. Suppose, we have Giita, Maala, and Siita in the context for the indefinite. The indefinite expression in (45-b) will be true in a situation where John met exactly one of Giita, Maala or Siita, but never two of them or all of them. Thus, an indefinite with the particle *-hari* will be used in a situation where an “inclusive” reading will be true while an indefinite with the particle *-də* will be used in a situation where only an “exclusive” reading will be true.

We see that the meanings of the sentences with the two particles *-hari* and *-də* are crucially different. The particle *-hari* carries a possibility of an inclusive reading of the alternatives of a disjunction or indefinite and the particle *-də* carries a requirement of an exclusive reading of the alternatives in the domain of a disjunction or indefinite. It is important to note that I use the notion “domain” to be uniform across both disjunctions and indefinites. I assume that the value for the quantificational domain (be it disjunctions or indefinites) is determined by pragmatic or contextual means.

In the next section, I discuss the positive polarity behavior of the two particles and relate these different requirements/possibilities of the two particles to the different behaviors of the two particles as PPIs. In Section 2.6, I formally account for differences in the PP behavior of the two particles relative to the exclusivity and inclusivity requirements/possibilities of the two particles in their respective domains.

1.6.2 Positive polarity (PP) behavior: the two particles with negation

Disjunctions or indefinites formed with the particles *-hari* and *-də* can not be interpreted under clause-mate (immediate scope of) negation and thus are PPIs in Sinhala. However, the PP behavior of the particles *-hari* and *-də* are different as observable in the examples given below.

As observable in (46), Sinhala *-hari* is a PPI, but, it is a mild PPI as its narrow scope interpretation can be derived by way of extra clausal negation or a rescuing strategy as exemplified in (47) and (48).¹⁴ The same effect can be observed across disjunction and simple and complex indefinite constructions.

(46) Anti-licensing:

- a. John Gita-hari Mala-hari dækk-e næ.
John Gita-hari Mala-hari saw-E not
“John did not see Gita or he did not see Mala.”: *-hari* (or) > not
(This would be true in a context where John saw one of Gita or Mala, but he is not sure which he did not see. Not > *-hari* (or) (i.e. John did not see any of them) is ruled out.)
- b. John kaawə-hari dækk-e næ.
John who-hari saw-E not
“John did not see somebody.”: somebody > not
(This would be true in a context where John did see someone, but he did not see some “particular” one. Not > someone (i.e. John did not see anyone) is ruled out.)
- c. John kaawə-hari kelle-ek dækk-e næ.
John who-hari a-girl saw-E not
“John did not see some girl.”: some girl > not
(This would be true in a context where John did see some girl, but he did not see some particular girl. Not > some girl (i.e. John did not see any girl) is ruled out.)

(47) Locality of anti-licensing:

- a. mamə hithnne næ John Gita-hari Mala-hari dækk-a kiyala.
I think not John Gita-hari Mala-hari saw-A COMP
“I do not think John saw Gita or Mala.”: not > *-hari* (or)
(This would be true in a context where the speaker thinks that John did not see any of Giita or Maala.)

¹⁴The term “mild PPI” was borrowed from Spector (2014) referring to the behavior of French *ou* disjunction.

- b. mamə hithnne nə John kaawə-hari dækk-a kiyala.
I think not John who-hari saw-A COMP
“I do not think John saw somebody.”: not > somebody
(This would be true in a context where the speaker thinks that John did not see anyone.)
- c. mamə hithnne nə John kaawə-hari kell-ek dækk-a kiyala.
I think not John who-hari girl-ek saw-A COMP
“I do not think John saw some girl.”: not > some girl
(This would be true in a context where the speaker thinks that John did not see any girl.)

(48) Rescuing:

- a. John Gita-hari Mala-hari dækk-e nə kiyala penennə nə.
John Gita-hari Mala-hari saw-E neg COMP appear neg
“It is unlikely that John did not see Gita or Mala.”
(This would be true in a context where it appears that John saw both Giita and Maala.)
- b. John kaawə-hari dækk-e nə kiyala penennə nə.
John who-hari saw-E neg COMP appear neg
“It is unlikely that John did not see somebody.”
(This would be true in a context where it appears that John saw at least one person (possibly more).)
- c. John kaawə-hari kell-ek dækk-e nə kiyala penennə nə.
John who-hari girl-ek saw-E neg COMP appear neg
“It is unlikely that John did not see some girl.”
(This would be true in a context where it appears that John saw at least one girl.)

Similar to *-hari* disjunctions and indefinites, *-də* disjunctions and indefinites are anti-licensed by a clause mate negation. *-də* disjunctions and indefinites are even anti-licensed by extra-clausal negation. As shown in (49), and (50), a narrow scope interpretation can neither be recovered under extra clausal negation nor can it be rescued under another downward entailing operator. Thus, it can never receive a conjunctive interpretation.

(49) Locality of anti-licensing is not applicable:

- a. #mamə hithnne nə John Gita-də Mala-də dækk-a kiyala.
I think not John Gita-də Mala-də saw-A COMP
“I do not think John saw Gita or Mala.” (Under a narrow scope interpretation for disjunction)
- b. #mamə hithnne nə John kaawə-də dækk-a kiyala.
I think not John who-də saw-A COMP
“I do not think John saw somebody.”(Under a narrow scope interpretation

for indefinite)

- c. #mamə hithnne nə John kaawə-də kell-ek dækk-a kiyala.
I think not John who-də girl-ek saw-A COMP
“I do not think John saw some girl.” (Under a narrow scope interpretation for indefinite)

(50) ‘Rescuing’ is not applicable:

- a. #John Gita-də Mala-də dækk-e nə kiyala penennə nə.
John Gita-də Mala-də saw-E neg COMP appear neg
“It is unlikely that John did not see Gita or Mala.” (Under a narrow scope interpretation for disjunction)
- b. #John kaawə-də dækk-e nə kiyala penennə nə.
John who-də saw-E neg COMP appear neg
“It is unlikely that John did not see somebody.” (Under a narrow scope interpretation for indefinite)
- c. #John kaawə-də keel-ek dækk-e nə kiyala penennə nə.
John who-də girl-ek saw-E neg COMP appear neg
“It is unlikely that John did not see some girl.” (Under a narrow scope interpretation for indefinite)

Thus, it is seen that the particles *-hari* and *-də* are PPIs in Sinhala. But, *-hari* is only a mild PPI as it can be interpreted *in situ* with extra-clausal negation and it can be rescued under the scope of negation with another DE operator scoping over it. On the other hand, *-də* is a very strong PPI as it can neither be interpreted *in situ* in the scope of extra-clausal negation nor can it be rescued under the scope of negation with another DE operator scoping over it. It is also observed that the PP behavior of *-də* disjunction is different even from that of French *soit-soit* as discussed in Spector (2014). For instance, we saw in Section 1.2.2 that the narrow scope interpretation for *soit-soit* can be rescued under an even number of DE operators. But, as we observed above, narrow scope interpretation of *-də* can never be rescued or recovered. I do not attempt to account for the differences between French *soit-soit* and Sinhala *-də* in this thesis and it is left for future research. In Chapter 2, I argue for a link between different ways of behavior of the particles *-hari* and *-də* as PPIs and the exclusivity and inclusivity requirements/possibilities of the two particles *-hari* and *-də*.

Both disjunctions and indefinites formed with the two particles give rise to ignorance inferences. However, the nature of ignorance expressed with the constructions with the two particles is very different. This is discussed in the next section.

1.6.3 Ignorance expressed with the two particles

It is observed that both disjunctions and indefinites formed with the particles *-hari* and *-də* give rise to ignorance inferences. For example, both the disjunction and indefinite expressions with the particle *-hari* in (51), (52) and (53) signal that the speaker lacks knowledge about who satisfies the existential claim about the person that John met. So, a continuation equivalent to *namely* by the speaker or a question *kaawə-də ?* equivalent to *who ?* by the hearer is odd as shown in the following examples.¹⁵

- (51) a. John Giita-hari Maala-hari hambə-un-a. #namin Giita.
John Giita-hari Maala-hari meet-PAST-A. namely Giita
“John met Giita or Maala. Namely Giita”
b. #kaawə-də
who-də
“Who?”¹⁶
- (52) a. John kaawə-hari hambə-un-a. #namin Giita
John who-hari meet-PAST-A. namely Giita
“John met somebody. Namely Giita”
b. #kaawə-də
who-də
“Who?”
- (53) a. John kaawə-hari kelle-ek hambə-un-a. #namin Giita
John who-hari girl-INDF meet-PAST-A namely Giita
“John met some girl. Namely Giita”
b. #kaawə-də
who-də
“Who?”

At the same time, *-də* disjunction and indefinite sentences also give rise to ignorance inferences. As shown in (54), (55) and (56), a continuation equivalent to *namely* by the speaker or the question *kaawə-də ?* (who?) by the hearer is odd.

- (54) a. John Giita-də Maala-də hambə-un-a. #namin Giita.
John Giita-də Maala-də meet-PAST-A. namely Giita
“John met Giita or Maala. Namely Giita.”
b. #kaawə-də
who-də
“Who?”

¹⁵The theoretical aspects pertaining to ignorance inferences will be discussed in Chapter 2.

¹⁶The use of these tests were particular motivated by Alonso-Ovalle and Menéndez-Benito (2003) and Alonso-Ovalle and Menéndez-Benito (2008).

- (55) a. John kaawə-də hambə-un-a. #namin Giita
 John who-də meet-PAST-A namely Giita
 “John met somebody. Namely Giita”
 b. #kaawə-də
 who-də
 “Who?”
- (56) a. John kaawə-də kelle-ek hambə-un-a. #namin Giita
 John who-də girl-INDF meet-PAST-A namely Giita
 “John met some girl. Namely Giita”
 b. #kaawə-də
 who-də
 “Who?”

On the other hand, in contrast to *-hari* and *-də* disjunctions or indefinites, a plain indefinite does not convey such ignorance so that the speaker can well continue with *namin* “namely” or the hearer can well ask the question *kaawə-də* ? “who?” as shown in (57) and (58).

- (57) a. John guruwəriy-ak hambə-un-a. namin Giita.
 John teacher-INDF meet-PAST-A namely Giita
 “John met a teacher. Namely Giita.”
- (58) a. John guruwəriy-ak hambə-un-a.
 John teacher-INDF meet-PAST-A
 “John met a teacher. ”
 b. kaawə-də ?
 who-də
 “Who?”

Thus, *-hari* and *-də* disjunctions and indefinites as opposed to plain indefinites in Sinhala explicitly express ignorance with respect to the witness of the existential claim.

However, with a close scrutiny of the cancelability and felicity conditions of the ignorance component of the *-hari* and *-də* disjunctions and indefinites, it is observed that the nature of ignorance that they express is different. As observable in the examples below, the ignorance implicatures of *-hari* disjunctions and indefinites can be canceled in a number of contexts.¹⁷

As seen in (59), *-hari* disjunctions allow for a continuation with “In fact, both”. If one

¹⁷This is only a brief summary of the data pertaining to non/cancelability and felicity conditions of ignorance component of *-hari* and *-də* disjunctions and indefinites. This will be discussed with more examples and background in Chapter 2.

can continue the disjunction with a clause similar to “In fact, both”, it is compatible with a situation where the speaker knows who John met.

- (59) John Giita-hari Maala-hari hambə-un-a. æththətəmə, eyya dennawəmə
 John Giita-hari Maala-hari met-A. In fact he both
 hambəun-a
 meet-PAST-A
 “John met Giita or Maala. In fact, he met both. ”

As shown in (60) and (61), *-hari* disjunctions and indefinites are also compatible with a continuation with “In fact, I know who/which one”. If one can continue the disjunction or indefinite with a clause similar to “In fact, I know who/which one”, it obviously is a situation where the speaker knows who John met.

- (60) John Giita-hari Maala-hari hambə-un-a. æththətəmə, mamə dannəwa kaawə-də
 John Giita-hari Maala-hari meet-past-A. in fact I know who-də
 kiyəla.
 COMP
 “John met Giita or Maala. In fact, I know who/which one. ”
- (61) John kaawə-hari hamu-un-a æththətəmə, mamə dannəwa kaawə-də kiyəla.
 John who-də meet-PAST-A in fact I know who-də COMP
 “ John met someone. In fact, I know who.”

On the other hand, the ignorance with respect to disjunctions or indefinites with the particle *-də* can never be canceled. As seen in (62), a *-də* disjunction never allows for a continuation with “In fact, both”. Thus, unlike for *-hari* disjunctions, it is seen that the ignorance inferences of a *-də* disjunction can not be canceled with a continuation similar to “In fact, both”.¹⁸

- (62) John Giita-də Maala-də hamu-un-a. #æththətəmə, eyya dennawəmə hamu-un-a
 John Giita-də Maala-də met-A. In fact he both met-A
 “John met Giita or Maala. In fact he met both. ”

As shown in (63) and (64), *-də* disjunctions and indefinites are also not compatible with a continuation with “In fact, I know who/which one”. If one can not continue a disjunction or an indefinite with a clause similar to “In fact, I know who/which one”, it is not compatible with a situation where the speaker knows who John met.

- (63) John Gita-də Mala-də hamuun-a. #æththətəmə, mamə dannəwa kaw-də kiyəla.
 John Gita-də Mala-də met-A, in fact I know who-də COMP
 “John met Gita or Mala. In fact, I know who/which one.”

¹⁸More details related to implicature calculation and cancelation will be discussed in Chapter 2.

- (64) John kaawə-də hamuun-a. #æththətəmə, mamə dannəwa kaw-də kiyəla.
 John who-də met-A in fact I know who-də COMP
 “John met someone. In fact, I know who.”

At the same time, *-hari* and *-də* indefinites differ with respect to their conditions for felicitous use in terms of the type of epistemic access available to the speaker.¹⁹ As shown in (65) and (66), *-hari* indefinites can be felicitous both in contexts in which the speaker has direct perceptual access to the witness of the existential claim of the indefinite and in contexts in which the speaker does not. On the other hand, *-də* indefinites are only felicitous in contexts in which the speaker has direct (clear) perceptual access or some kind of epistemic access (i.e. a conversational background) to the witness of the existential claim of the indefinite as illustrated in (66).

- (65) a. CONTEXT: Mary sees John kissing a girl far away (blurry vision), and she does not know who the girl is.
 b. balannə, John kaawə-hari/#-də kəll-ek imbinaw-a.
 see, John who-hari/-də girl-INDF kiss-A
 “See, John is kissing some girl.”
- (66) a. CONTEXT: Mary sees John kissing a girl close by (clear vision), but she does not know who the girl is.
 b. balannə, John kaawə-də/-hari kəll-ek imbinaw-a.
 see, John who-də/-hari girl-ek kiss-A
 “See, John is kissing some girl.”

Thus, the ignorance component of the two types of disjunctions and indefinites differs along two dimensions. On the one hand, they differ with respect to the type of ignorance evoked (and thus have different types of felicity conditions) and they also differ with respect to whether ignorance can be canceled (positive for *-hari* disjunctions and indefinites, negative for *-də* disjunctions and indefinites). I will discuss these facts in detail in Chapter 2. I will also account for the differences in the non/cancelable nature of the ignorance component associated with the disjunction and indefinite expressions formed with the two particles in Chapter 2.

At the same time, *-hari* and *-də* disjunctions and indefinites give rise to different scope and epistemic effects with respect to the universal quantifier. This is discussed next.

¹⁹Also see Aloni (2001); Aloni and Port (2015); Alonso-Ovalle and Shimoyama (2014); Alonso-Ovalle and Menéndez-Benito (2017) for more details with respect to felicity conditions associated with indefinites cross-linguistically. These accounts will be discussed with respect to *-hari* and *-də* indefinites in Chapter 2.

1.6.4 Scope and epistemic effects: interaction with quantifiers

It is observed that a *-hari* disjunction gives rise to a narrow scope reading with respect to the universal quantifier. In its narrow scope reading, a *-hari* disjunction is compatible with a reading with an ignorance inference and one without. As illustrated in (67), a *-hari* disjunction is used only in a context like that in 1 in (67) claiming that every student met at least one of Giita or Maala and the speaker may/may not know who met who.

- (67) hāmə goolə-ek-mə Giita-hari Maala-hari hamu-un-a.
every student-INDF-EMPH Giita-hari Maala-hari meet-past-A
“Every student met Giita or Maala.”
√READING 1: Every student met at least one of Giita or Maala.
SCOPE EFFECT : $\forall > \text{-hari/or}$.
EPISTEMIC IMPLICATURE: The speaker may/may not know who met who.
#READING 2: There is exactly one of Giita or Maala that Every student met.
SCOPE EFFECT: $\text{-hari/or} > \forall$.
EPISTEMIC IMPLICATURE: The speaker does not know who met who.

Similarly, a *-hari* indefinite also gives rise to a narrow scope reading of its associated alternatives with respect to the universal quantifier. It is also ambiguous between a reading with an ignorance inference and one without. For instance, as illustrated in (68), a *-hari* indefinite is used only in a context like that in Reading 1 claiming that every student met at least one person (in the context for the indefinite) and the speaker may/may not know who met who.

- (68) hāmə goolə-ek-mə kaawə-hari hambə-un-a.
every student-INDF-EMPH who-hari meet-past-A
“Every student met someone.”
√READING 1: Every student met at least one person.
SCOPE EFFECT : $\forall > \text{-hari}/\exists$.
EPISTEMIC IMPLICATURE: The speaker may/may not know who met who.
#READING 2: There is exactly one person that Every student met.
SCOPE EFFECT: $\text{-hari}/\exists > \forall$.
EPISTEMIC IMPLICATURE: The speaker does not know who met who.

On the other hand, a *-də* disjunction triggers an obligatory wide scope reading with respect to the universal quantifier. At the same time, it always gives rise to an ignorance effect as illustrated in (69). A *-də* disjunction with respect to the universal quantifier is compatible only with a reading like that in Reading 2 in (69). A reading like that in 1 in (69) is not allowed by a *-də* disjunction.

- (69) hāmə goolə-ek-mə Giita-də Maala-də hambə-un-a. mamə danne næ
 every student-INDF-EMPH Giita-də Maala-də meet-past-A I know not
 kaawə-də kiyəla.
 who COMP
 “Every student met Giita or Maala. I do not know who/which.”
 #READING 1: Every student met at least one of Giita or Maala.
 SCOPE EFFECT : $\forall > -də/or$.
 EPISTEMIC IMPLICATURE: The speaker may/may not know who met who.
 $\sqrt{\text{READING 2}}$: There is exactly one of Giita or Maala that Every student met.
 SCOPE EFFECT: $-də/or > \forall$.
 EPISTEMIC IMPLICATURE: The speaker does not know who met who.

Similarly, a *-də* indefinite also triggers an obligatory wide scope reading with respect to the universal quantifier. A reading like that in 1 in (70) is not allowed by a *-də* indefinite. At the same time, it always gives rise to an ignorance effect as illustrated in (70).

- (70) hāmə goolə-ek-mə kaawə-də hambə-un-a.
 every student-INDF-EMPH who-də meet-past-A
 “Every student met someone.”
 #READING 1: Every student met at least one person.
 SCOPE EFFECT : $\forall > -də/\exists$.
 EPISTEMIC IMPLICATURE: The speaker may/may not know who met who.
 $\sqrt{\text{READING 2}}$: There is exactly one person that Every student met.
 SCOPE EFFECT: $-də/\exists > \forall$.
 EPISTEMIC IMPLICATURE: The speaker does not know who met who.

Thus, the scope properties of the disjunctions and indefinites with the two particles: *-hari* and *-də* are crucially different. At the same time, we see here that different scope effects are related to differences in the ignorance effects of the disjunctions and indefinites with the two particles *-hari* and *-də*. These facts will be discussed in detail in Chapter 3. I will also account for these different scope effects and scope related ignorance effects in Chapter 3.

Disjunctions and indefinites with the two particles *-hari* and *-də* give rise to free-choice or no-choice readings with respect to a deontic possibility modal respectively. This is discussed next.

1.6.5 Free/no-choice effects: the two particles with modals

A *-hari* disjunction may give rise to a reading with an ignorance inference or one with free-choice effect with respect to a deontic possibility modal, as illustrated in (71).²⁰

- (71) John-tə dæn bath-hari paan-hari kannə puluwan.
John-DAT now rice-hari bread-hari eat can
“John can eat rice or bread now. ”

READING WITH IGNORANCE: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John could eat something (i.e. rice or bread) now. But, the speaker has forgotten or does not know whether John is allowed to eat rice or bread, or both.

READING WITH FREE-CHOICE : John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John could eat rice or bread now and he is permitted to eat any of rice or bread.

Similarly, as seen in (72), a *-hari* indefinite with its narrow scope effect can generate a reading with ignorance or one with free-choice with respect to a deontic possibility modal. This is illustrated in (72).

- (72) John-tə dæn monəwa-hari kannə puluwan.
John-DAT now what-hari eat can
“John can eat something now. ”

READING WITH IGNORANCE: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John could eat something now and he is permitted to eat at least one thing in the context. But, the speaker has forgotten or does not know what (i.e. whether he is allowed to eat rice or bread or both in a context where there is bread and rice).

READING WITH FREE-CHOICE: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John could eat something now and he is permitted to eat anything salient in the context.

Thus, it is seen that disjunctions and indefinites formed with the particle *-hari* can generate a narrow scope reading with an ignorance inference and one with free-choice

²⁰The same type of ignorance and free-choice effects are observed of a *-hari* disjunction/indefinite with respect to a deontic necessity modal. This will be presented and discussed in detail in Chapter 3.

with respect to a deontic possibility modal.

Contrary to that, a *-də* disjunction only generates a no-choice reading and obligatory ignorance inferences with respect to a deontic possibility modal as shown in (73).²¹

- (73) John-tə dæn bath-də paan-də kannə puluwan, mamə danne næ mokak-də
John-DAT now rice-də bread-də eat can I know not what-də
kiyəla.

COMP

“John can eat either rice or bread now, I don’t know which one.”

NO-CHOICE READING: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that there is one thing (either rice or bread) that John could eat. The speaker has either forgotten or does not know which one.

#FREE-CHOICE READING: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John could eat rice or bread now and he is permitted to eat any of rice or bread.

Similarly, a *-də* indefinite generates a no-choice reading with respect to a deontic possibility modal.

- (74) John-tə dæn monəwa-də kannə puluwan.

John-DAT now what-də eat can

“John can eat something now” (one thing unknown to the speaker)

NO-CHOICE READING: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned something that John could eat, he further said that John could eat only that and nothing else. The speaker has either forgotten or does not know what.

#FREE-CHOICE READING: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John could eat something now and he is permitted to eat anything in the context.

Thus, a *-hari* disjunction/indefinite with narrow scope effects generates a reading with an ignorance inference or free-choice effects with respect to a deontic possibility modal, while a *-də* disjunction/indefinite with its wide scope effects generates a no-choice read-

²¹The same type of no-choice reading and ignorance inferences are observed of a *-də* disjunction/indefinite with respect to a deontic necessity modal. This will be presented and discussed in detail in Chapter 3.

ing and obligatory ignorance inferences with respect to a deontic possibility modal.

I will discuss the implications associated with these facts in detail in Chapter 3 and will formally account for them in it.

As shown in the following section, *-hari* and *-də* disjunctions and indefinites under attitude verbs give rise to different types of *de re* and *de dicto* readings.

1.6.6 *de re/dicto* readings: the two particles with attitude verbs

More interesting facts are observed with *-hari* and *-də* indefinites with respect to attitude verbs such as *believe*, as explained below.

A complex indefinite with *-hari* embedded under an attitude verb like *believe* as in (75) is ambiguous between two readings: non-specific *de dicto* and non-specific *de re*.²²

- (75) Mary wiswaasə-kəṛənəwa John kaawə-hari gooləy-ek bənda kiyəla.
Mary believe John who-hari student-INDF married COMP
“Mary believes that John married some student.”
- a. #Specific *de re*: There is a particular person *x* (i.e. Sue) of whom Mary believes that John married *x*. She is a student in the actual world. Mary may or may not know this.
 - b. Non-specific *de dicto*: Mary believes that there is some student *x* and John married *x*.
 - c. Non-specific *de re*: Mary believes that John married either Sue or Jane. But she does not know which one. Sue and Jane are students in the actual world. Mary may or may not know this.

However, on the other hand, for a complex indefinite marked with *-də* in Sinhala, only the third reading is available as shown in (76).

- (76) Mary wiswaasə-kəṛənəwa John kaawə-də gooləy-ek bənda kiyəla.
Mary believe John who-də student-INDF married COMP
“Mary believes that John married some student.”
- a. #Specific *de re*: There is a particular person *x* (i.e. Sue) of whom Mary believes that John married *x*. She is a student in the actual world. Mary may or may not know this.

²²At least since Fodor (1970), it is believed that there is a third “non-specific *de re*” reading for indefinites under attitude verbs (cf. von Stechow and Heim (2011); Keshet (2010)). This will be discussed in Chapter 3.

- b. #Non-specific *de dicto*: Mary believes that there is some student x and John married x .
- c. $\sqrt{\text{Non-specific } de\ re}$: Mary believes that John married either Sue or Jane. But she does not know which one. Sue and Jane are students in the actual world. Mary may or may not know this.

In contrast to these, a plain indefinite with respect to an attitude verb, is ambiguous between three readings: specific *de re*, non-specific *de dicto* and non-specific *de re* as shown in the example in (77).

(77) Mary wiswaasə-kəɾənəwa John gooləy-ek bænda kiyəla.
 Mary believe John student-INDF married COMP
 “Mary believes that John married a student.”

- a. Specific *de re*: There is a particular person x (i.e. Sue) of whom Mary believes that John married x . She is a student in the actual world. Mary may or may not know this.
- b. Non-specific *de dicto*: Mary believes that there is some student x and John married x .
- c. Non-specific *de re*: Mary believes that John married either Sue or Jane. But she does not know which one. Sue and Jane are students in the actual world. Mary may or may not know this.

The facts above show that a plain indefinite embedded under an intensional operator can give rise to three readings: specific *de re*, non-specific *de dicto* and non-specific *de re*. But, only the non-specific *de re* and non-specific *de dicto* readings are available for a *-hari* indefinite in such a context and only the non-specific *de re* reading is available for a *-də* indefinite in such a context.

To sum up, *-də* disjunctions/indefinites can be regarded as taking widest scope over negation, quantifiers, modals and intensional operators.²³ The fact that the narrow scope interpretation of *-də* can never be recovered or rescued ever makes it different from other PPIs such as *soit – soit, ou* in French or *-hari* in Sinhala. On the other hand *-hari* disjunctions/indefinites may take narrow scope with respect to negation, quantifiers, modals and intensional operators.

Now, the challenge is to account for the empirical facts just observed in the sections

²³See section 2.4.5 for a discussion of how *-də* indefinites are different from indefinites such as *some* in English.

above. I mostly utilize the theoretical tools, frameworks and assumptions already available in the literature to formally account for these intriguing empirical phenomenon.

1.7 Theoretical background, tools and assumptions

This thesis proposes a compositional account to derive the semantics of *-hari* and *-da* disjunction and indefinite expressions on their own, and in the contexts of negation, the universal quantifier, modals, intensional operators and ignorance implicatures. I cast my proposal in a hybrid system of lexical (cf. Levinson (2000); Chierchia (2004)) and grammatical (cf. Fox (2007); Chierchia et al. (2012)) approaches borrowing good insights from both the approaches. I also use a hybrid framework of Hamblin semantics (cf. Hamblin (1973); Kratzer and Shimoyama (2002); Alonso-Ovalle (2006)) to keep domain alternatives separated and application of an alternative sensitive exhaustivity (*Exh*) operator (cf. the grammatical approach) to derive implicatures. In order to maintain uniformity across chapters, in the following, I present detailed accounts of the crucial theories, frameworks, tools and assumptions on which I am going to build my analysis and with which I am going to cast my proposals. In the chapters to follow, wherever relevant, I will only refer to those theories, frameworks and tools that are explained in detail here.

1.7.1 Indefinites in Hamblin semantics

Building on Kratzer and Shimoyama (2002), I also cast my analysis of indefinites in the framework of Hamblin semantics. Kratzer and Shimoyama (2002) base their analysis on Hamblin type semantics applied to Japanese indeterminate and German *irgendein* phrases. They argue that, like focus Rooth (1985), indefinites too introduce sets of alternatives. According to Kratzer and Shimoyama (2002), all expressions denote sets of traditional denotations as alternatives. Most lexical items such as verbs denote singleton sets. They argue that indeterminate pronouns denote sets of individuals as individual alternatives, rather than as properties.

According to Kratzer and Shimoyama (2002), sets of alternatives introduced by indefinites keep propagating or expanding by way of Hamblin functional application which is given in (78) as defined in Kratzer and Shimoyama (2002).

- (78) Hamblin Functional Application: If α is a branching node with daughter β and γ and $[[\beta]]^{w,g} \subseteq D_\sigma$ and $[[\gamma]]^{w,g} \subseteq D_{\langle \sigma, \tau \rangle}$, then $[[\alpha]]^{w,g} = \{ a \in D_\tau : \exists b \exists c [b \in [[\beta]]^{w,g} \ \& \ c \in [[\gamma]]^{w,g} \ \& \ a = c(b)] \}$

Kratzer and Shimoyama (2002) illustrates how the interpretation of a simple indefinite

sentence works in a Hamblin semantics, with the Japanese example **Dare(- ga) nemutta** as shown in (79).

- (79) For all possible worlds w and the variable assignment g , we have
- $$[[\mathbf{dare}]]^{w,g} = \{x:\text{human}(x)(w)\}$$
- $$[[\mathbf{nemutta}]]^{w,g} = \{\lambda x.\lambda w. \text{slept}(x)(w)\}$$
- $$[[\mathbf{Dare(- ga) nemutta}]]^{w,g} = \{p : \exists [\text{human}(x)(w) \text{ and } p = \lambda w. \text{slept}(x)(w)]\}$$

According to Kratzer and Shimoyama (2002), $[[\mathbf{dare}]]$ denotes the set of all humans in w . $[[\mathbf{nemutta}]]$ denotes the singleton set introducing just one alternative, the property of sleeping. To compute $[[\mathbf{Dare(- ga) nemutta}]]$ functional application is applied point-wise, and the denotation of **Dare(- ga) nemutta** is as in (80).²⁴

- (80) $[[\mathbf{Dare(- ga) nemutta}]]^{w,g} = \{a \text{ slept, } b \text{ slept, } c \text{ slept, etc } \}$

According to Kratzer and Shimoyama (2002), the alternatives will expand until they meet a relevant operator that operates on the set of alternatives to derive a particular type of quantificational (existential/universal), interrogative, modal, or some other force. They show that the propositional operators such as $[\exists]$, $[\forall]$, $[\text{Neg}]$, $[Q]$ operate over propositional alternatives. The denotations of these operators are explained in (81) and (82).

Propositional Quantifiers

- (81) Where A is a set of propositions, we have:
- $$[\exists](A) = \{ \text{the proposition that is true in all worlds in which some proposition in } A \text{ is true} \}$$
- $$[\forall](A) = \{ \text{the proposition that is true in all worlds in which every proposition in } A \text{ is true} \}$$
- $$[\text{Neg}](A) = \{ \text{the proposition that is true in all worlds in which no proposition in } A \text{ is true} \}$$
- $$[Q](A) = A$$

More technically,

- (82) For All $[[\alpha]]^{w,g} \subseteq D_{\langle st \rangle}$
- (i) $[[\exists\alpha]]^{w,g} = \{\lambda w'. \exists p [p \in [[\alpha]]^{w,g} \ \& \ p(w')=1]\}$
 - (ii) $[[\forall\alpha]]^{w,g} = \{\lambda w'. \forall p [p \in [[\alpha]]^{w,g} \rightarrow p(w')=1]\}$
 - (iii) $[[\text{Neg}\alpha]]^{w,g} = \{\lambda w'. \neg\exists p [p \in [[\alpha]]^{w,g} \ \& \ p(w')=1]\}$
 - (iv) $[[Q\alpha]]^{w,g} = [[\alpha]]^{w,g}$

Thus, building on Kratzer and Shimoyama (2002), for the derivations involving indefinites, I assume that both *-hari* and *-də* indefinites introduce contextually relevant alterna-

²⁴This is illustrated in detail in relation to Sinhala *-hari* and *-də* disjunctions in chapter 2.

tives that expand upto be propositions. The existential operator is assumed to scope over the propositional alternatives, thus closing the alternatives.

In the next section, I discuss the theoretical background to the derivations in disjunctions.

1.7.2 Disjunction in Hamblin semantics

Building on Alonso-Ovalle (2006), I cast the derivations of disjunctions in the framework of Hamblin semantics. Following Partee and Rooth (1983) and Simons (2005), Alonso-Ovalle (2006) assumes that English *or* does not have any quantificational force and it just collects the denotations of the alternatives in a set. He proposes the semantics in (83) for the meaning of English *or*.

$$(83) \quad \text{Where } [[A]], [[B]] \subseteq D_\tau, \quad \left\| \begin{array}{c} \text{orP} \\ \swarrow \quad \downarrow \quad \searrow \\ A \quad \text{or} \quad B \end{array} \right\| \subseteq D_\tau = [[A]] \cup [[B]]^{25}$$

Based on (83), if we consider the two disjuncts as in (84-a), we will have the derivation in (84-b).

- (84) a. tea or coffee
 b. [DP [DP₁ tea] or [DP₂ coffee]]

As per Alonso-Ovalle (2006), the alternatives introduced by *or* can expand into propositional alternatives by point-wise (Hamblin) function application. So, the meaning of the English disjunction expression in (85) is proposed to be derived in a compositional manner in terms of point-wise function argument application.

- (85) John drank tea or coffee.

The idea here is that the individual alternatives *tea* and *coffee* introduced at DP level, will be combined with the denotation of V by point-wise functional application, and will propagate up to the propositional level by combining with the denotation of the subject DP. At propositional level we will have two alternatives.²⁶

- (86) { λw . John drank tea in w , λw . John drank coffee in w }

²⁵Expressions of type τ are mapped into sets of objects in D_τ .

²⁶How this is derived compositionally is illustrated in detail in relation to Sinhala *-hari* and *-də* disjunctions in chapter 2.

Following Kratzer and Shimoyama (2002), he assumes that the set of propositional alternatives introduced by *or* is existentially closed at S level. The denotation of the existential operator as given in Kratzer and Shimoyama (2002) is repeated here in (87). This amounts to the proposition that is true in all worlds in which some proposition in the set of alternatives (propositions) is true.

$$(87) \quad \text{For All } [[\alpha]]^{w,g} \subseteq D_{\langle st \rangle} \\ (i) \quad [[\exists \alpha]]^{w,g} = \{\lambda w'. \exists p [p \in [[\alpha]]^{w,g} \ \& \ p(w')=1]\}$$

Thus, as per Alonso-Ovalle (2006), in (88), we have the two alternatives scoping under the existential operator as the meaning of the disjunction expression in (85).

$$(88) \quad \exists [\lambda w. \text{ John drank tea in } w, \lambda w. \text{ John drank coffee in } w]$$

Building on Alonso-Ovalle (2006), for the derivations involving disjunction, I assume that both *-hari* and *-də* like English *or* collect the denotations of the alternatives in a set that can expand upto be propositions. The propositions are assumed to be caught by the existential closure at the matrix level.

One crucial reason for adopting Hamblin semantics for the derivations in Sinhala *-hari* and *-də* disjunctions is to assume and maintain that the alternatives of a disjunctive phrase include each of the disjuncts separately that can expand up to be propositions on their own. The consequence of this assumption is that, as we will see in the sections that follow, it serves well in the case of exhaustification of alternatives.

However, as it will be seen in Chapter 2, following Alonso-Ovalle (2006) and Kratzer and Shimoyama (2002), I also show that Sinhala *-hari* and *-də* disjunctions also carry morpho-syntactic/semantic requirements (as we also saw in Section 1.6.1). These have to be represented in the syntactic structures and semantic derivations. Following Kratzer and Shimoyama (2002), Kratzer (2005) and Szabolcsi (2015), these requirements are represented in terms of un-interpretable features to agree with the interpretable features of a matching operator in the syntactic structures of a disjunction or indefinite sentence. This will be discussed in detail in Section 1.7.5. These semantic requirements are accounted for based on the lexical requirements/properties of the two particles and the grammatical approach to implicature calculations following Kratzer and Shimoyama (2002), Chierchia (2006), Fox (2007), Chierchia et al. (2012), among many others. This is discussed in detail next.

1.7.3 Approaches to implicature calculation

Derivation of implicatures has been of much interest and debate with respect to the interface between semantics and pragmatics in linguistics for a long time. For example, the following expressions with the disjunction *or* and determiner *some* are standardly considered to give rise to scalar and ignorance implicatures as shown in (89) and (90).

(89) John met Paula or Suzanne.

SCALAR IMPLICATURE: John did not meet both Paula and Suzanne.

IGNORANCE IMPLICATURE: The speaker is not sure that John met Paula and the speaker is not sure that John met Suzanne.

(90) John met some students.

SCALAR IMPLICATURE: John did not meet all the students.

IGNORANCE IMPLICATURE (IF AVAILABLE): The speaker does not know who.

Following seminal work on implicatures (Horn, 1972; Gazdar, 1979; Grice, 1975, 1989), the way such implicatures are derived has been extensively discussed and argued. It has received much attention and interest recently (Kratzer and Shimoyama (2002), Spector (2003), Schulz and Van Rooij (2006), Van Rooij and Schulz (2004), Sauerland (2004), Chierchia (2006), Fox (2007), Chierchia et. al (2012), Alonso-Ovalle and Menéndez-Benito (2010), Alonso-Ovalle and Menéndez-Benito (2017), among many others). Depending on the way such implicatures are calculated, there are at least three approaches to derivation of implicatures: pragmatic; lexical and grammatical theories.

In calculating implicatures, what is called the Horn sets or Horn scales (Horn, 1972) are found to play a crucial role. Horn proposed that the alternatives for scalar items such as *or* or *some* are specified in the lexicon as shown in (91).

- (91)
- a. {or, and}
 - b. {some, all}
 - c. {one, two, three,...}
 - d. {can, must}
 - e. {not all, few, none}, etc.

These sets provide an algorithm to determine the alternatives for a sentence. The idea is that these items are represented as ordered with respect to each other. The items on the right are logically stronger than the items on the left. Items in these sets are referred to in all three approaches mentioned above.

In the following sections, I briefly introduce each approach to implicature calculation.

1.7.3.1 The pragmatic approach

The pragmatic approach is basically built on post grammatical pragmatic reasoning based on Gricean conversational implicatures (Grice, 1975, 1989). The pragmatic approach assumes that a hearer considers reasons or explanations about the intentions of a speaker for a choice of a certain utterance by a speaker. There are mainly four Gricean principles which are called maxims: maxim of quantity; maxim of quality; maxim of relevance and maxim of manner that are taken into account in Gricean reasoning.

- (92)
- a. Quantity
Make your contribution to the conversation as informative as is required.
Do not make your contribution more informative than required.
 - b. Quality
Do not say what you believe to be false.
Do not say what you don't have adequate evidence for.
 - c. Relation
Be relevant.
 - d. Manner
Avoid obscurity and ambiguity.
Be brief and orderly. (cf. Chierchia et al. (2012))

For example, the pragmatic reasoning to derive the scalar implicature of (93) will be as in (94) as explained in Chierchia et al. (2012). Chierchia et al. (2012) explains that, according to pragmatic reasoning, upon hearing something like (94-a), a hearer considers the alternative in (94-b) and subconsciously goes through the reasoning steps in (94-c).

- (93) Joe or Bill will show up
- (94)
- a. Joe or Bill will show up.
 - b. Joe and Bill will show up
 - c.
 - i. The speaker said (94-a) and not (94-b), which, presumably, would have been also relevant [relevance]
 - ii. (94-b) entails (94-a), hence is more informative
 - iii. If the speaker believed that (94-b), she would have said so [quantity]
 - iv. It is not the case that the speaker believes that (94-b) holds
 - v. It is likely that the speaker has an opinion as to whether (94-b) holds.
 - Therefore: vi. It is likely that the speaker takes (94-b) to be false. (cf. Chierchia et al. (2012))

Thus, a hearer would reason out that the speaker is trying to convey that Joe and Bill will not both come.

Let us look at another example. The pragmatic reasoning to derive the ignorance implicatures of (95) will be as follows.

(95) John met Paula or Suzanne.

The uncertainty implicatures for (95) would be to reason out on the part of the hearer as to why the speaker did not commit to a singleton proposition (i.e. John met Paula) in the set of alternative propositions meant for the disjunction. The hearer would thus reason out that the speaker did not select a singleton proposition since the speaker was not sure that John met Paula and the speaker is not sure that John met Suzanne. Thus, a pragmatic approach would derive the ignorance implicature as a quantity implicature that arises as a result of a competition between a disjunction domain and stronger singleton domain that a hearer makes references to in his/her reasoning (cf. Alonso-Ovalle and Menéndez-Benito (2017)).

Some of the proponents of the pragmatic approach are Horn (1989), Kratzer and Shimoyama (2002), Spector (2003), Schulz and Van Rooij (2006), Van Rooij and Schulz (2004), Sauerland (2004), among many others. Accounts that have recently utilized the pragmatic mechanisms in their proposals include Alonso-Ovalle and Menéndez-Benito (2010) and Alonso-Ovalle and Menéndez-Benito (2017).

The important aspect of the pragmatic approach is that implicatures are derived at global or post compositional level. In other words, they are applicable only to speech acts. As we will see in the next section, this encounters an issue with respect to embedded implicatures. The issue is how implicatures in embedded contexts can be derived by pragmatic reasoning.

1.7.3.2 The lexical approach

Levinson (2000) and Chierchia (2004) pioneered the lexical approach to implicature calculation noting that implicatures are not always global. For example, they argue that the exclusivity component of *or* should be analyzed as intrinsic to *or* for it to be compatible with a continuation like in (96).

(96) Mary solved the first problem or the second problem or Mary solved both problems.

The idea here is that for a speaker to continue as in (96), the disjunction *or* has to be marked with an exclusivity inference.

Thus, in the lexical approach, scalar implicatures of lexical items such as *or* or *some* are assumed to be stored in the lexicon and retrieved when such a lexical item is used. In other words, lexical items such as *or* or *some* carry the scalar implicatures as part of their lexical meaning. For example, in this approach, *or* means: *or* and *not and*, and *some* means: *some* and *not all*. Thus, according to the lexical approach (95) should be read as in (97).

(97) John met Paula or Suzanne and not both.

This way, the lexical approach predicts that the implicatures are part of meanings of lexical items and thus local, not global.

However, one challenge for the lexical theory is that implicatures are not always local. Sauerland (2012) notes that in an example like in (98) (as also explained in detail in the next section), the indirect implicature *Mika likes some of Beethovens symphonies*, that is triggered when *all* is embedded under negation is not predicted under the lexical theory. Thus, the lexical theory is also not without problems.

- (98) a. Mika doesn't like all of Beethoven's symphonies.
b. Mika likes some of Beethoven's symphonies.

However, my account borrows certain insights from the lexical account. I argue that the two particles *-hari* and *-də* carry some lexical features (i.e. un-interpretable exhaustivity features) to be matched with those of a relevant operator (i.e. an exhaustivity operator) placed in a higher up position in the syntactic structure. Thus, it is a hybrid account with insights borrowed from both the lexical and grammatical approaches that I propose here. The background on the grammatical approach to derivation of implicatures is discussed next.

1.7.3.3 The grammatical approach

In the recent past, deriving implicatures based on the grammatical approach has been quite influential (cf. Gajewski and Sharvit (2012); Meyer (2013); Nicolae (2017); among many others). The grammatical approach to implicature calculation (Chierchia (2006); Fox (2007); Chierchia et al. (2012); among many others) proposes that scalar implicatures (and such similar implicatures) are generated in the grammar by way of syntactic or

semantic mechanisms, not by means of pragmatic mechanisms as conversational implicatures. One of the main reasons for the grammatical approach to implicature calculation is the observation/fact that implicatures are not always global. The proponents of the grammatical approach note that some implicatures are local as embedded implicatures and a pragmatic/global approach can not account for such implicatures. For instance, Chierchia et al. (2012) note that for the scalar item *most* in (99), there is an implicature *not all* as seen in (99). This implicature is computed at the level of the antecedent embedded under the conditional, and thus can not be predicted to occur globally.

- (99) If most of the students do well, I am happy; if all of them do well, I am even happier.

They also note that unlike what is predicted by the lexicalist approach, implicatures are not always local and that there are some implicatures generated at the global level. For example, as Sauerland (2012) points out, the expression in (100-a) generates an indirect implicature as shown in (100-b).

- (100) a. Mika doesn't like all of Beethoven's symphonies.
b. Mika likes some of Beethoven's symphonies.

As Sauerland (2012) notes, these types of indirect implicatures are not predicted by a lexical theory, but only by a pragmatic approach. He explains that *all* is the most informative item of the scale relevant to *some* and it does not trigger implicatures.

Following these observations, in accounts such as Chierchia (2006), Fox (2007), and Chierchia et al. (2012), a grammatical way of deriving implicatures is proposed. The idea of the grammatical view to derivation of implicatures is that the computation of implicatures is done via a silent grammatical operator, which is called the *exhaustivity operator*, abbreviated as *Exh* or *O*. The meaning of this exhaustivity operator is similar to the meaning of *only* in some ways. This operator placed in a syntactic structure is supposed to serve to generate implicatures at both local and global levels. In this approach, when *Exh* is applied at the sentence level, as in Chierchia et al. (2012), it can be explained in the following manner. The disjunction sentence in (101-a) with the speaker's intention to convey (101-c) is represented as (101-b) with the insertion of the operator *O*:

- (101) a. John or Bill will show up.
b. O_{Exh} (John or Bill will show up.)
c. John or Bill will show up, but not both.

Generally, an *Exh* operator takes two arguments, a proposition φ and a set of alternative propositions ($ALT(\varphi)$) and returns a proposition that entails φ , which leads to a strengthened meaning of φ (the conjunction of φ and its quantity implicatures). It amounts to the meaning that φ is true and any alternative proposition Ψ not entailed by φ is false, as long as negating any Ψ is consistent with negating any other non-weaker alternatives (cf. Spector (2016)).

Since, Groenendijk and Stokhof (1984), the notion of exhaustivity has been applied in many domains of linguistic inquiry such as pragmatic reasoning, questions and answers, free relatives, correlatives, degree relatives, comparatives, scalar implicatures, free-choice implicatures, etc. (Zeevat, 1994; Spector, 2003; Schulz and Van Rooij, 2006; Aloni, 2007; Kratzer and Shimoyama, 2002; Chierchia, 2004; Alonso-Ovalle, 2006). Recently, the notion of exhaustivity (or exhaustivity operator) has been widely applied in the domains of disjunction and indefinites to derive scalar implicatures, ignorance inferences and FC effects of disjunctions or indefinites in contexts involving overt/covert modals/quantifiers (cf: Chierchia (2006); Fox (2007); Chierchia et al. (2012); Meyer (2013); Nicolae (2017)).

The exhaustivity operator has been defined in several ways in the literature (cf. Groenendijk and Stokhof (1984), Krifka (1993), Chierchia (2006), Alonso-Ovalle (2006), Fox (2007), among many others). Fox (2007) has been very influential in the recent literature (cf. Meyer (2013), Nicolae (2016), Nicolae (2017)). Alonso-Ovalle (2006) and Fox (2007) argue that there are certain constraints on the exhaustification of a set of alternatives. They considered it crucial to incorporate the notion of *innocent exclusion* in exhaustification. I will illustrate this as in the following with examples.

Consider the sentence in (102-a). The alternatives for the sentence in (102-a) can be preliminarily identified as the ones given in (102-b).

- (102) a. Sue talked to John or Fred.
b. $ALT(\text{Sue talked to John or Fred}) = \{ \text{Sue talked to John, Sue talked to Fred, Sue talked to John and Fred} \}.$

All the alternatives in (102-b) asymmetrically entail the disjunction in (102-a). As a result, if an *Exh* (without innocent exclusion) as in (103) applies to the sentence in (102-a), it generates the inconsistent propositions as illustrated in (104).

$$(103) \quad \text{Exh}(A_{\langle st, t \rangle})(p_{st})(w) \Leftrightarrow p(w) \wedge \forall q \in A (q \neq p \rightarrow \neg q)$$

Exh combines with a set of propositions *A* that are alternatives to the proposition *p*, with *p* and a possible world *w* and the result will be true iff *p* is true in *w* and all the alternatives in *A* that are different from *p* are false.

- (104) a. *Exh* [Sue talked to John or Fred]=
 b. Sue talked to John or Fred & Sue did not talk to John & Sue did not talk to Fred & Sue did not talk to John and Fred.

It would also not help to focus on just one disjunct. Adding negation to one individual disjunct and adding it to the assertion entails the truth of the other disjunct, as illustrated in (105). In other worlds, the strengthened implicature together with the assertion as in (105) entails that the speaker knows that Sue talked to Fred, which is incorrect.

- (105) a. *Exh* [Sue talked to John or Fred]=
 b. Sue talked to John or Fred & Sue did not talk to John $\Rightarrow$ Sue talked to Fred.

In order to handle this, the notion of innocent exclusion (IE) was incorporated into the definition of *Exh* in Fox (2007). The denotation of *Exh* as per Fox (2007) is as in (106).

$$(106) \quad [[\text{Exh}]] (A_{\langle st, t \rangle}) (p_{st}) (w) \Leftrightarrow p(w) \wedge \forall q \in \text{IE}(p, A) \rightarrow \neg q(w)$$

It amounts to the meaning that the proposition expressed by the sentence under its scope is true and all its innocently excludable competitors (alternatives) are false. Rather than claiming that a proposition *p* is true as opposed to all other alternatives, Fox (2007) proposes to identify the propositions that can be safely excluded which are referred to as “innocently excludable” propositions. As in Fox (2007), the definition of the set of innocently excludable competitors to a certain proposition *p* in a set of propositions *A* is represented in (107).

$$(107) \quad \text{IE}(p, A) = \cap \{A' \subseteq A: A' \text{ is a maximal set } A' \text{ s.t. } A'^{\neg} \cup \{p\} \text{ is consistent} \}$$

$$A^{\neg} = \{\neg p: p \in A\}$$

Given a proposition *p* and a set of alternatives *A*, innocent exclusion *IE* (*p*, *A*) excludes any maximal set of propositions in *A* such that its exclusion is consistent with the prejacent. Now, *Exh* with *IE* applied to a disjunction sentence as in (102-a) excludes only the maximal set {Sue talked to John and Fred}, which is consistent with the prejacent and whose exclusion does not force the inclusion of another alternative, as illustrated in (108).

- (108) a. *Exh* [Sue talked to John or Fred]=
 b. *ALT*(Sue talked to John or Fred) = { Sue talked to John, Sue talked to Fred, Sue talked to John and Fred }.
 c. *IE* = {Sue talked to John and Fred}
 d. Sue talked to John or Fred & Sue did not talk to John and Fred.

Nicolae (2017) offers a slightly different and more transparent formulation of the exhaustivity operator in Fox (2007) that takes innocent exclusion into account as in (109).

- (109) $\text{Exh}(p) = p \wedge \forall q \in \text{IE}(p, \text{Alt}(p)): \neg q$
 where: $\text{IE}(p, \text{Alt}(p)) = \lambda q \in \text{Alt}(p). \neg \exists r \in \text{Alt}(p): (p \wedge \neg q) \longrightarrow r$.

(109) amounts to the meaning that *p* is true and any alternative *q* not entailed by *p* is false, as long as negating *q* is consistent with negating any other non-weaker alternatives (cf. Nicolae (2016; 2017)).

In my semantic derivations wherever an exhaustivity operator is involved, I assume an operator that takes “innocent exclusion” into account, and will often refer to Nicolae’s more transparent formulation.

How do *-hari* and *-də* associate with exhaustivity?²⁷ This is the topic in the next section.

1.7.4 Positive polarity items and obligatory exhaustivity

In showing the relationship between the particles *-hari* and *-də* and exhaustivity, I draw crucial insights from Spector (2014) who claims that positive polarity items have a strong association with exhaustivity. As discussed earlier in Section 1.2.2, Spector (2014) argues that both *ou* and *soit – soit* in French are PPIs based on the evidence that both *ou* and *soit – soit* are not licensed under the scope of negation.

- (110) Marie n’a pas invité Léa ou Jean à dîner.
 “Marie did not invite Lea or Jean for dinner.” [Understood as John did not invite Lea for dinner or John did not invite Jean for dinner] (Spector (2014))

Spector claims that *ou* is a local PPI while *soit – soit* is a global PPI. He calls *ou* a local or very mild PPI as it can be interpreted in the scope of extra clausal negation as shown in (111).

²⁷Note that for Fox (2007); Chierchia et al. (2012); Nicolae (2017), *Exh* is freely insertable.

- (111) Je ne pense pas que Marie ait invit^ée Pierre ou Julie à diner.
 “I don’t think that Marie invited Pierre or Julie for dinner.” [Understood as John did not invite any of Lea or Jean for dinner] (Spector (2014))

Moreover, Spector claims that *soit-soit* tends to give rise to more robust exclusivity inferences or more complex exhaustivity effects than those of *ou* as illustrated in the following examples.

- (112) A: Marie ira au cinéma lundi ou mardi.
 “Marie will go to the movies on Monday or Tuesday.”
 B: Absolument ! Et elle ira même à la fois lundi ET mardi.
 “Absolutely! She will even go both days.”
- (113) A: Marie ira au cinéma soit lundi soit mardi.
 “Marie will go to the movies SOIT on Monday SOIT on Tuesday.”
 B: #Absolument! Et elle ira même à la fois lundi ET mardi.
 “Absolutely! She will even go on both days.” (Spector (2014))

He notes that the exclusivity inference for *ou* disjunction is optional based on the the compatibility of the continuation with the clause “Absolutely! She will even go both days ” as seen in (112). However, as seen in (113), he notes that the exclusivity inference of *soit-soit* is obligatory. This is based on its incompatibility with a continuation like “Absolutely! She will even go both days.”.

Based on this evidence, Spector claims that *soit-soit* disjunctions obligatorily trigger scalar inferences while scalar inferences are generally optional for *ou* disjunctions.

Building on this evidence of obligatory scalar inferences, Spector (2014) argues that the distribution of complex PPIs such as *soit-soit* is related to the distribution requirement of an exhaustivity operator. He claims that the presence of an obligatory exhaustivity operator in the logical form of a sentence with *soit-soit* is responsible for exclusivity or exhaustivity inferences generated by PPIs such as *soit-soit*.

Accordingly, he assumes that *soit-soit* is licensed only under the scope of an exhaustivity operator, which he presents as a condition as in (114).

- (114) *soit-soit* must occur in the scope of an exhaustivity operator. (Spector 2014, p. 17)

He makes the generalization that in a plain, unembedded context, the exhaustivity operator is responsible for the obligatory exclusivity inferences generated by *soit-soit*.

He also accounts for the unavailability of embedded exhaustivity in DE-environments with a constraint regulating the distribution of the exhaustivity operator (as an economy constraint) as given in (115).

- (115) An occurrence of *exh* in a given sentence *S* is not licensed if eliminating this occurrence leads to a sentence *S'* such that *S'* entails *S*.

He claims that this constraint will prevent an exhaustivity operator from occurring in a DE environment because if it occurs in a DE context, that would lead to a globally weaker meaning than the regular meaning of a sentence. Thus, this economy condition allows exhaustification to be licensed only if it leads to a strengthened meaning. This means that if *soit-soit* occurs in a globally DE environment, it can not be in the scope of the exhaustivity operator without violating the constraint in (115). Now, in upward entailing (UE) environments, disjunction is weaker than conjunction. In UE environments exhaustivity leads to strengthening. Then, *soit-soit* is licensed only in UE environments. Following Spector (2014), Nicolae (2017) illustrates this with the examples in (116) and (117). Nicolae notes that exhaustification leads to strengthening in (116) while exhaustification is vacuous (is not licensed) in (117). The alternatives for (116) are as in (116-a). Given the notion of innocent exclusion, the individual alternatives are not negated and disjunction is weaker than conjunction. Thus, exhaustivity leads to strengthening as shown in (116-b). On the other hand, the alternatives for (117) are as in (117-a). Thus, the alternatives are entailed by the assertion, and the exhaustification is vacuous, as shown in (117-b).

- (116) $\text{Exh}[p \vee q]$
 a. $\text{Alt}(p \vee q) = \{p, q, p \wedge q\}$
 b. $\text{Exh}[p \vee q] = (p \vee q) \wedge \neg(p \wedge q)$
- (117) $\text{Exh}[\neg(p \vee q)]$
 a. $\text{Alt}(\neg[p \vee q]) = \{\neg p, \neg q, \neg[p \wedge q]\}$
 b. $\text{Exh}(\neg[p \vee q]) = \neg(p \vee q)$

Now, we observed in Section in 1.6.2 that both the particles *-hari* and *-də* are PPIs in Sinhala. Following Spector (2014), I argue that both the particles *-hari* and *-də* associate with an obligatory implicit exhaustivity operator, which I present as *Exh*. So, for the alternatives introduced by *-hari* and *-də* disjunctions or indefinites, I argue that the exhaustification is factored into the grammatical structure by way of this *Exh* operator.

The debate as to whether the phenomena such as free-choice or ignorance implicatures are derived in the pragmatics or in the syntax/semantics (grammar) is still alive. My account here is not to argue for or argue against any of those approaches, but to present a detailed account of the facts in Sinhala. A comparison with other views of implicatures remains for future work.

The issue is how we can account for the relationship between the particles *-hari* and *-də* as PPIs and the *Exh* operator. This is discussed next.

1.7.5 Particle-operator concord

As one of Sauerland's arguments against the grammatical approach to implicature calculation with a silent *Exh* operator, Sauerland (2012) notes that if overt lexical items are present, they do not generally predict silent ones to exist. He argues that the negation in English is an overt lexical item, but there is no silent negation in English. He also proposes to approach grammatical theory with skepticism by pointing out that *Exh* can not be a silent version of *only*. He notes that *only* licenses negative polarity items most of the time, while *Exh* never licenses negative polarity items. However, building on much of the accounts discussed below, I argue for an agreement relation account between lexical items and grammatical operators such as *Exh* operator. This forces to cast my proposal in a hybrid framework of lexical and grammatical approaches. This is discussed in the following.

Kratzer and Shimoyama (2002) argue for a syntactic agreement/feature movement relation between the operators such as $[\exists]$, $[\forall]$, $[\text{Neg}]$, $[\text{Q}]$, etc, and different types of indefinites with such interpretable or uninterpretable features. They argue that if the features do not match or a DP is found within the scope of an incompatible operator, the sentence would result in ungrammaticality. Kratzer (2005) essentially argues that indefinites carry an uninterpretable existential feature that has to agree with an existential operator carrying an interpretable existential feature. For instance, Kratzer (2005) argues that German *irgendein* indefinites are lexically specified as existentials, but they have no quantificational force of their own. Kratzer claims that *irgendein* indefinites need to agree with a matching $\exists$ operator as shown in (119) (for an example as in (118)).

- (118) Mary muss irgendeinen Arzt heiraten.
 Mary has to irgend-a doctor marry
 "Mary has to marry a doctor, any doctor is a permitted option."

- (119) (Muss + $\exists$ (Mary irgendeinen Arzt heiraten))

Kratzer (2005) particularly talks about the existential, interrogative and negative concord in German. This is also in line with much of the modern theoretical analysis of functional morphemes such as Chinese *dou*, Japanese *ka* and *mo*, English *each* and *every*, Hungarian *minden* and *mai*, which claims that these particles or morphemes themselves are not existential or question or distributive operators themselves, but they may carry such features to associate with a sentence level relevant operator (cf. Ladusaw (1992); Beghelli and Stowell (1997); Kusumoto (2005); Kratzer (2005); Szabolcsi et al. (2014); Szabolcsi (2015); among many others). This line of analysis can be traced back to Ladusaw (1992) who argued that the pre/post verbal negative particles in English and other languages are just negative concord particles and they have to agree with a real negative operator which is phonetically null and placed higher up in the structure. Beghelli and Stowell (1997) claims that ‘each’ and ‘every’ in English are not distributive operators themselves but just morphemes that enter into agreement relations with a distributive operator higher up in the structure. Kusumoto (2005) claims that a tense morpheme on a verb only indicates a time variable that has to enter into a quantificational operation/agreement with a tense operator higher up in the structure. Szabolcsi (2015) has recently argued that the particles of the Japanese MO and KA kind, which also include Sinhala particles *-hari* and *-də*, are not disjunction or quantifier operators themselves “They do not perform meet/join themselves” (Szabolcsi 2015, p.1). She claims that their function is to impose semantic requirements to be satisfied by a ‘host’s semantic contribution’ with ‘something else’. She argues that these particles may be analyzed in terms of type-shifters as well as meaning-changing silent operators similar to existential closure, tense operators, etc. This way, building on recent proposals by Szabolcsi et al. (2014), and Szabolcsi (2015) on the structural properties of particles identical to *-hari* and *-də*, I argue that these particles are not exhaustivity, existential or question operators themselves. They carry some semantic requirements/constraints represented by uninterpretable features that have to agree with an operator (carrying the counterpart matching interpretable features) such as the existential quantifier $\exists$, the question operator (Q), a focus/alternative sensitive operator (Exh), etc placed at the matrix level in a syntactic structure.

In line with this body of work, I argue that exhaustification is partially determined by the semantics of the particles *-hari* and *-də* carrying an uninterpretable exhaustivity [*unExh*] feature. Thus, obligatory exhaustivity is treated as a morphological requirement/lexical property of the particles *-hari* and *-də* represented by an uninterpretable exhaustivity [*unExh*] feature. Then, this lexical property is factored into the grammar by way of the *Exh* operator carrying an equivalent interpretable exhaustivity [*inExh*] feature placed in the syntactic structure of a *-hari* or *-də* disjunction/indefinite construction at LF. Thus,

I cast my proposal in a hybrid system of lexical (cf. Levinson (2000); Chierchia (2004)) and grammatical (cf. Fox (2007); Chierchia et al. (2012)) approaches as discussed in Section 1.7.3. I argue for a syntactic agreement/feature checking relation between the particles *-hari* and *-də* carrying an uninterpretable exhaustivity [*unExh*] feature and *Exh* operator carrying an interpretable exhaustivity [*inExh*] feature in generation of implicatures. As also discussed in detail in Section 2.5.2, I argue that the particle *-də* enters into a local agreement relation with the *Exh* operator to generate its strong exclusivity implicatures (i.e. that the [*unExh*] feature of *-də* must be checked in the local domain (within the CP that contains it)). On the other hand, even though the particle *-hari* establishes an agreement relation with the *Exh* operator, it is not marked for a non-/local (i.e. [$\pm$ locality]) condition of the agreement relation. In other words, the agreement relation of the particle *-də* is marked for a domain conditions on feature checking, represented by a [$\pm$ locality] constraint on the exhaustification of scalar alternative/s associated with it, while that of the particle *-hari* is unmarked. The prediction is that *-hari* will be used in the non-local cases.

Thus, I am using a feature agreement mechanism as in Kratzer and Shimoyama (2002). Given the current robust accounts of feature checking, this is not a very sophisticated account of feature checking (cf. Chomsky (2001); Chomsky (2002); Chomsky (2005); Pesetsky and Torrego (2007); Epstein et al. (2015), a. m. o.). More work would be needed to relate this to the current views on feature checking. I consider the CP to be the relevant domain for checking of the *Exh* features. The CP is generally the domain where focus features are checked, as I observe a commonality between focus being alternative sensitive (cf. Rooth (1985)) and these particles being alternative sensitive. More investigation is needed to make claims about the exact location for the checking of the EXh feature with respect to the CP domain.

As we observed in Sections 1.6.3 and 1.6.4, even in the absence of overt modals or quantifiers, *-hari* and *-də* disjunctions and indefinites give rise to different types of modal effects, non/specificity effects, etc. I assume that in non-modal and non-quantifier contexts, assertions are implicitly modalized. This is discussed next.

1.7.6 A doxastic operator for assertions

At least since 1960s, the notion that declarative sentences are headed by an assertoric operator has been influential in syntactic and semantic literature on declaratives (cf. Bellert (1969); Stalnaker (1978); among many others). At the same time, Alonso-Ovalle and Menéndez-Benito (2003), Alonso-Ovalle and Menéndez-Benito (2008), Alonso-Ovalle

and Menéndez-Benito (2010), Meyer (2013) and Nicolae (2017), among many others, have more recently assumed application of an implicit modal (assertoric) operator to derive the epistemic effects of disjunctions or indefinites. Following these proposals, I also assume that assertions are implicitly modalized and a doxastic operator akin to an epistemic necessity modal is adjoined at the matrix level at LF of a disjunction or indefinite sentence. Especially following Alonso-Ovalle and Menéndez-Benito (2010), I assume the assertoric operator defined as in (120).

$$(120) \quad [[\text{ASSERT}]]^c = \lambda p. \lambda w. \forall w': \text{Epistemic}_{\text{Speaker of } c}(w) [p(w')]]$$

(Alonso-Ovalle and Menéndez-Benito, 2010)

This amounts to the meaning that the assertoric operator takes a propositions p , a world w as its arguments and asserts that for all worlds w' epistemically accessible to the speaker in w , this proposition is true in w' . I present this assertoric/doxastic operator as a necessity epistemic modal represented with $\Box$ in the derivations. Following is a discussion of the motivation for this proposal from Alonso-Ovalle and Menéndez-Benito (2003) and Alonso-Ovalle and Menéndez-Benito (2010).

Building on Kratzer and Shimoyama (2002), Alonso-Ovalle and Menéndez-Benito (2003) claim that the free-choice effect that Spanish *algún* induces is an epistemic effect (See also Alonso-Ovalle and Menéndez-Benito (2010)). For this, they assume that assertions are implicitly modalized, which serves to derive the epistemic effects of an indefinite construction without a modal. One of the scenarios they provide is presented in (121).

- (121) SCENARIO
- There are five male linguists in the department: John, Bill, Charles, Richard, and Mike. I have heard from a trustworthy source, that María is dating one of them. But, that is all I know; I have no idea which of them she is dating.

They show that a speaker can felicitously utter a sentence like that in (122) in such a scenario.

- (122) María está saliendo con algún chico del departamento de lingüística.
 Mary is going out with ALGÚN guy of the department of linguistics.

They argue that by using *algún* the speaker signals that, as far as she knows, the linguist that María is dating might be any of the five men in the domain. In other words, for each x in the domain, there has to be an epistemic alternative w such that the proposition that Mary is dating x is true in w . They call this a ‘free choice epistemic effect’. They claim

that this epistemic effect comes about as a result of the interaction between epistemic modality and domain widening that *algún* induces. With this assumption that assertions are implicitly modalized, they claim that Mary’s epistemic alternatives might look like the following (applied to two alternatives).

- (123) [[ASSERT]]^{w,g} ($\lambda w'$. Mary is dating Mike in w' , $\lambda w'$. Mary is dating Charles in w' ...)

I assume the assertoric operator as in (120) in Alonso-Ovalle and Menéndez-Benito (2010) for the derivation of epistemic effects of the disjunction and indefinite sentences in Sinhala. Implications of application of this exhaustivity operator with respect to *-hari* and *-də* disjunctions and indefinites are discussed in detail in Section 2.5.3.

1.8 Central claims and the architecture of the thesis

This thesis examines the grammar of the two particles *-hari* and *-də* that systematically appear in disjunction and indefinite constructions in Sinhala. These two particles appear attached to individual alternatives in disjunctions, or wh-words in indefinites. These are contexts that involve alternatives. I claim that the two particles *-hari* and *-də* are alternative sensitive particles (cf. also Slade (2011)). It is observed that the two particles *-hari* and *-də* are not licensed under immediate scope of negation. Following this observation, the two particles are claimed to be positive polarity items (PPIs) in Sinhala. I also show that as PPIs the two particles *-hari* and *-də* associate with an exhaustivity operator.

In Chapter 2, accounting for the derivation of ignorance inferences associated with disjunctions and indefinites formed with the particles *-hari* and *-də*, I argue that exhaustification (based on PP character of the two particles) with respect to an anti-singleton domain of alternatives is responsible for generation of ignorance inferences. To derive the right truth conditions for ignorance inferences with respect to epistemically accessible worlds, I claim that there is a distribution requirement (DR) for ignorance inferences. This is derived by way of exhaustification with respect to epistemically modalized domain alternatives. To account for the non/cancelability of ignorance inferences associated with *-hari* and *-də* disjunctions and indefinites, I show that there is a correlation between non/cancelability of ignorance inferences and the strength of a PPI. The ignorance inferences of a “weak” PPI can be canceled while those of a “strong” PPI can not be canceled. Thus, I argue that both derivation and non/cancelability of the ignorance implicatures are predicted in the grammar of *-hari* and *-də* disjunctions and indefinites.

In Chapter 3, I argue that there is a link between the scope and epistemic effects of a *-hari* or *-də* disjunction or indefinite. I propose to derive the scope effects (and ignorance inferences) as implicatures, particularly as ‘wide/narrow scope implicatures’ by way of exhaustification with respect to domain and scalar alternatives. I claim that a *-hari* disjunction/indefinite gives rise to narrow scope effects of a disjunction/indefinite in contexts of the universal quantifier, deontic modals or attitude verbs. The narrow scope effects of a *-hari* disjunction/indefinite are responsible for optional ignorance, free-choice and non-specificity effects in contexts of the universal quantifier, deontic modals or attitude verbs. I claim that a *-də* disjunction/indefinite gives rise to wide scope effects of the disjunction/indefinite and obligatory ignorance inferences in contexts of the universal quantifier, deontic modals or attitude verbs. The wide scope effects of a *-də* disjunction/indefinite is responsible for obligatory ignorance inferences, no-choice effects, and *de-re* readings in contexts of the universal quantifier, deontic modals or attitude verbs. I argue that the Exh operator as defined in Fox (2007) falls short of deriving the wide-scope effects of a *-də* disjunction/indefinite with respect to the universal quantifier, deontic modal and an attitude verb. I claim that a Fox defined Exh operator with a set of alternatives closed under conjunction (following an insight from Spector (2016)) can derive a stronger meaning to account for the wide scope effects. As an alternative, I also show that we can account for the wide scope effect by way of a felicity condition on epistemic access (pragmatic constraint) that the particle *-də* places on the alternatives in the domain of a *-də* disjunction/indefinite. I claim that we can derive the *de re* aspect of the meaning of a *-də* indefinite with respect to an attitude verb in the same manner.

Chapter 4 offers a summary of the main points discussed and the claims and conclusions drawn.

Chapter 2

Exhaustivity and Ignorance

2.1 Introduction

This chapter investigates the derivation and non/cancelability of the ignorance implicatures associated with disjunctions and indefinites formed with the particles *-hari* and *-də* in Sinhala. Both disjunctions and indefinites formed with the particles *-hari* and *-də* give rise to ignorance inferences. To account for the ignorance inferences associated with such disjunctions and indefinites in Sinhala, the chapter presents two conditions each of which is necessary but not sufficient to derive the ignorance implicatures. These necessary conditions are: [1] the domain must have more than one alternative (i.e. an anti-singleton domain); [2] the disjunction/indefinite has to be a positive polarity item (PPI) associated with exhaustification of alternatives. This chapter argues that each of these conditions combined together complement each other contributing to the generation of ignorance as part of the semantics (grammar) of disjunctions and indefinites.

The chapter argues for a distribution requirement for deriving the right truth conditions for ignorance inferences. This distribution requirement for both *-hari* and *-də* disjunctions and indefinites is shown to be derived from a common source, by way of exhaustification with respect to epistemic domain alternatives. Also, it marks a clear distinction between domain exhaustification and scalar exhaustification to account for the distinctive effects they generate.

Arguing against the standard assumption, the chapter claims that the choice of non/cancellation of implicatures does not depend on whether an implicature is conversational or not, but rather on the strength of the positive polarity item (whether it is a strong PPI or weak PPI). Thus, a correlation is shown between non/cancelability of ignorance implicatures and the strength of a PPI.

The chapter casts its proposal in a hybrid mechanism of lexical and grammatical approaches borrowing good insights from both. Obligatory exhaustification of alternatives and different kinds of requirements/possibilities such as exclusivity and inclusivity are deemed to be lexical requirements/properties of the particles *-hari* and *-də* represented by un-interpretable features. The chapter shows that not only the derivation but also the non/cancelability of the ignorance implicatures of *-hari* and *-də* disjunctions and indefinites are predicted in the grammar of these expressions.

The chapter is organized as follows: Section 2 of the chapter lays out the main empirical puzzles related to *-hari* and *-də* disjunctions and indefinites in Sinhala. It introduces the ignorance component associated with the disjunctions and indefinites formed with the two particles and presents evidence that the nature of ignorance associated with the two particles is different in terms of their truth conditions, non/cancelable behavior and felicity conditions. Thus, Section 2 reviews data already presented in Chapter 1. Section 3 offers a discussion of the background to ignorance associated with disjunctions and indefinites across languages and Sinhala. Section 4 presents a critical analysis of the existing accounts that use different methods in deriving ignorance. Section 5 presents the particular theoretical tools selected to account for the derivations with respect to *-hari* and *-də* disjunctions and indefinites. Section 6 of the chapter is concerned with formally deriving the ignorance component in the case of disjunctions formed with the two particles. Section 7 is devoted to formally accounting for the non/cancelability of the ignorance component of disjunctions formed with the two particles. Section 8 discusses the accounts in Meyer (2013) and Nicolae (2017) that have recently addressed issues associated with derivation of ignorance inferences of disjunctions. Sections 9 and 10 extend the analysis of disjunctions formed with the two particles to that of indefinites formed with the two particles. Section 9 is concerned with formally deriving the ignorance component in the case of indefinites formed with the two particles and Section 10 formally accounts for the non/cancelability of the ignorance associated with the indefinites formed with the two particles. Section 11 offers the summary and conclusions for this chapter.

2.2 The nature of ignorance expressed with *-hari* and *-də*

It was seen in Chapter 1 that both disjunctions and indefinites formed with the particles *-hari* and *-də* give rise to ignorance inferences. We briefly saw that the ignorance effect of *-hari* disjunctions and indefinites can be canceled while that of *-də* disjunctions and indefinites can not be canceled. These observations present us with a challenge as to how we can account for these empirical phenomena in a formal approach. But, first of all, we need to see the data of interest in place. We saw some of the important data in Chapter

1. I briefly introduced them to present the distributional facts of the particles *-hari* and *-də* and to have a preliminary idea about the nature of the ignorance component of the disjunction and indefinite sentences formed with the two particles. Now, I re-present the data here in more detail in order to introduce the empirical puzzle/s in a more informed manner.

2.2.1 Ignorance expressed with the two particles

Both disjunction and indefinite expressions with the particle *-hari* as in (1), (2) and (3) signal epistemic uncertainty (i.e. that the speaker lacks knowledge about who satisfies the existential claim about the person that John met). So, a continuation with *namin* “namely” by the speaker or the question *kaawə-də* ? “who?” by the hearer in a context like in (1), (2) or (3) is odd.¹ These expressions signal that either the speaker is ignorant of the identity of the individual associated with the indefinite, or the speaker considers the identity irrelevant to the discourse.

- (1) a. John Giita-hari Maala-hari hambə-un-a. #namin Giita.
John Giita-hari Maala-hari meet-PAST-A namely Giita
“John met Giita or Maala. Namely Giita.”
b. #kaawə-də
who-də
“Who?”
- (2) a. John kaawə-hari hambə-un-a. #namin Giita.
John who-hari meet-PAST-A namely Giita
“John met somebody. Namely Giita.”
b. #kaawə-də
who-də
“Who?”
- (3) a. John kaawə-hari kell-ek hambə-un-a. #namin Giita.
John who-hari girl-INDF meet-PAST-A namely Giita.
“John met some girl. Namely Giita.”
b. #kaawə-də
who-də
“Who?”

As illustrated in (4), (5) and (6), the disjunction and indefinite expressions with the particle *-də* also gives rise to ignorance inferences. So, the continuation with “namely” by the speaker or the question *kaawə-də* ? “who?” by the hearer is odd.

¹The use of these tests was mainly motivated by Alonso-Ovalle and Menéndez-Benito (2008).

- (4) a. John Giita-də Maala-də hambə-un-a. #namin Giita.
John Giita-də Maala-də meet-PAST-A namely Giita
“John met Giita or Maala. Namely Giita.”
- b. #kaawə-də
who-də
“Who?”
- (5) a. John kaawə-də hambə-un-a. #namin Giita.
John who-də meet-PAST-A namely Giita
“John met somebody. Namely Giita.”
- b. #kaawə-də
who-də
“Who?”
- (6) a. John kaawə-də kell-ek hambə-un-a. #namin Giita.
John who-də girl-INDF meet-PAST-A namely Giita
“John met some girl. Namely Giita.”
- b. #kaawə-də
who-də
“Who?”

On the other hand, in contrast to *-hari* and *-də* disjunctions or indefinites, a plain indefinite does not necessarily convey ignorance so that the speaker can well continue with “namely” and the hearer can well ask the question *kaawə-də* ? “who?” as shown in (7) or (8).

- (7) John guruwəriy-ak hambə-un-a. namin Giita.
John teacher-INDF meet-PAST-A namely Giita
“John met a teacher. Namely Giita.”
- (8) a. John guruwəriy-ak hambə-un-a.
John teacher-INDF meet-PAST-A
“John met a teacher. ”
- b. kaawə-də ?
who-də
“Who?”

At the same time, even though a plain indefinite in Sinhala does not necessarily express ignorance, it is compatible with ignorance. As shown in (9), an expression with a plain indefinite can be continued with a clause similar to *I do not know who/what*.

- (9) John guruwəriy-ak hambə-un-a. mamə danne næ kaawə-də kiyəla.
John teacher-INDF meet-PAST-A I know not who-də COMP
“John met a teacher. I do not know who”

Thus, in Sinhala, *-hari* and *-də* disjunctions and indefinites in contrast to plain indefinites give rise to marked epistemic (ignorance) effects.

However, close scrutiny of the non/cancelability conditions of the ignorance component of *-hari* and *-də* disjunctions and indefinites shows that the impact of the ignorance that they express is different. That is, on the one hand, the ignorance expressed with a *-hari* disjunction or indefinite can be canceled while that expressed with a *-də* disjunction or indefinite can not be canceled. This is presented in the following section.

2.2.2 Non/cancelability of ignorance expressed with the two particles

As illustrated in the examples below, the ignorance implicatures of *-hari* disjunctions and indefinites can be ‘canceled’ in a number of contexts such as, teasing, correcting, etc. It is observed that when the ignorance inferences are canceled this way, it does not give rise to a feeling of contradiction on the part of the speaker or hearer.

As seen in (10), *-hari* disjunctions allow for a continuation with “In fact, both”. If one can continue the disjunction with a clause similar to “In fact, both”, it is a situation where the speaker knows who John met. So, ignorance is canceled, together with exclusivity.

- (10) John Giita-hari Maala-hari hambə-un-a. æththətəmə, eyya dennawəmə
 John Giita-hari Maala-hari met-A. In fact he both
 hambəun-a
 meet-PAST-A
 “John met Giita or Maala. In fact he met both. ”

As shown in (11), (12), and (13), *-hari* disjunctions and indefinites are compatible with a continuation of “In fact I know who/which one” ((11) is a disjunction sentence, (12) is a sentence with an indefinite pronoun, and (13) is an example with a complex indefinite). If one can continue the disjunction or indefinite with a clause similar to “In fact I know who/which”, it is obviously a situation where the speaker knows who John met. Thus, ignorance is canceled. Observe the examples with the particle *-hari* in the following.

- (11) John Giita-hari Maala-hari hambə-un-a. æththətəmə, mamə dannəwa kaawə-də
 John Giita-hari Maala-hari met-A. in fact I know who-də
 kiyəla.
 COMP
 “John met Giita or Maala. In fact I know who/which. ”
- (12) John kaawə-hari hamu-un-a. æththətəmə, mamə dannəwa kaawə-də kiyəla.
 John who-də meet-PAST-A in fact I know who-də COMP

“ John met someone. In fact, I know who.”

- (13) John kaawə-hari kell-ek hamu-un-a æththətəmə, mamə dannəwa
 John who-də girl-INDF meet-PAST-A in fact I know
 kaawə-də kiyəla.
 who-də COMP
 “ John met some girl. In fact, I know who.”

On the other hand, the ignorance expressed with disjunctions or indefinites involving the particle *-də* can never be canceled. As shown in (14), (15), and (16), *-də* disjunctions and indefinites are not compatible with a continuation of “In fact, I know who/which”. Thus, ignorance inferences can not be canceled. Observe the examples with the particle *-də* in the following.

- (14) John Giita-də Maala-də hamuun-a. #æththətəmə, mamə dannəwa kaawə-də
 John Giita-də Maala-də met-A in fact I know who-də
 kiyəla.
 COMP
 “John met Giita or Maala. In fact, I know who/which.”
- (15) John kaawə-də hamuun-a. #æththətəmə, mamə dannəwa kaawə-də kiyəla.
 John who-də met-A in fact I know who-də COMP
 “ John met someone. In fact, I know who.”
- (16) John kaawə-də kell-ek hamuun-a. #æththətəmə, mamə dannəwa kaawə-də
 John who-də girl-INDF met-A in fact I know who-də
 kiyəla.
 COMP
 “ John met some girl. In fact, I know who.”

As also seen in (17), *-də* disjunctions never allow for a continuation of “In fact, both”.

- (17) John Giita-də Maala-də hambə-un-a. #æththətəmə, eyya dennawəmə
 John Giita-də Maala-də met-A In fact he both
 hambə-un-a
 meet-PAST-A
 “John met Giita or Maala. In fact he met both. ”

In Section 2.7, I argue that if a speaker can not continue a disjunction expression with something such as “In fact, both”, the ignorance implicatures can not be canceled.²

In addition, in contexts such as teasing or quizzes, a speaker can well utter any sen-

²This might sound controversial for now because if only the exclusivity implicature of a conjunctive alternative is present, the ignorance inferences may be obviated. See the argument developed for non-cancelability of ignorance inferences of *-də* disjunctions in Section 2.7 for more details.

tence in (18) with *-hari* when s/he well knows where the bread is. Or a speaker can well utter any sentence in (19), when s/he is well aware of who called.

- (18) a. mamə paan kussi-ye-hari gbadaa-we-hari hængu-w-a. mamə oyaa-tə
I bread kitchen-in-hari store-in-hari hid I you-DAT
kiyann-e næ.
tell Neg
“I hid the bread in the kitchen or store. I won’t tell you.”
- b. mamə paan kohe-hari hængu-w-a. mamə oyaa-tə kiyann-e næ.
I bread somewhere-hari hid I you-DAT tell Neg
“I hid the bread somewhere. I won’t tell you.”³
- (19) a. Giita-hari Maala-hari katha keruw-a. kau-də kiyannə?
Giita-hari Maala-hari call did. Who say
“Giita or Maala called. Guess who?”
- b. kauru-hari katha keruw-a. kau-də kiyannə?
wh-hari call did. Who say
“Somebody called. Guess who?”
- c. kauru-hari kell-ek katha keruw-a. kau-də kiyannə?
wh-hari girl-INDF call did. Who say
“Some girl called. Guess who?”

But, in contrast to *-hari* disjunctions or indefinites, *-də* disjunctions and indefinites, can not be used in such contexts as it is never felicitous in a context that signals knowledge on the part of the speaker.

- (20) a. #mamə paan kussi-ye-də gbadaa-we-də hængu-w-a. mamə oyaa-tə
I bread kitchen-in-hari store-in-hari hid I you-DAT
kiyann-e næ.
tell-E Neg
“I hid the bread in the kitchen or store. I won’t tell you.”
- b. #mamə paan kohe-də hængu-w-a. mamə oyaa-tə kiyann-e næ.
I bread somewhere-də hid I you-DAT tell-E Neg
“I hid the bread somewhere. I won’t tell you.”
- (21) a. #Giita-də Maala-də katha keruw-a. kau-də kiyannə
Giita-də Maala-də call did. Who say
“Giita or Maala called. Guess who?”
- b. #kau-də katha keruw-a. kau-də kiyannə
wh-də call did. Who say
“Somebody called. Guess who?”
- c. #kau-də kell-ek katha keruw-a. kau-də kiyannə
wh-də girl-INDF call did. Who say
“Some girl called. Guess who?”

³These examples were inspired by Grice (1989).

In the above discussion, we saw that both disjunctions and indefinites formed with the particles *-hari* and *-də* give rise to ignorance inferences. At the same time, we observed that the impact of the ignorance inferences is different, the ignorance effect expressed by *-hari* disjunctions and indefinites can be canceled while the ignorance effect expressed by *-də* disjunctions and indefinites can not be canceled. Now, we are faced with a challenge as to how we can uniformly account for the derivation of the ignorance expressed with disjunctions and indefinites formed with the two particles. Moreover, these observations present us with a challenge to account for the cancelability and non-cancelability nature of ignorance associated with the disjunctions and indefinites involving the two particles. My goal in the sections that follow here is to formally account for these empirical phenomena.

In the next section, I explore the phenomenon of ignorance associated with disjunctions and indefinites across languages, in order to set the background for the analysis of ignorance component of Sinhala *-hari* and *-də* disjunctions and indefinites.

2.3 Background on ignorance

This section carries out a short cross-linguistics survey on epistemic disjunctions and indefinites that give rise to ignorance inferences. The purpose of this is to compare and contrast the ignorance component of Sinhala *-hari* and *-də* disjunctions and indefinites with those of other languages discussed in the literature. I also critically review the only accounts (i.e. Slade (2011) and Slade (2015)) that have addressed the ignorance component of indefinites in Sinhala.

2.3.1 Ignorance across languages

At least since Strawson (1974), who briefly discussed the ignorance component of English *some*, there is a growing body of literature that deals with the ignorance component of meaning in disjunctions and indefinites. In the case of English, for example, it has been claimed that an indefinite with *some* as in (22) is epistemically non-specific (cf. Farkas (1994); Becker (1999)). Alonso-Ovalle and Menéndez-Benito (2003, 2008, 2010, 2013, 2017) refer to such indefinites as ‘epistemic indefinites’. They signal that either the speaker is ignorant of the identity for the individual of the existential claim of the indefinite, or the speaker considers the identity irrelevant to the discourse.

(22) John met some teacher yesterday.

There has been much interest about the ignorance component of disjunctions and indefinites in languages recently. Aloni (2001), Kratzer and Shimoyama (2002), Aloni and Port

(2010), Aloni and Port (2012), Aloni and Port (2015) have addressed issues to do with the ignorance component of German *irgendein* indefinites. Alonso-Ovalle and Menéndez-Benito (2003, 2008, 2010, 2013, 2017) have extensively explored the epistemic component of the Spanish *algún* indefinite by mainly treating the ignorance component as a quantity implicature. Sudo (2010), Alonso-Ovalle and Shimoyama (2014), Alonso-Ovalle and Shimoyama (2017) and Weerasooriya (2018) address different aspects of the epistemic component of Japanese *Wh – ka* indefinites. Farkas (2002a), Farkas (2002b), Fălăuș (2009), Fălăuș (2011a) and Fălăuș (2011b) have addressed the issues to do with the epistemic aspect of Romanian *vreun* indefinites. Aloni and Port (2012) has discussed the epistemic component of Italian *(un) qualche* and *uno qualsiasi*.⁴ Dating back to at least Gazdar (1979), the ignorance component of disjunction has been approached from formal perspectives. Zimmermann (2001) analysed English disjunction in terms of conjunctive lists of epistemic possibilities. Fox (2007), while mainly analysing the free-choice component, also discusses the ignorance implicatures associated with English *or* disjunction. Sauerland (2012) refers to the ignorance component of *or* disjunction in terms of uncertainty implicatures. Meyer (2013) has addressed various issues associated with the ignorance component of the English *or* disjunction. Nicolae (2016) has recently talked about the ignorance implicatures of the French *ou* disjunction. Ivlieva (2016) has also addressed issues to do with Russian disjunctions *to li...to li...* and *ne to...ne to....*. More recently, Nicolae (2017) has discussed the ignorance implicatures associated with English disjunctions *or* and *either – or* and French disjunctions *ou* and *soit – soit*.

These are only a few of the accounts to be mentioned and there is an ever developing body of literature on the ignorance component of disjunctions and epistemic indefinites. An understanding of the nature of the ignorance component of disjunctions and indefinites across languages is crucial for a better understanding of the nature of the ignorance component of *-hari* and *-də* disjunctions and indefinites in Sinhala.

In the next section, I present a short survey of the ignorance component of disjunctions in a sample of languages. Afterwards, I present details about the ignorance component of indefinites in some languages.⁵

⁴Most of this overview on epistemic indefinites was based on Alonso-Ovalle and Menéndez-Benito (2013). For more details, see Alonso-Ovalle and Menéndez-Benito (2013).

⁵It has to be noted that this is only an introductory survey of epistemic disjunctions and indefinites across languages. I present the details in the most basic and clearest manner possible, limiting the use of any technical terms where possible.

2.3.1.1 Epistemic disjunctions in some languages

There has been much interest recently related to the ignorance component of disjunctions in particular. In the following, I discuss some descriptive data pertaining to the ignorance component of disjunction in four languages: English, French, Japanese and Russian.

Zimmermann (2001), in his proposal on free-choice disjunction and epistemic possibility, refers to the ignorance component of English disjunction *or* as the epistemic variant of a choice effect. He claims that “disjunctions are conjunctive lists of epistemic possibilities”. He notes that a construction such as that in (23-a) with wide disjunction can be understood as a ‘conjunction’ of its modalized disjuncts as in (23-b). Crucially, he claims that the non-modal disjunction in (24) can be understood in terms of the conjunction with modals as in (23-b).

- (23) a. John might be in Victoria or he might be in Brixton.
b. John might be in Victoria and he might be in Brixton.

- (24) John is in Victoria or he is in Brixton.

He suggests that the lexical meaning of *or* may specify the “underlying modality to be epistemic”.

Alonso-Ovalle (2006) notes that the expression in (25) may give rise to an ignorance implicature other than its free-choice reading.

- (25) Sandy may have this ice cream or that cake.

He argues that in a context where the speaker either does not know or has forgotten what Sandy is allowed to eat, it expresses ignorance implicatures as in (26).

- (26) Sandy may have this ice cream or that cake. I don’t know which.

Fox (2007) also draws attention to the ignorance inferences of English *or* disjunction. He notes that in a sentence like in (27), it generates an inference that the speaker’s beliefs do not determine which person John talked to. Fox (2007) presents these as ignorance inferences as in (27-b).

- (27) a. Sue talked to John or Fred.
b. *Ignorance Inferences:* The speaker doesn’t know that Sue talked to John.
The speaker doesn’t know that Sue talked to Fred.

Sauerland (2012) has also discussed the ignorance implicatures of English *or*. He analyses the ignorance inferences associated with a disjunction as in (28) as “uncertainty implicatures”.

(28) Ernie **or** Bert was at the airport.

He claims that in an example like in (28), uncertainty implicatures are that the speaker is not sure that Ernie was at the airport and also not sure that Bert was.

Meyer (2013) in her dissertation mainly discusses the implications associated with sentences as in the following.

(29) They have locations in Alewife or Braintree.

(30) They have locations in Alewife or Braintree, or both.

She claims that the ignorance inferences derived for expressions as in (30) can be accounted for in terms of grammatical ignorance inferences.⁶

Nicolae (2017) has more recently argued that the complex disjunction *either...or* in English necessarily gives rise to an ignorance implicature as shown in (31).

(31) Mary visited (either) John or Bill. But, I don’t know which.

Taking French disjunctions into account, Nicolae (2016) and Nicolae (2017) discuss the ignorance implicatures associated with simple and complex PPI disjunctions such as *ou* and *soit – soit* as in the examples in (32) and (33).

(32) Marie a parlé à Jean ou Paul.

Mary talked with John or Paul.

(33) Marie ira au cinéma soit lundi soit mardi.

“Marie will go to the movies either on Monday or Tuesday.”

Taking Japanese disjunction into consideration, Weerasooriya (2018) discusses the ignorance component of Japanese plain disjunction –*ka*

(34) John-ga Giita-ka Maala-ni atta.
John-NOM Giita-ka Maala-DAT met
John met Giita or Maala.”

⁶More details as to how these inferences are derived as grammatical inferences will be discussed in detail in Section 2.8

Drawing attention to Russian disjunctions, Ivlieva (2016) has recently claimed that the disjunctions *to li...to li...* and *ne to...ne to...* in Russian give rise to obligatory ignorance inferences as in the examples in (35).

- (35) Každyj mal'čik prinës to li/ne to košku, to li/ne to sobaku.
 every boy brought TO LI/NE TO a cat TO LI/NE TO a dog

The facts presented here show that languages of the world often employ more than one disjunction marker. The facts also show that Sinhala *-hari* and *-də* disjunctions pattern with those of many languages with respect to expressing ignorance in their domain. I draw insights from the way the ignorance component of these disjunctions in other languages has been analyzed to account for the ignorance components of *-hari* and *-də* disjunctions in Sinhala.

2.3.1.2 Epistemic indefinites in some languages

There has also been much interest recently concerning the ignorance component of indefinites in languages. In the following, I discuss some descriptive data pertaining to the ignorance component of indefinites in four languages: Spanish, German, Italian and Japanese.

In a number of proposals, (Alonso-Ovalle and Menéndez-Benito, 2003, 2008, 2010, 2013, 2017) Alonso-Ovalle and Menéndez-Benito argue that a sentence such as that in (36) with the Spanish *algún* indefinite conveys an ignorance effect. That is, they note that the sentence in (36) makes an existential claim (that there is a doctor that María married), and additionally conveys that the speaker does not know/can not identify the witness of the existential claim of the indefinite. Therefor, the continuation with *namely* as in (36) is incompatible. They call the Spanish *algún* an epistemic indefinite, as it generates an epistemic effect.

- (36) María se casó con algún médico (*en concreto con el Dr. Smith)
 María SE married with ALGÚN doctor, in particular with the Dr. Smith
 “María married some doctor or other, (* namely Dr. Smith).”

Drawing attention to the epistemic effect of the German *Irgendjemand*, Kratzer and Shimoyama (2002) claims that it conveys an ignorance effect.

- (37) Hans: Irgendjemand hat angerufen.
 Irgend-one has called
 Maria: # Wer war es?
 Who was it? (Ignorance or Indifference)

In a number of proposals (Aloni, 2001; Aloni and Port, 2010, 2012, 2015), Aloni and Port also claim that German *Irgendein* is an epistemic indefinite.

- (38) Irgendein Student hat angerufen. #Rat mal wer.
Some student has called guess PRT who (Aloni and Port, 2015)

Taking Italian indefinite *uno qualsiasi* into account, Alonso-Ovalle and Menéndez-Benito (2013) claim that expressions with Italian *uno qualsiasi* as in (39) (originally discussed in Chierchia (2006)) convey an effect of ignorance. They note that the expression in (39) indicates that it is consistent with expressing that any door might have been the one knocked at.

- (39) Gianni è uscito di corsa e non sapendo che fare, ha bussato ad una porta
Gianni ran out and not knowing what to do knocked at a door
qualsiasi.
QUALSIAS (Chierchia, 2006)

Aloni and Port (2015) also note that Italian *uno qualsiasi* bears the character of an epistemic indefinite.

- (40) Maria ha sposato un qualche professore. #Indovina chi?
Maria has married a qualche professor, guess who? (Aloni and Port, 2015)

Discussing the ignorance component of Japanese indefinites, Sudo (2010) argues that Japanese *wh-ka* indefinites are concerned with the “identifiability” of the individual in question as represented with (41).

- (41) John likes who-ka.
a. $\exists x$: John likes x.
b. The speaker cannot identify x. (Sudo, 2010)

Alonso-Ovalle and Shimoyama (2017) have also recently discussed the ignorance component of *wh – ka* indeterminates in unembedded contexts as exemplified in (42).

- (42) A: Mariko-wa dare-ka gengogaku-no gakusei-to kekkonshita.
Mariko-TOP who-KA linguistics-GEN student-with married
“Mariko married a linguistics student.”
A: # Sunawachi, Taro-to da.
namely Taro-with COP
“Namely, Taro.”

Weerasooriya (2018) has also discussed the ignorance component of Japanese indefinites

as in the example in (43).

- (43) A: John-ga dare-ka(-ni) atta.
 John-NOM somebody-ka(-DAT) met
 “John met somebody.”
 B: *honto? aitsu dare-ni atteita?
 really he who-DAT was.meeting
 “Really? Who was he meeting with?”

The facts above bear evidence that Sinhala *-hari* and *-də* indefinites are also not alone among the world languages with respect to expressing ignorance. (This, however, is not an exhaustive list of epistemic indefinites in the languages of the world.) I draw insights from the way the ignorance component of these indefinites in other languages has been analyzed to account for the ignorance components of *-hari* and *-də* indefinites in Sinhala.

2.3.2 Non/cancelability of ignorance across languages

As we saw above in Section 2.2.2, the ignorance implicatures of *-hari* disjunctions and indefinites can be canceled while the ignorance implicatures of *-də* disjunctions and indefinites can not be canceled. In this section, I present a short survey of non/cancelability of implicatures, in particular ignorance implicatures, across languages. I take up examples discussed in earlier sections, but focus now on cancelability.

Implicature cancellation is a much discussed phenomenon in the fields of semantics and pragmatics (Horn, 1972; Grice, 1975; Gazdar, 1979; Grice, 1989; Potts, 2002, 2005, 2007; Kratzer and Shimoyama, 2002; Sauerland, 2012; Alonso-Ovalle and Menéndez-Benito, 2013). For example, the expressions in (44-a) with *some* and in (44-b) with *or* give rise to the scalar implicatures as shown.⁷ At the same time as shown in (44-a) and (44-b), the implicatures can be canceled with continuations like *In fact, he saw both* or *In fact, he saw all of them*.

- (44) a. John saw some of the students.
 SCALAR IMPLICATURE: John did not see all of the students.
 IMPLICATURE CANCELATION: In fact, he saw all of them.
 b. John saw Giita or Maala.
 SCALAR IMPLICATURE: John did not see both Giita and Maala.
 IMPLICATURE CANCELATION: In fact, he saw both.

⁷The notion of scalar implicatures was introduced and discussed in detail in Section 1.7.3.

Implicatures can not be canceled sometimes. For example the scalar implicature of the French complex disjunction *soit...soit* can not be canceled as shown in (45).

- (45) a. Marie ira au cinéma soit lundi soit mardi.
 “Marie will go to the movies either on Monday or Tuesday.”
 b. #Absolument! Et elle ira même à la fois lundi ET mardi.
 “Absolutely! She will even go both days.” (Spector 2014)

In general, ignorance implicatures of an expression with English disjunction *or* can be canceled with a continuation similar to “In fact, I know who”, as shown in (46).

- (46) John saw Giita or Maala.
 EPISTEMIC IMPLICATURE: The speaker does not know who.
 IMPLICATURE CANCELATION: In fact, I know who.

We need to keep in mind that there is a difference between cancellation and contradiction. As we saw above, implicatures can be canceled without contradiction. For instance, as it was discussed in the previous section, Sauerland (2012), among many others, notes that a disjunction expression as in (47) can give rise to exclusivity (scalar) implicatures (as in (48-a)) or uncertainty implicatures (as in (48-b)).

- (47) Ernie **or** Bert were at the airport.
 (48) a. The speaker is sure that Ernie and Bert were not at the airport.
 b. The speaker is not sure that Ernie was at the airport and also not sure that Bert was.

Sauerland (2012) points out that such inferences can also be canceled. He notes a difference between canceling and contradicting. He argues that the scalar implicature of (48-a) can be explicitly canceled without contradicting the lexical content of (47). He notes that if the speaker continues with *...and maybe I saw both*, it only cancels the exclusivity implicature (i.e. it is not a contradiction). But, if the speaker continues with *...and maybe I saw neither*, it results in the lexical content of the example being contradicted (i.e. it is a contradiction). Moreover, Sauerland notes that uncertainty (ignorance) implicatures of (48) are also cancelable. When (48) is followed by *..., but I won't tell you which of the two*, he notes that the ignorance implicatures disappear or are canceled. What is crucial for us in Sauerland's account is the fact that implicatures can be explicitly canceled without contradicting the lexical content of an utterance.

Implicatures have traditionally been categorized as “conventional implicatures” and

“conversational implicatures”. One difference traditionally established between conversational and conventional implicatures is that conversational implicatures have the property of being able to be canceled while conventional implicatures have the property of not being able to be canceled. (cf. Horn (1972); Grice (1975); Gazdar (1979); Grice (1989); Potts (2002); Potts (2005)). I uniformly use the term ‘implicatures’ to refer to any type of scalar or ignorance implicatures as in the examples in (44) or (45) or (46). As mentioned earlier, I also use the term ‘inferences’ interchangeably with ‘implicatures’ to mean the same.⁸ In the grammatical approach adopted in this thesis, I show that cancelability or non-cancelability of implicatures does not depend on whether an implicature is conversational or not. I show that cancelability or non-cancelability characters of implicatures of *-hari* and *-də* disjunction or indefinite expressions can depend on the differences in the positive polarity behavior of the particles *-hari* and *-də*. This is discussed in detail in Section 2.7.

In the next section, I present an overview of non/cancelability of ignorance implicatures of disjunctions across languages.

2.3.2.1 Implicature cancellation in disjunctions across languages

As it was just illustrated above, Sauerland (2012) notes that exclusivity (scalar) and uncertainty (ignorance) implicatures of English *or* can be canceled without a contradiction. Chierchia et al. (2012) also shows that in an example as in (49), the implicatures seem to be canceled.

(49) Peter or Jack or both came.

The idea is that once the speaker continues with *or both*, it cancels the scalar implicature *not both* associated with the disjunction *or*.

Nicolae (2016) also argues that as shown in (50), an expression with French *ou* can be continued with *In fact, she talked with both*. This shows that the scalar and ignorance implicatures of French disjunction *ou* can be canceled. If one can continue a disjunction expression with *It fact, she saw both*, the ignorance implicatures of that disjunction obviously disappear.

(50) a. Marie a parlé à Jean ou Paul. En fait, elle a parlé aux deux.
Mary talked with John or Paul. In fact, she talked with both.

⁸Also, see Spector (2014) where he uses a more neutral term ‘inferences’ to refer to implicatures.

Spector (2014) notes that, as shown in (51), an expression with French complex disjunction can not be continued with a clause similar to *In fact, both*. Thus, the scalar implicature can not be canceled. In what follows here, I also show evidence and argue that if the scalar implicature can not be canceled, the ignorance implicatures also can not be canceled.

- (51) a. Marie ira au cinéma soit lundi soit mardi.
 “Marie will go to the movies either on Monday or Tuesday.”
 b. #Absolument! Et elle ira meme à la fois lundi ET mardi.
 “Absolutely! She will even go both days.” (Spector (2014))

Nicolae (2017) also notes that an expression with the English complex disjunction *either...or* can not be continued with *In fact, both*. Thus, the scalar implicature can not be canceled.

As discussed in Weerasooriya (2018), the ignorance component of Japanese plain disjunction can be canceled in a number of contexts such as teasing, re-correcting, etc.

- (52) John-ga Giita-ka Maala-ni atta. Jituwa, dare-ka sitteiru.
 John-NOM Giita-ka Maala-DAT met in fact who-ka know
 “John met Giita or Maala. In fact, I know who.”

Thus, a distinction between ignorance implicatures in terms of whether they can be canceled or not is also a robust phenomenon across languages. It can be seen that Sinhala *-hari* disjunction patterns with Japanese *—ka*, English *or*, and French *ou* in terms of its cancelability. On the other hand Sinhala *-də* disjunction patterns with English *either...or* and French *soit...soit* in terms of its ignorance implicature not being able to be canceled.

Moreover, it is seen that there is a correlation between non/cancelability of scalar implicatures and non/cancelability of ignorance implicatures. A consistent pattern is observed. For example, as illustrated in (53), the scalar implicature of the French simple disjunction *ou* can be canceled. At the same time, the ignorance implicatures of the French disjunction *ou* can also be canceled. On the other hand, as shown in (54), the scalar implicature of the French complex disjunction *soit...soit* can not be canceled. At the same time, the ignorance implicatures of the French disjunction *soit...soit* can not be canceled.

- (53) a. Marie a parlé à Jean ou Paul.
 “Mary spoke to John or Paul.”

SCALAR IMPLICATURE: Mary did not speak to both.

IMPLICATURE CANCELATION: En fait, elle a parlé aux deux.

“In fact, she spoke to both.”

- b. Marie a parlé à Jean ou Paul.

“Mary spoke to John or Paul.”

IGNORANCE IMPLICATURE: The speaker does not know who.

IMPLICATURE CANCELATION: En fait, je sais qui.

“In fact, I know who.”

- (54) a. Marie a parlé soit à Jean soit à Paul.

“Mary spoke to John or Paul.”

SCALAR IMPLICATURE: Mary did not speak to both.

IMPLICATURE CANCELATION: #En fait, elle a parlé aux deux.

“In fact, she spoke to both.”

- b. Marie a parlé soit à Jean soit à Paul.

“Mary spoke to John or Paul.”

IGNORANCE IMPLICATURE: The speaker does not know who.

IMPLICATURE CANCELATION: #En fait, je sais qui.

“In fact, I know who.”⁹

The same pattern is observed with respect to the Sinhala *—hari* and *-də* disjunctions. As illustrated in (55), the scalar implicature of the Sinhala *—hari* disjunction can be canceled. At the same time, the ignorance implicatures of the Sinhala *—hari* disjunction can also be canceled. On the other hand, as shown in (56), the scalar implicature of the Sinhala *-də* disjunction can not be canceled. At the same time, the ignorance implicatures of the Sinhala *-də* disjunction can not be canceled.

- (55) a. John Giita-hari Maala-hari hamu-un-a.

John Giita-hari Maala-hari meet-PAST-A

“John met Giita or Maala.”

SCALAR IMPLICATURE: John did not meet both.

IMPLICATURE CANCELATION: æththətəmə, John dennawəmə hamu-un-a.

“In fact, John met both.”

- b. John Giita-hari Maala-hari hamu-un-a.

John Giita-hari Maala-hari meet-PAST-A

“John met Giita or Maala.”

IGNORANCE IMPLICATURE: The speaker does not know who/which.

⁹I would like to thank Myriam Dali and Nathalie Dion for judgments of the data here.

IMPLICATURE CANCELATION: æththətəmə, mamə dannəw-a kaawə-də kiyəla.

“In fact, I know who/which.”

- (56) a. John Giita-də Maala-də hamu-un-a.

John Giita-də Maala-də meet-PAST-A

“John met Giita or Maala.”

SCALAR IMPLICATURE: John did not meet both.

IMPLICATURE CANCELATION: #æththətəmə, John dennawəmə hamu-un-a.

“In fact, John met both.”

- b. John Giita-də Maala-də hamu-un-a.

John Giita-də Maala-də meet-PAST-A

“John met Giita or Maala.”

IGNORANCE IMPLICATURE: The speaker does not know who/which.

IMPLICATURE CANCELATION: #æththətəmə, mamə dannəw-a kaawə-də kiyəla.

“In fact, I know who/which.”

So, it is seen that there is a correlation between non/cancelability of scalar implicatures and non/cancelability of ignorance implicatures of disjunction. As it was discussed in Section 1.6.2, it is also observed that there is a correlation between the strength of a PPI and cancelability of exclusivity/scalar implicatures. I account for this correlation between non/cancelability of scalar implicatures and non/cancelability of ignorance implicatures based on the strength of a PPI in Section 2.7.

Next, I discuss the cancelability and non-cancelability of ignorance in indefinites across languages.

2.3.2.2 Implicature cancellation in indefinites across languages

It is observed that ignorance implicatures of indefinites across languages can also be canceled. As Fălăuş (2009) notes, the ignorance effect of Spanish *algún* can be canceled as shown in (57). The fact that it allows a continuation with “In fact, I know who” is an indication of cancelability.

- (57) Maria se caso con algún estudiante del departamento de lingüística. De
Maria SE married with ALGUN student the department of Linguistics In
hecho, sé exactamente con quién
fact, know exactly with whom
“Maria married a Linguistics student. In fact, I know exactly who!” (Fălăuş, 2009)

In a similar manner, the ignorance inference of English *some* indefinites can also be can-

celed as shown in (58).

(58) John met some student. In fact, I know who.

Aloni and Port (2015) also presents evidence that for German *jemand*, the ignorance implicature can be canceled.

(59) Jemand hat angerufen. Rat mal wer?
somebody has called guess prt who
“Somebody called. Guess who?”

Alonso-Ovalle and Shimoyama (2017) also show evidence that the ignorance component of Japanese *wh-ka* indefinites can be canceled, as shown in the following example.

(60) Mariko-wa dare-ka gengogaku-no gakusei-to kekkonshita. jitsuwa
Mariko-TOP who-KA linguistics-GEN student-with married in.fact
dare-ka shitteru.
who-Q know
“Mariko married a linguistics student. In fact, (I) know who it is.”

It is observed that unlike for Spanish *algún*, German *jemand*, English *some* or Japanese *wh-ka*, for Romanian *vreun*, German *Irgendein*, Italian *un qualche*, and English *some - or other-* indefinites, the ignorance effect can not be canceled as shown in the following examples.

Fălăuș (2009) claims that the ignorance effect of Romanian *vreun* can not be canceled as shown in the example in (61).

(61) (Maria) s-o fi căsătorit cu vreun lingvist. #De fapt,
Maria RELF-FUT2.3SG BE married with v-A lingvist in fact
știu cu cine.
know.1SG with whom
“I guess Maria married some linguist. #In fact, I know whom.” (Fălăuș, 2009)

Aloni and Port (2015) also claim that for German *irgendein*, the ignorance implicature can not be canceled in the sense that it can not be continued with a clause similar to “Guess who?” as shown in the following examples.

(62) Irgendjemand hat angerufen. #Rat mal wer?
irgend-somebody has called guess prt who
CONVENTIONAL MEANING: Somebody called - the speaker does not know who.
(Aloni and port 2015)

- (63) Irgendein Student hat angerufen. #Rat mal wer?
 irgend-one student has called guess prt who?
 Some student called, I don't know who" (Aloni and port 2015)

Aloni and Port (2015) also give evidence for the non-cancelability of the ignorance component in Italian *un qualche* epistemic indefinites. They show that as in (64), the indefinite expression with *un qualche* is not compatible with a clause similar to "Guess who?" as shown in the following examples.

- (64) Maria ha sposato un qualche professore. #Indovina chi?
 Maria has married a qualche professor guess who?
 CONVENTIONAL MEANING: Maria married some professor- the speaker does not know who" (Aloni and port 2015)

As we saw above, the ignorance implicatures of *-hari* disjunctions and indefinites can be canceled in a number of contexts involving teasing, re-correcting, etc., without contradicting the lexical content of the utterance. We also saw just above that the ignorance implicatures of Spanish *algún*, German *jemand* or English *some* can be canceled. Thus, Sinhala *-hari* indefinites pattern with Spanish *algún*, German *jemand*, Japanese *wh – ka* or English *some* indefinites in terms of cancelability of the ignorance component. On the other hand, as we saw above, the ignorance implicatures of *-də* disjunctions and indefinites can not be canceled. We also saw just above that the ignorance implicatures of Romanian *vreun*, German *irgendein*, Italian *un qualche* or English *some-or other* indefinites can not be canceled. Thus, Sinhala *-də* indefinites pattern with Romanian *vreun*, German *Irgendein*, Italian *un qualche* or English *some-or other* indefinites in terms of non-cancelability.

Now, the task at hand is to address the issue of cancelability and non-cancelability of the ignorance effect. It is important to note that none of these previous accounts has addressed the issue of non-cancelability in their accounts. Pragmatic theories have been able to account for the cancelability of implicatures in detail. But, the non-cancelability of implicatures has received very little attention in these accounts. Before accounting for non/cancelability of ignorance inferences, it is also important to investigate how the ignorance component of *-hari* and *-də* disjunctions or indefinites in Sinhala has been analyzed previously.

2.3.3 Background on ignorance in Sinhala

The first ever linguistic treatment of the ignorance component of Sinhala indefinites is found in Slade (2011). He argues that *-hari* and *-də* indefinites “are clearly epistemic indefinites, that is indefinites which explicitly signal a lack of further information about who or what satisfies the existential claim.” (Slade 2011, p. 112). He makes a conceptual claim that *-hari* indefinites are ‘extensionally-unknown’ and *-də* indefinites are ‘intensionally-unknown’. He characterizes the two notions as represented in (65).

- (65) “Extensionally-unknown” indefinites are felicitous where the speaker has no means of uniquely identifying an extension which satisfies his existential claim, and “intensionally-unknown” indefinites are felicitous where the speaker cannot even uniquely identify an individual concept which satisfies his existential claim.” (Slade 2011, p. 125).

Thus, he analyses *-hari* and *-də* indefinites in terms of ‘intensionally unknown’ and ‘extensionally unknown’ indefinites as shown in (66).

- (66) a. Sanath monəwa-hari gatt-a.
Sanath what-hari buy-PAST-A
“Sanath bought something.” (Extensionally unknown)(Slade 2011, p.132)
- b. Sanath monəwa-də gatta.
Sanath what-də buy-PAST-A
“Sanath bought something.” (Intensionally unknown)(Slade 2011, p.132)

Slade (2011) explains the two notions by comparing the epistemic indefinites in Sinhala with those of English in the following manner. He shows that the sentence in (67-a) does not convey additional information about the speaker’s ignorance. However, the sentence in (67-b) conveys the speaker’s ignorance about the ‘precise identity’ of the girl. But, he claims, it does not convey complete ignorance, because as seen in the dialogue in (68), even though the hearer can not ask ‘Who?’, she can still ask ‘Which one?’.

- (67) a. John is kissing a girl.
b. John is kissing some girl.
c. John is kissing some girl-or-other.

- (68) A: John is kissing some girl.
B: *Who? (cf. Strawson 1974)
B: Which one?
(i) A: That one over there. [pointing]
(ii) A: The blonde. (in case there is only one pragmatically-salient blonde)

(iii) A: *Sally Bloggs, the daughter of our department head. (Slade 2011, p.124)

Thus, he notes that an indefinite with *some* as in the example in (68) demonstrates that the speaker A has additional knowledge that helps uniquely identify the girl John is kissing.

However, as he argues, if a *someone-or-other* indefinite as in (67-c) is employed as seen in (69), it conveys that the speaker B can not ask either ‘Who?’ or ‘Which one?’. Even though the speaker has no means of uniquely identifying the girl in question here, the answer in (ii) in (69) shows that the speaker may still have additional knowledge about the girl.

(69) A: John is kissing some girl-or-other.

B: *Who?

B: *Which one?

B: Do you know anything about this girl?

(i) A: *Yes, she is the blonde standing over there.

(ii) A: Well, she is in the philosophy department. (Slade 2011, p.125)

Slade (2011) compares English *someNPs* such as the one in (68) with Sinhala *-hari* indefinites and English *someNP-or-other* such as the one in (69) with Sinhala *-də* indefinites. He shows that the English example in (70-b) is roughly equivalent to the Sinhala example in (71-a), and the English example in (70-c) is roughly equivalent to the Sinhala example in (71-b).

(70) a. Sanath bought a painting. [plain indefinite]

b. Sanath bought some painting. [extensionally-unknown indefinite]

c. Sanath bought some painting-or-other. [intensionally-unknown indefinite]
(Slade 2011, p. 134).

(71) a. Sanath monəwa-hari gatta.

Sanath what-hari buy.PAST.A

“Sanath bought something.” (Extensionally unknown)(Slade 2011, p.132)

b. Sanath monəwa-də gatta.

Sanath what-də buy.PAST.A

“Sanath bought something.” (Intentionally unknown)(Slade 2011, p.132)

The facts presented above show that Slade (2011) based his analysis of the ignorance component of epistemic indefinites in Sinhala on the felicity conditions of the indefinites formed with the two particles.

Since Slade (2011) compares Sinhala *-hari* indefinites with English *some* indefinites in

terms of their felicity conditions, we expect the ignorance component of *-hari* indefinites to work in the following manner:

(72) Predictions for *-hari* indefinites on the basis of Slade (2011)

- a. A: John kauru-hari kell-ek imbinawa.
John who-hari girl-ek kiss
“John is kissing some girl.”
- b. B: *kau-də?
who-də
“Who?”
- c. B: monə kena-də?
which one-də
“Which one?”
 - (i) A: That one over there. [pointing]
 - (ii) A: The blonde. (in case there is only one pragmatically-salient blonde)
 - (iii) A: *Sally Bloggs, the daughter of our department head.

On the other hand, since *-də* indefinites are compared with English *someNP-or-other*, we expect them to behave in the following manner:

(73) Predictions for *-də* indefinites on the basis of Slade (2011)

- a. A: John kau-də kell-ek imbinawa.
John who-də girl-ek kiss
“John is kissing some girl.”
- b. B: *kau-də?
who-də
“Who?”
- c. B: *monə kena-də?
which one-də
“Which one?”
 - B: Do you know anything about this girl?
 - (i) A: *Yes, she is the blonde standing over there.
 - (ii) A: Well, shes in the philosophy department.
 - (iii) A: *Sally Bloggs, the daughter of our department head.

One problem with this analysis of the felicity conditions for the two types of indefinites is Slade (2011) makes wrong predictions for *-də* indefinites in Sinhala. I show that like in the case of *-hari* indefinites, in the case of *-də* indefinites, a hearer can also ask the question “which one?”, and the speaker can easily point to the person referred to by the indefinite and say “She is the blonde standing over there”. Then the empirical facts for *-də* indefinites are actually as in (74), not as in (73), which is based on Slade’s claim.

- (74) a. A: John kau-də kell-ek imbinawa.
John who-də girl-ek kiss
“John is kissing some girl.”
- b. B: *kau-də?
who-də
“Who?”
- c. B: monə kena-də?
which one-də
“Which one?”
- B: Do you know anything about this girl?
- (i) A: Yes, she is the blonde standing over there.
- (ii) A: Well, shes in the philosophy department.
- (iii) A: *Sally Bloggs, the daughter of our department head.

In Slade (2015) (to be discussed later in this section), he himself argues that *-də* indefinites are most felicitous (and preferred over *-hari* indefinites) in clear vision contexts.¹⁰ And, since *-də* indefinites are most felicitous in clear vision contexts in Sinhala, his claim that pointing and a reference like “She is the blonde standing over there” (as in the example in (73)) is not compatible with *-də* indefinites in Sinhala is empirically incorrect.

Slade (2011) also makes wrong predictions about the cancelability/non-cancelability of the ignorance component of *-hari* and *-də* indefinites. He claims that the ignorance component of both *-hari* and *-də* is a presupposition. At the same time, he claims that the ignorance implicatures of both *-hari* and *-də* indefinites can be canceled, providing the examples in (75-a) for *-hari* and (75-b) for *-də*.

- (75) a. gunəpaalə iiye kauru-hari kasaadə bənda, Eththətəmə mamə
Gunapalla yesterday who-hari marry did Infact I
dannəwa kau-də eyaa bənde kiyala.
know who-də he married that
“Gunapaala married someone yesterday, in fact I know whom he married.”
- b. gunəpaalə iiye kau-də kasaadə bənda, Eththətəmə mamə dannəwa
Gunapalla yesterday who-də marry did Infact I know
kau-də eyaa bənde kiyala.
who-də he married that
“Gunapaala married someone yesterday, in fact I know whom he married.”
(Slade 2011, p 136)¹¹

¹⁰A clear vision context is defined as a context where the speaker has direct perceptual access to the extension of the indefinite. This will be discussed in detail in Section 2.4.2.

¹¹It has to be noted that the construction/expression in (75-b) is infelicitous/deviant. It is not marked with an asterisk here as I am presenting it exactly as presented in Slade (2011).

There are two issues/problems connected to the examples in (75). The first is a conceptual one. That is, Slade (2011) claims that the ignorance component of both *-hari* and *-də* indefinites is a presupposition. At the same time, he claims that the ignorance implicatures of both *-hari* and *-də* indefinites can be canceled. This goes against the standard view of presuppositions. Presuppositions are generally not supposed to be canceled (cf. Potts (2002); Potts (2005)). The other issue is an empirical one. With the example in (75-b), Slade (2011) claims that the ignorance component of *-də* indefinites can be canceled. I claim that (75-b) is deviant or infelicitous. The ignorance component of *-də* indefinites can never be canceled what so ever.¹²

Furthermore, Slade's (2011) analysis is not uniform across the ignorance components of disjunctions and indefinites. He analyses the syntax and semantics of disjunctions and indefinites in a uniform fashion, but limits the discussion of the ignorance component to indefinites. It is not clear how Slade's proposal can be extended to disjunctions. If one offers a unified semantics to account for the uniform occurrence of the two particles in such heterogeneous contexts as disjunctions and indefinites, it would be important to uniformly account for the ignorance component of disjunctions as well as indefinites.

Moreover, even though Slade (2011) refers to cancellation of the ignorance component of *-hari* and *-də* indefinites, he does not account for the non/cancelability of the ignorance implicatures of these indefinites (i.e. what properties of these indefinites make it possible for the ignorance component of indefinites to be canceled.). Thus, one of the aims of this chapter is to fill in these gaps.

Slade (2011) casts his analysis of disjunctions and indefinites in Sinhala in the framework of choice functions. However, as we saw in Chapter 1, and in the previous section, the *-hari* and *-də* disjunctions and indefinites give rise to a variety of implicatures such as scalar implicatures which are also crucial in the analysis of ignorance implicatures in language. We also observed that these implicatures in some contexts can be canceled while in some other contexts they can not be canceled. However, the existing choice function based analyses of indefinites or disjunctions have no explanation for the availability or non/cancelability of such scalar implicatures. While it may be possible to extend the choice function analysis to account for such implicatures, in this chapter I present a straightforward analysis that does not require choice-functions.

A more recent account of Sinhala epistemic indefinites is found in Slade (2015). In

¹²These are my own native speaker judgments as well as those of native speakers I consulted.

Slade (2015), he attempts to account for the ignorance component of Sinhala indefinites in terms of different identification methods proposed in a number of accounts by Aloni and Port (Aloni, 2001; Aloni and Port, 2010, 2012, 2015) that analyze the ignorance component of indefinites as being derived from the speaker's inability to identify the individual associated with the existential claim in a contextually relevant way.¹³ He argues that *-də* indefinites as in the example in (76) are felicitous in contexts where a person is fully visible to the speaker while *-hari* indefinites are not felicitous in such contexts. (i.e. in a context where the speaker observes a person dancing on the table and the person is fully visible to the speaker).

- (76) a. kau-də mese uda natanawa.
wh-də table on dance-PRES
"Somebody dances on the table."
b. #kauru-hari mese uda natanawa.
wh-hari table on dance-PRES
"Somebody dances on the table." (Slade 2015, p.83)

However, I argue that *-də* indefinites are only preferred in such contexts. Even though *-hari* indefinites are not preferred in such clear vision contexts, they are still possible in such contexts. As I show in Section 2.4, *-hari* indefinites are preferred in blurry vision contexts while *-də* indefinites are not possible in blurry vision contexts.¹⁴ In Section 2.4.2, I show that the account based on identification methods as proposed in Aloni and Port (2000) is not able to account for the whole range of facts of the Sinhala epistemic indefinites.

Even though Slade (2015) tries to account for the ignorance effects of Sinhala indefinites based on different pragmatic clues and methods of identification, he notes that the results are inconclusive: "Although thinking about epistemic indefinites in Sinhala and in English in terms of identification methods is useful, it appears that ostension does not provide a good characterization of the felicity conditions" (Slade 2015, p.90). He asserts that "...formulating a reasonable formal semantic analysis of epistemic indefinites also requires paying attention to morphological make up of such indefinites-especially in languages like Sinhala, Malayalam or Japanese, where the morphological components of epistemic indefinites participate systematically in the formation of a variety of other structures." (Slade 2015, p.90). It is important to note that my account in this thesis takes morphological features of the particles *-hari* and *-də* more seriously in order to offer an

¹³The theory of different identification methods in (Aloni, 2001; Aloni and Port, 2010, 2012, 2015) is discussed in detail in Section 2.4.2.

¹⁴This is discussed in detail in Section 2.4.2.

analysis based on feature agreement/movement between these particles and a related operator.

In this section, we saw that *-hari* and *-də* in disjunctions and indefinites in Sinhala pattern with many other disjunctions and indefinites across languages in expressing and canceling ignorance. We also saw that the only accounts (Slade (2011) and Slade (2015)) addressing the ignorance component of *-hari* and *-də* indefinites in Sinhala do not include the disjunctions formed with *-hari* and *-də* in the analysis of the ignorance component. Neither do they account for the non/cancelability of the ignorance component of *-hari* and *-də* disjunctions and indefinites. We also observed that there are gaps in the empirical facts presented in Slade (2011). Moreover, as mentioned, it is unclear how a choice function based analysis would be able to account for the non/availability and non/cancelability of scalar implicatures.

Following these observations and new insights drawn from the observation of the two particles in the contexts of negation as discussed in Section 1.5.2, I offer a new account based on the PP behavior of *-hari* and *-də* in disjunctions and indefinites not only to account for the derivations of their ignorance component but also to characterize the non/cancelable behavior of their ignorance implicatures. This is presented in the following section.

2.4 Deriving ignorance

My goal in the following sections is to investigate how we can formally account for the derivation of the ignorance implicatures of both *-hari* and *-də* disjunctions and indefinites in a uniform manner. First, I examine the existing approaches to derivation of ignorance and test whether these can handle the empirical facts of the ignorance component of *-hari* and *-də* disjunctions and indefinites in Sinhala.

There are mainly two approaches to account for the derivation of the epistemic effect of indefinites: the Conceptual Cover (CC) or Lack of Relevant Identification approach (LRI) developed in a number of proposals in (Aloni, 2001; Aloni and Port, 2010, 2012, 2015), and the Quantity Implicature (QI) approach developed in a number of proposals (Kratzer and Shimoyama, 2002; Alonso-Ovalle and Menéndez-Benito, 2003, 2008, 2010, 2013, 2017). In the sections that follow here, I critically examine the two methods in light of the Sinhala data and argue that neither method can immediately account for the full range of the empirical phenomena in Sinhala. I also examine the implications of a hybrid approach proposed for Spanish *algún* indefinites in Alonso-Ovalle and Menéndez-

Benito (2017) and show that this proposal also falls short of handling certain issues of *-də* disjunctions and indefinites in Sinhala. Then, I explore the feasibility of an approach based on the positive polarity behavior of the two particles *-hari* and *-də* and present its implications.

2.4.1 The quantity implicature approach (QI)

The classic QI approach proposes that the ignorance effect of epistemic indefinites is brought about as a quantity implicature (QI) via a competition between an asserted proposition and the alternative stronger claims that result from restricting the domain to a singleton or a narrower domain (Kratzer and Shimoyama, 2002; Alonso-Ovalle and Menéndez-Benito, 2003, 2008, 2010, 2013, 2017). QIs as viewed in line with Gricean perspectives can consequently be canceled. According to the QI approach to epistemic indefinites, the ignorance component/QI is able to be canceled (i.e. disappears) in a number of contexts such as downward entailing environments. For instance, Alonso-Ovalle and Menéndez-Benito (2017) argue that a construction like in (77) is felicitous in a context where all the professors are dancing with the same student, but the speaker can not identify the student.

- (77) Todos los profesores están bailando con algún estudiante.
 All the professors are dancing with ALGÚN student
 "Every professor is dancing with some student."

They also show that when *algún* is interpreted in the restrictor of the universal quantifier as in (78), the ignorance effect disappears. This is in the sense that the speaker can identify the students that different professors are talking to.

- (78) Todos los profesores que están hablando con algún estudiante llevan
 All the professors who are talking with algún student wear
 sombrero.
 hat
 "Every professor who is talking to a student wears a hat."

They use this disappearance/cancellation of the ignorance implicature in contexts like in (78) as a diagnostic for QIs and to label the ignorance component as an implicature.

Based on this evidence, they propose that the ignorance component of *algún* indefinites behaves like an implicature. They support this with a claim that *algún* is an anti-singleton indefinite. Alonso-Ovalle and Menéndez-Benito (2003, 2008, 2010) argue that for *algún* to be pragmatically felicitous, it requires its domain to have at least two live alternatives. They analyze this requirement as an anti-singleton constraint on the domain of quantification. For example, they show that when *algún* is in the scope of a modal in

a construction such as that in (79), it means that in all the worlds compatible with the speaker's evidence, Juan is in a room of the house. They, further argue that (79) with *algún* is felicitous only if two or more rooms are live options.

- (79) Juan tiene que estar en alguna habitación de la casa.
 Juan ha to be in ALGUNA room of the house
 "Juan must be in a room of the house."

They show that *un*, in contrast to *algún*, does not impose such a constraint on the domain of quantification.

Building on Kratzer (2005), Alonso-Ovalle and Menéndez-Benito (2008) proposes the denotation in (80) for Spanish *un*. In (80), *un* takes as arguments a subset selection function f (which takes a set and returns one of its subsets) and two functions of type $\langle et \rangle P$ and Q such that the existential claim will be true of a contextually relevant subset of the extension of the noun phrase that *un* combines with.

$$(80) \quad [[un]] = \lambda f_{\langle et, et \rangle} \lambda P_{\langle et \rangle} \lambda Q_{\langle et \rangle} . \exists x[f(P)(x) \ \& \ Q(x)]$$

They also show that different kinds of constraints may be imposed on a domain of quantification based on the nature of the determiners that a noun phrase is combined with. As per Alonso-Ovalle and Menéndez-Benito (2008), we can have a singleton subset selection function as in (81-a), and we can have an anti-subset selection function that will never return a singleton as in (81-b) for different types of indefinites.

- (81) a. f is a singleton subset selection function iff for any set p , $f(p)$ is a singleton.
 b. f is an anti-singleton subset selection function iff for any set p , $f(p)$ is *not* a singleton.

For Spanish *algún*, Alonso-Ovalle and Menéndez-Benito (2017) propose the following definition that requires an anti-singleton subset selection function. In (82), *algún* takes as arguments a subset selection function f (which takes a set and returns one of its subsets) and two functions of type $\langle et \rangle P$ and Q and is defined only if $f(P)$ is not (the characterizing function of) a singleton set such that the existential claim will be true of a contextually relevant subset of the extension of the noun phrase that *algún* combines with.

$$(82) \quad [[algún]] = \lambda f_{\langle et, et \rangle} \lambda P_{\langle et \rangle} : |f(P)| > 1. \lambda Q_{\langle et \rangle} . \exists x[f(P)(x) \ \& \ Q(x)]$$

Thus, they argue that Spanish *algún* places an anti-singleton constraint on its domain of quantification that triggers a pragmatic competition with alternative assertions that range

over singleton domains, which serves to generate ignorance inferences. They explain this with an example and a context as in the following.

- (83) a. Juan tiene que estar en alguna habitación de la casa.
 Juan ha to be in ALGUNA room of the house
 ‘Juan must be in a room of the house.’
 b. Juan is in a room in {bedroom, living room, study}

They note that the domain of rooms for *f* is the set containing the bedroom, the living room and the study. The assertion of (83-a) is (83-b). The pragmatic competitors in (83-b) (i.e. bedroom, living room, study) are more informative than the assertion. If the maxim of quantity is followed, the speaker should choose the most informative statement. According to (Alonso-Ovalle and Menéndez-Benito, 2017), the reason why the speaker did not select any of the pragmatic competitors is he did not want to commit to any of them. And this is expected to give rise to an ignorance effect.

As we saw above, the QI approach to ignorance predicts the cancelability nature of the ignorance implicatures. As we discussed above in section 2.2.2, the ignorance implicatures of *-hari* disjunctions and indefinites can be canceled in a number of contexts such as, teasing, correcting, etc., without feeling contradictory on the part of the speaker or hearer. Some of the examples involving *-hari* disjunctions and indefinites from Section 2.2.2 are repeated here in order to make the facts clearer.

As shown in (84) and (85), *-hari* disjunctions and indefinites are compatible with a continuation with “In fact I know who/which”, which shows that the ignorance implicatures can be canceled explicitly.

- (84) John Giita-hari Maala-hari hambə-un-a. æththətəmə, mamə dannəwa kaawə-də
 John Giita-hari Maala-hari met-A. in fact I know who-də
 kiyəla.
 COMP
 “John met Giita or Maala. In fact I know who/which. ”
 (85) John kaawə-hari hamu-un-a. æththətəmə, mamə dannəwa kaawə-də kiyəla.
 John who-də meet-PAST-A in fact I know who-də COMP
 “ John met someone. In fact, I know who.”

Moreover, as it was shown in Section 1.6.4, (and as seen in the examples repeated here in (86) and (87)), when a *-hari* disjunction or indefinite is interpreted under the scope of the universal quantifier, the ignorance effect may be obviated.

- (86) hāmə goolə-ek-mə Giita-hari Maala-hari hamu-un-a.
 every student-INDF-EMPH Giita-hari Maala-hari meet-past-A
 “Every student met Giita or Maala.”
 ✓READING 1: Every student met at least one of Giita or Maala.
 SCOPE EFFECT : $\forall > \text{-hari/or}$.
 EPISTEMIC IMPLICATURE: The speaker may/may not know who met who.
 #READING 2: There is exactly one of Giita or Maala that every student met.
 SCOPE EFFECT: $\text{-hari/or} > \forall$.
 EPISTEMIC IMPLICATURE: The speaker does not know who met who.
- (87) hāmə goolə-ek-mə kaawə-hari hambə-un-a.
 every student-INDF-EMPH who-hari meet-past-A
 “Every student met someone.”
 ✓READING 1: Every student met at least one person.
 SCOPE EFFECT : $\forall > \text{-hari}/\exists$.
 EPISTEMIC IMPLICATURE: The speaker may/may not know who met who.
 #READING 2: There is exactly one person that every student met.
 SCOPE EFFECT: $\text{-hari}/\exists > \forall$.
 EPISTEMIC IMPLICATURE: The speaker does not know who met who.

If (86) is interpreted as every boy met any of Giita or Maala, the speaker can well utter the sentence when he/she well knows who met who as seen in the Reading 1 in (86). If (87) is interpreted as every boy met at least one person, the speaker can well utter the sentence when he/she clearly knows who met who as seen in Reading 1 in (87).

Now, based on the observations of the cancelability nature of the ignorance component of *-hari* disjunctions and indefinites, one may want to derive the ignorance inferences of *-hari* disjunctions and indefinites based on a QI approach. However, the non-cancelable nature of the ignorance implicatures of *-də* disjunctions or indefinites poses a challenge for the QI approach. As we saw above in section 2.2.2, the ignorance implicatures of *-də* disjunctions or indefinites can never be canceled in any kind of environment or context. Some of the examples involving *-də* disjunctions and indefinites from Section 2.2.2 are repeated here in order to make the facts clearer.

As shown in (88) and (89). *-də* disjunctions and indefinites are not compatible with a continuation with “In fact, I know who/which one”.

- (88) John Gita-də Mala-də hamuun-a. #æththətəmə, mamə dannəwa kaw-də kiyəla.
 John Gita-də Mala-də met-A in fact I know who-də COMP
 “John met Giita or Maala. In fact, I know who/which.”

- (89) John kaawə-də hamuun-a. #æththətəmə, mamə dannəwa kaawə-də kiyəla.
 John who-də met-A in fact I know who-də COMP
 “John met someone. In fact, I know who.”

Furthermore, a *-də* disjunction triggers an obligatory wide scope reading with respect to the universal quantifier. A reading like that in Reading 1 in (90) is not allowed by a *-də* disjunction. At the same time, it always gives rise to an ignorance effect as illustrated in (90).

- (90) hāmə goolə-ek-mə Giita-də Maala-də hambə-un-a. mamə danne næ
 every student-INDF-EMPH Giita-də Maala-də meet-past-A I know not
 kaawə-də kiyəla.
 who COMP
 “Every student met Giita or Maala. I do not know who/which.”
 #READING 1: Every student met at least one of Giita or Maala.
 SCOPE EFFECT : $\forall > -də/or$.
 EPISTEMIC IMPLICATURE: The speaker may/may not know who met who.
 ✓/READING 2: There is exactly one of Giita or Maala that every student met.
 SCOPE EFFECT: $-də/or > \forall$.
 EPISTEMIC IMPLICATURE: The speaker does not know who met who.

Moreover, a *-də* indefinite triggers an obligatory wide scope reading with respect to the universal quantifier and it always gives rise to an ignorance effect as illustrated in (91).

- (91) hāmə goolə-ek-mə kaawə-də hambə-un-a.
 every student-INDF-EMPH who-də meet-past-A
 “Every student met someone.”
 # READING 1: Every student met at least one person.
 SCOPE EFFECT : $\forall > -də/\exists$.
 EPISTEMIC IMPLICATURE: The speaker may/may not know who met who.
 ✓/ READING 2: There is exactly one person that every student met.
 SCOPE EFFECT: $-də/\exists > \forall$.
 EPISTEMIC IMPLICATURE: The speaker does not know who met who.

The discussion above shows that it is difficult to analyze the ignorance implicatures of *-də* disjunctions or indefinites in terms of the QI approach as proposed in Kratzer and Shimoyama (2002), Alonso-Ovalle and Menéndez-Benito (2003, 2008, 2010, 2013, 2017).

We may account for the derivation of *-hari* disjunctions and indefinites under the QI approach as their ignorance implicatures can be canceled, but not *-də* disjunctions or in-

definites as their ignorance implicatures can not be canceled. However, one of the goals of this chapter is to investigate the possibility for a uniform mechanism that serves to derive the aspects of ignorance associated with both *-hari* and *-də* types of disjunctions and indefinites.

We can explore another approach, Lack of Relevant Identification approach (LRI). This is examined next.

2.4.2 The conceptual covers approach (CC)

The “Lack of Relevant Identification approach” (LRI) developed in a number of proposals in (Aloni, 2001; Aloni and Port, 2010, 2012, 2015) claims that the ignorance component of epistemic indefinites conveys that the speaker cannot identify the individual in question in the indefinite in a contextually relevant manner. It claims that the ignorance component is not an implicature but is derived by way of a particular context determining a quantificational domain. This will lead to a shift in the method of identification required by the context, which they call a Conceptual Cover (CC) shift. Aloni and Port (2015), as originally introduced in Aloni and Port (2001), account for the ignorance component of an epistemic indefinite by way of conceptual covers or different methods of identification, as illustrated in the scenario in (92).

- (92) In front of you lie two face-down cards, one is the ace of hearts, the other is the ace of spades. You know that the winning card is the ace of hearts, but you don’t know whether it’s the card on the left or the one on the right. (Aloni and Port 2015, p. 127)

Then, Aloni and Port test the truth or falsity of (93) in the context of (92).

- (93) You know which card is the winning card.

They note that there are different ways in which the card can be identified here.

- (94) i. by way of their position (i.e. the card on the left, the card on the right) [ostension]
 ii. by way of their name (i.e. the ace of hearts, the ace of spades) [naming]
 ii. by way of their suit (i.e. the winning card, the losing card) [description]

They note that (93) in the context of (92) is false if the card is identified by ostension and true if the card is identified by name. In other words, in this context, the person in question has knowledge about the winning card in some contextually relevant way (by

one method of identification: i.e. by their name) but is ignorant about the winning card in some other contextually relevant way (by another method of identification: i.e. by their place). In this way, ignorance is characterized by a method of identification. They claim that epistemic indefinites are sensitive to some methods of identification.

We can test whether the notions proposed in the CC/LRI method can be applied to the empirical facts in Sinhala.

As it was also discussed in Section 1.6.3, it is observed that *-də* disjunctions and indefinites are sensitive to different methods of identification. On the other hand, *-hari* disjunctions and indefinites do not make discrimination regarding the context or method of identification. As shown in (95) and (96), *-hari* indefinites can be felicitous both in contexts in which the speaker has direct perceptual access to the extension of the indefinite and in contexts in which the speaker does not. On the other hand, *-də* indefinites are not felicitous in contexts in which the speaker has blurry perceptual access to the extension of the indefinite as illustrated in (96).¹⁵

- (95) a. Mary sees John kissing a girl far away (blurry vision), and she does not know (has no idea of) the girl .
 b. balannə, John kauru-hari/#-də kell-ek imbinawa.
 see, John who-hari/-də girl-ek kiss
 “See, John is kissing some girl.”
- (96) a. Mary sees John kissing a girl close by (clear vision), but she does not know (i.e. the name of) the girl.
 b. balannə, John kauru-də/-hari kell-ek imbinawa.
 see, John who-də/-hari girl-ek kiss
 “See, John is kissing some girl.”

As seen in (96), the speaker can identify the witness of her existential claim for a *-də* indefinite by ostension (i.e. by one way of identification, i.e. with the help of the clear vision context), but the speaker is ignorant about another aspect with respect to the individual of the existential claim (i.e. the name). However, *-hari* indefinites, on the other hand, are felicitous in contexts where there are no contextual clues nor methods of identification available. As also noted in Slade (2015), *-hari* indefinites in Sinhala are felicitous in contexts where there is no source of visual access to the individual of the existential

¹⁵As it was introduced in Section 1.6.3, *-də* indefinites are felicitous only in contexts where the speaker has some kind of epistemic access to the witness of the existential claim of the indefinite. This could be either in a context with clear perceptual access to the witness of the existential claim or with some conversational background providing epistemic access.

claim. For instance, in a context where we hear a sound of somebody dancing on a table in an adjoining room, somebody can felicitously utter (97) even though s/he does not have any perceptual access to the witness of the existential claim.

- (97) kauru-hari meesey-ak udə natəṇəw-a.
 wh-hari table-INDF on dance-a
 “Somebody is dancing on a table.”¹⁶(Slade 2015)

This provides evidence for the fact that *-hari* indefinites in Sinhala are not sensitive to different methods of identification, contrary to what is predicted by Aloni and Port for epistemic indefinites. As opposed to *-də* indefinites, which are sensitive to different methods of identification, *-hari* indefinites can be used in any kind of context.

As it was also mentioned in the previous section, one of the goals of this chapter is to search for a method to account for the ignorance component of both *-hari* and *-də* disjunctions or indefinites in a uniform manner. In the sections that follow here, I attempt to find a solution.

Making use of insights from both the CC and QI approaches, Alonso-Ovalle and Menéndez-Benito (2017) have proposed a hybrid approach to account for both the distribution and content of epistemic indefinites, as in the cases/examples that we have considered in the last two sections. In the next section, I explore how much of the hybrid approach in Alonso-Ovalle and Menéndez-Benito (2017) can account for the ignorance facts of epistemic disjunctions and indefinites in Sinhala.

2.4.3 The hybrid approach combining CC and QI approaches

Alonso-Ovalle and Menéndez-Benito (2017) observes that there are aspects of the ignorance component of epistemic indefinites that the conceptual cover approach and the quantity implicature approach on their own can not handle. For instance, the authors note that the CC approach can not account for the disappearance of the epistemic effect in contexts such as DE environments. They also note that the QI approach is not able to account for the descriptive content of an epistemic indefinite. Alonso-Ovalle and Menéndez-Benito (2017) propose a hybrid approach by reconciling both quantity implicature approaches and conceptual cover approaches to account for both the distribution

¹⁶Based on speaker judgments, Slade reports that a *-hari* indefinite as opposed to a *-də* indefinite is preferred in this context. My native speaker intuitions are that for a *-də* indefinite to be felicitous in such a context, it has to have some epistemic background (i.e. that the speaker knows that there are some people in the next room.)

and content of the epistemic effect of Spanish *algún* indefinites. They propose an account based on what they call “identificational properties”. They show that by using *algún*, a speaker signals that s/he is not using a restriction that (i) s/he believes picks out exactly one individual, and (ii) is a stable property.

They characterize the identificational properties (for an individual, in a world) as in (98).

- (98) A property P is identificational for an individual d in w iff
- a. In all the worlds w' compatible with d 's beliefs in w , $|\{x : f(w')(x)\}| = 1$,
and
 - b. d believes in w that f is a stable property ¹⁷.

Alonso-Ovalle and Menéndez-Benito (2017) provide examples that Spanish *algún* indefinites are not felicitous in clear vision contexts as shown in (99).

- (99) a. L and P are visiting the Math department. They don't know anything about the people working there, and they haven't seen any of them before. They suddenly see an individual, who can be inferred to be a professor, frantically dancing lambada on his desk.
- b. #Mira! algún profesor está bailando encima de la mesa!
Look! ALGUN professor is dancing on of the table
Look! Some professor is dancing on the table! (Alonso-Ovalle and Menéndez-Benito, 2017)

They claim that *algún* indefinites are only felicitous in blurry vision contexts. They argue that a hearer will infer that a speaker will use *algún* only in a context when the speaker is not able to restrict the domain with an identificational property. They note this as a reason for the felicity of *algún* in the blurry vision context but not in the clear vision one.

The proposition corresponding to the sentence in (100), according to Alonso-Ovalle and Menéndez-Benito (2017), will be defined for w_0 only if the conditions in (101) are true and that the proposition in (100) will be true only if the truth conditions in (101-b) are satisfied.

¹⁷According to Alonso-Ovalle and Menéndez-Benito (2017) a stable property holds across times, having access to a stable singleton property would allow the speaker to pick out the witness.

- (100) María está besando a algún estudiante!
 María is kissing A ALGÚN student
 María is kissing some student.
- (101) a. $f(\text{STUDENT})$ is not identificational for the speaker of c in w_0 .
 b. $\exists x[f(\text{STUDENT})(w_0)(x) \ \& \ \text{KISS}(w_0)(x)(\text{MARIA})]$

Alonso-Ovalle and Menéndez-Benito (2017) also note that even though the utterance in (99) is not acceptable in clear vision contexts such as the one given for it, it is compatible with an act of pointing in a blurry vision context. In other words, a speaker can utter the sentence in (99) in a context with blurry vision while pointing towards the individual. They argue that, in such a context, the speaker knows that the student is in front of him/her at the time of utterance, and that there is only one individual in the world that has this property. They characterize this as a function f and the value made salient by the act of pointing for f is the function that combines with a property P and returns the property as in (102). They claim that based on the value in (102-a) the restriction of *algún* is as in (102-b). They note that the sentence in (99) (in a blurry vision context involving pointing) expresses the proposition in (103).

- (102) a. $\lambda w. \lambda x. P(x)$ and x is in front of the speaker in w .
 b. $\lambda w. \lambda x. x$ is a student that is in front of the speaker in w .
- (103) $\lambda w. \exists x [\text{STUDENT}_w(x) \ \& \ \text{IN-FRONT-OF-SP}_w(x) \ \& \ \text{KISS}_w(x)(M)]$

The authors present properties such as the physical appearance of an individual as an identificational property of the restrictor of an epistemic indefinite. They note that the original quantity implicature accounts did not have the capacity to incorporate such properties (as QI accounts focused only on the quantity/number of alternatives in the domain with respect to domain restriction). They claim that *algún* flags that the restriction is not an identificational property and evokes alternative assertions where the restriction is identificational. For instance, they argue that the content of the proposition in (104) will serve for it to act as a pragmatic competitor to the content of the proposition in (103).

- (104) $\lambda w. \exists x [\text{STU}(w)(x) \ \& \ \text{IN-FRONT-OF-SP}(w)(x) \ \& \ \text{APPEAR}(w)(x) \ \& \ \text{KISS}(w)(x)(M)]$

The difference between (103) and (104) is that the content of the proposition in (104) includes a particular appearance that the content of the proposition in (103) does not have. The proposition in (104) as an alternative is stronger than the assertion in (100) or (103). Thus, a quantity implicature arises as a result. They argue that an ignorance implicature arises as a result of the pragmatic competition between an assertion with *algún* without an identificational property as in (103) and an alternative assertion with an identificational

property for the restrictor as in (104).

The proposal combines the insights of both CC (that takes identificational methods into account) and QI (that takes a pragmatic competition between an assertion and more informative alternatives) approaches, in order to propose a mechanism to account for both the distribution and content of the epistemic effect of epistemic indefinites.

However, the hybrid approach in Alonso-Ovalle and Menéndez-Benito (2017) is also not able to cover the full range of facts associated with ignorance implicatures of *-hari* and *-də* disjunctions and indefinites in Sinhala. For instance, we saw in Section 2.1.2 that *-də* disjunctions and indefinites give rise to ignorance inferences that can not be canceled. Clearly, the pragmatic based hybrid account as in Alonso-Ovalle and Menéndez-Benito (2017) is not able to capture the non-cancelability property of the ignorance inferences of *-də* disjunctions and indefinites. Crucially, it is important that we look for a system that can account for the whole range of facts, if possible.

Now we have seen that the anti-singleton constraint of *algún* is crucial in the derivation of the ignorance component of *algún* indefinites. In the next section, I explore whether we can draw any insights from the contrast between singleton and anti-singleton domains to investigate whether the anti-singleton constraint holds universally for deriving ignorance.

2.4.4 Singleton vs anti-singleton indefinites and implications

There are some indefinites that are traditionally analyzed as “specific indefinites”. Those that have traditionally been called “specific indefinites” are also, in a sense, epistemic indefinites. They express knowledge with respect to the individual that satisfies the existential claim of the indefinite (i.e. “known reference”). Schwarzschild (2002) argues that indefinites that have specific readings are “referential” (i.e. the speaker can identify the referent) and are apt to have a ‘singleton domain’ or a ‘singleton set’. In a context where the indefinite as in (105) is referential (i.e. in the sense that the speaker has a particular friend in mind and can identify the referent, but the hearer can not), its domain is supposed to be restricted to a singleton.

- (105) If a friend of mine from Texas had died in the fire, I would have inherited a fortune.

The idea is that a specific indefinite which is referential (in the sense that the speaker can identify the referent, but the hearer can not) is deemed to be a singleton indefinite.

So, is it the case that an item with more than one individual (alternative) in its domain is a necessary condition for ignorance implicatures?

As we discussed in Section 2.4.1, Alonso-Ovalle and Menéndez-Benito (2010) argue that for *algún* to be pragmatically felicitous, it requires its domain to have at least two live alternatives, which they analyse as an anti-singleton constraint on the domain of quantification. As it was also discussed in section 2.4.1, they link the anti-singleton constraint with the generation of ignorance inferences by *algún*.

Inspired by this, I propose that a domain with more than one alternative is a necessary condition for expressing ignorance with respect to a disjunction or indefinite.¹⁸ For example, as we saw at the beginning, disjunctions with the particles *-hari* and *-də* (thus a domain with more than one alternative) in Sinhala overtly convey ignorance.¹⁹

- (106) a. John Giita-hari Maala-hari hambə-un-a. #namin Giita.
John Giita-hari Maala-hari meet-PAST-A namely Giita
“John met Giita or Maala. Namely Giita.”
- (107) a. John Giita-də Maala-də hambə-un-a. #namin Giita
John Giita-də Maala-də meet-PAST-A namely Giita
“John met Giita or Maala. Namely Giita ”

However, I argue that a domain with more than one alternative (i.e. a disjunction) does not necessarily give rise to ignorance. A domain having more than one alternative is necessary but not sufficient to generate ignorance. As observable in (108), the English disjunction does not give rise to ignorance when it is interpreted under the scope of negation. Under narrow scope interpretation, (108) means that John did not talk to either Paula nor Susan which implies that the speaker knows who John did not talk to (namely neither of them).²⁰

¹⁸I assume this condition to hold across almost all the mechanisms associated with deriving ignorance. For example, for pragmatic reasoning that involves domain comparison, the domains will include more than one alternative. Even within the conceptual cover approach, the CC domains will include more than one alternative.

¹⁹I do not wish to commit to a claim that a disjunction imposes an anti-singleton constraint. A disjunction by itself includes more than one alternative in the domain. An indefinite like *algún* might place it as a constraint because an indefinite may be ambiguous between a singleton and a non-singleton domain. Also, it is clear that *-hari* and *-də* are alternative sensitive particles. They appear only in contexts where alternatives are activated (i.e. disjunctions/indefinites/questions). It is a language specific fact that they appear attached to disjuncts or IDPs that introduce alternatives and place the semantic requirements/constraints on the alternatives in the respective domains. This explains why they do not show up on their own.

²⁰Note that the English disjunction is not a positive polarity item (PPI), so a narrow scope reading of the disjunction with respect to negation is possible in English.

(108) John did not talk to Paula or Susan. NOT > OR

As we also discussed in section 2.4.1, even for *algún* which is anti-singleton, when it is interpreted in the scope of the universal quantifier, it does not give rise to an ignorance effect. For example, Alonso-Ovalle and Menéndez-Benito (2017) claim that when *algún* is interpreted in the restrictor of the universal quantifier as in (109), the ignorance effect disappears. This is in the sense that the speaker can identify the students that the different professors are talking to.

(109) Todos los profesores que están hablando con algún estudiante llevan
 All the professors who are talking with algún student wear
 sombrero.
 hat
 “Every professor who is talking to a student wears a hat.”

All this discussion leads to the conclusion that a domain with more than one alternative is necessary but not sufficient to generate ignorance.²¹ So, what else is necessary to generate ignorance? This is discussed next.

2.4.5 Positive polarity items (PPIs) and implications for ignorance

Recently, Nicolae (2016) and Nicolae (2017) have shown a link between positive polarity (PPI) disjunctions and the ignorance inferences that they generate. In Section 1.7.4, we discussed Spector (2014) with respect to how PPI disjunctions associate with an obligatory exhaustivity operator. Following Spector (2014), Nicolae (2016) argues that PPI disjunctions require obligatory exhaustification. She notes that English *or* can be in the scope of local negation (it is not a PPI) as seen in (110). Thus, it does not obligatorily associate with an exhaustifier.

(110) Mary did not invite Paul or Peter for dinner. not > or / or > not

(111) Marie n’a pas invité Léa ou Jean à dîner.
 “Marie has not invited Lea or Jean for dinner.”

- a. Marie didn’t invite Lea or she didnt invite Jean for dinner. or > not
- b. *Neither Lea nor Jean were invited to dinner by Marie. not > or

Nicolae marks a difference between exhaustification with respect to domain alterna-

²¹It should be noted that I am not arguing against Alonso-Ovalle and Menéndez-Benito (2003, 2008, 2010, 2013, 2017). The discussion here is actually in keeping with their approach to the derivation of the ignorance component of indefinites. I am focusing on this research for the purpose of clarifying the details that support my arguments.

tives and scalar alternatives. The individual alternatives in the set of alternatives as in (112) are referred to as domain alternatives and the conjunctive alternative is referred to as the scalar alternative.

(112) Mary invited John or Bill.

$Alt(\text{Mary invited John or Bill}) = \{\text{Mary invited John and Bill, Mary invited John, Mary invited Bill}\}$ (Nicolae (2017))

Following Spector (2014), she argues that French *ou* as in (111) has a PP behavior because it obligatorily associates with a domain exhaustifier. She claims that exhaustification of disjunction in upward entailing (UE) environments gives rise to an epistemic inference (i.e. the speaker does not know which of the disjuncts is true), which leads to strengthening. Building on Chierchia et al. (2012), she assumes that ignorance implicatures are derived in the grammar by way of an exhaustivity operator placed in the syntactic structure. As discussed in detail in Section 1.7.6, Nicolae also assumes that a covert doxastic operator similar to a necessity modal adjoined at the matrix level at LF operates to generate the ignorance implicature. She derives the ignorance implicatures of a PPI disjunction as shown in (113).

- (113) a. $\Box [p \vee q]$
 b. $Alt_D(\Box [p \vee q]) = \{\Box p, \Box q\}$
 c. $Exh_D[\Box [p \vee q]] = \Box [p \vee q] \wedge \neg \Box p, \wedge \neg \Box q$

In the derivation in (113), there is the doxastic operator scoping over the disjunction at LF as in (113-a). In (113-b), we have the domain alternatives Alt_D of the disjunction with the doxastic operator in (113-a). In (113-c), we have the uncertainty implicatures derived by way of exhaustification with respect to domain alternatives. Thus, according to Nicolae (2016) and Nicolae (2017), an ignorance implicature arises as an uncertainty implicature due to the presence of an obligatory exhaustivity operator. Association with the exhaustivity operator results in PP since it must lead to strengthening.

It has to be noted that just the fact that an item is a PPI does not guarantee ignorance. As it was introduced in Chapter 1, the core properties of a PPI are: anti-licensing, locality of anti-licensing and rescuing (Szabolcsi, 2004; Spector, 2014). Anti-licensing means that a PPI can not be interpreted under the immediate scope of local (non-embedded) sentential negation. Consider the example in (114). The indefinite *some professor* in (114) in English is a PPI. The PPI *some* in (114) can not be interpreted as claiming that John did not meet any professor. It only means that there is some professor that John did not meet. Thus, only a wide scope interpretation of the indefinite with respect to negation

is available. But, the sentence does not necessarily give rise to ignorance. A speaker can well utter the sentence even if the speaker knew which professor John did not meet.

(114) John did not meet some professor yesterday.

In the case where the PPI above is in a situation where the speaker knew which professor that John met yesterday, we can assume that the indefinite will be of a singleton domain (following Schwarzschild (2002)). Logically, in a situation where the speaker is ignorant about which professor that John met, the domain will include more than one alternative. This shows that just the fact that an item is a PPI does not give rise to ignorance.²² This also explains the difference between wide scope indefinites such as *some NPs* in English and *-də* indefinites in Sinhala. Wide scope *some NP* indefinites can be analyzed as singleton indefinites while *-də* indefinites are anti-singleton indefinites associated with exhaustivity.

Thus, the discussions in the sections above (especially Sections 2.4.1 and 2.4.4) show that a PPI whose domain includes more than one alternative in association with an exhaustivity operator gives rise to ignorance. This means that a PPI that associates with an exhaustivity operator to derive its positive polarity is the one that gives rise to ignorance inferences by exhaustification of domain alternatives in relation to $\square$ as in (113). We can test these observations with the data in Sinhala.

2.4.6 The particles *-hari* and *-də* as “alternative sensitive” particles

Following the discussion above, I argue that the particles *-hari* and *-də* impose an anti singleton requirement on their domain of quantification. In this sense, the particles *-hari* and *-də* are “alternative sensitive” particles. They appear only in contexts where alternatives are activated (i.e. disjunctions/indefinites/questions). The domains associated with disjunctions or indefinites formed with the particles *-hari* and *-də* can not be of a singleton domain. Of course, disjunctions with the particles *-hari* and *-də* are intrinsically anti-singleton. Inspired by Alonso-Ovalle and Menéndez-Benito (2008) and Alonso-Ovalle and Menéndez-Benito (2010) that claim that Spanish *algún* is an anti-singleton indefinite, I claim that even the indefinites formed with the particles *-hari* and *-də* are anti-singleton indefinites. For example, the indefinites formed with *-hari* and *-də* as in (115) and (116) amount to the meaning that in all the worlds compatible with the speaker’s evidence, John

²²It should be noted that I am not arguing against Nicolae (2016). I am paying attention to these details for clarification of the facts. However, in Section 2.5, I argue for a link between uncertainty implicatures derived by way of exhaustification of domain alternatives and a distribution requirement for ignorance inferences.

met someone/ some girl. However, the indefinites in (115) and (116) are felicitous only if two or more individuals or girls are live options as far as the speaker is concerned.²³

- (115) a. John kaawə-də hambə-un-a.
John who-də meet-PAST-A
“John met somebody.”
- b. John kaawə-də kell-ek hambə-un-a.
John who-də girl-INDF meet-PAST-A
“John met some girl.”
- (116) a. John kaawə-hari hambə-un-a.
John who-hari meet-PAST-A
“John met somebody.”
- b. John kaawə-hari kell-ek hambə-un-a.
John who-hari girl-INDF meet-PAST-A
“John met some girl.”

These observations present us with the evidence that the particles *-hari* and *-də* are alternative sensitive particles that impose an anti-singleton requirement of alternatives on their domain of quantification. And, we need one more condition responsible for accounting for ignorance inferences. An item has to associate with exhaustivity and be a PPI. This is discussed next.

2.4.7 The particles *-hari* and *-də* as PPIs and implications for ignorance

We discussed in Section 1.7.4, a PPIs associates with an exhaustivity operator that serves to exhaustify alternatives (cf. Spector (2014)). When members/alternatives of a domain with more than one alternative are exhaustified in an upward entailing context, they generate uncertainty implicatures (Also see Nicolae (2016) as discussed in Section 2.4.5). This can be explained informally as follows. For the disjunction expression in (117-a), the uncertainty implicatures that give rise to ignorance are as in (117-b). These inferences signal that the speaker is uncertain about the status of the individual disjuncts.

- (117) a. John Giitaə-hari Maala-hari hambə-un-a.
John Giita-hari Maala-hari meet-PAST-A
“John met Giita or Maala.”
- b. The speaker is certain that John met one of Giita or Maala and it is possible that John did not meet Giita and it is possible that John did not meet Maala.

²³This might sound contradictory to the claim that *-hari* and *-də* indefinites are felicitous in clear vision contexts. The issue is that, in a clear vision context, the speaker can clearly see the witness of the existential claim and the indefinite may be of a singleton domain. However, I argue that even in a clear vision context, if the speaker does not know/can not identify the individual of the existential claim, it will still be of an anti-singleton domain (i.e. there is more than one epistemically accessible alternative).

Building on Zimmermann (2001) and Alonso-Ovalle (2006), I argue that derivation of these uncertainty inferences relates to a distribution requirement that there has to be at least one epistemic world for each alternative/proposition in which that proposition is false, as represented in (118).

$$(118) \quad a. \quad \Box (p \vee q) \wedge \Diamond \neg p \wedge \Diamond \neg q$$

Given the assertion of a disjunction in w^0 with two alternatives p, q , there is at least one world w' epistemically accessible from w^0 , where p is false and there is at least one world w'' epistemically accessible from w^0 , where q is false.

I show that exhaustification with respect to epistemically modalized domain alternatives serves to derive this distribution requirement (DR). This is discussed in detail in Section 2.6. The background to the derivation of the DR is discussed in the next section with the focus on *-hari* and *-də* disjunctions in Sinhala.

2.5 Background on deriving the ignorance in disjunctions with *-hari* and *-də*

In this section, I present an analysis of the ignorance component of *-hari* and *-də* disjunctions in the background of the theoretical frameworks, tools and assumptions introduced in Chapter 1. Implementation of the framework of Hamblin semantics as proposed in Alonso-Ovalle (2006) with respect to *-hari* and *-də* disjunctions is discussed in the next section.

2.5.1 Derivations in the framework of Hamblin semantics

As it was introduced in Chapter 1, Alonso-Ovalle (2006) in his proposal for disjunction in alternative semantics proposes that English *or* does not have any quantificational force and just collects the alternatives in a set that can propagate up to be propositions. Building on Alonso-Ovalle (2006), I argue that Sinhala *-hari* and *-də* disjunctions also collect the alternatives that can expand up to be propositions until they meet an operator such as the existential quantifier. I also argue that the particles *-hari* and *-də* in Sinhala impose certain semantic requirements on the set of alternatives in a domain. We also saw in Chapter 1 that unlike English *or*, Sinhala *-hari* and *-də* are PPIs that require obligatory exhaustification of alternatives. These morphological requirements have consequences on requirements on exhaustification with respect to the scalar alternative and deriving inclusive and exclusive readings of *-hari* and *-də* disjunctions. This section only introduces the derivation of *-hari* and *-də* disjunctions up to the propositional alternatives level. How the semantic requirements in terms of the difference in the nature of the PP behavior are

incorporated into the derivations is presented in Section 2.6. I begin analyzing the *-hari* and *-də* disjunctions in the framework of Hamblin semantics in the following manner:

Building on Alonso-Ovalle (2006), for disjunction expressions with both the particles *-hari* and *-də* as in (119), we will have a semantic representation similar to that in (120).

- (119) John Giita-hari/-də Maala-hari/-də hamu-un-a.
 John Giita-hari/-də Maala-hari/-də meet-PAST-A
 “John met Giita or Maala”

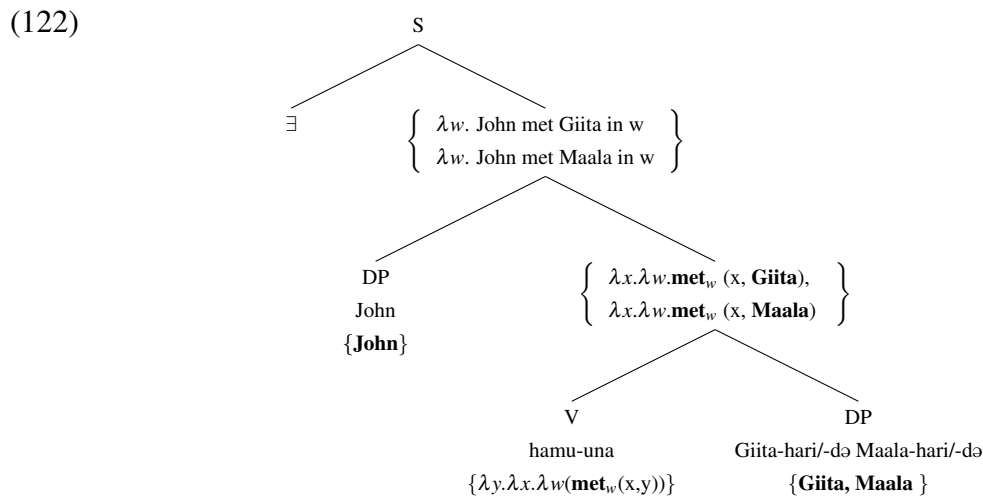
First, setting aside the specific semantic requirements, I argue that the meaning of a disjunction phrase with both *-hari* and *-də* will have a common core. I assume a tree structure that represents their structure at LF as in (120).²⁴

$$(120) \quad \text{Where } [[A]], [[B]] \subseteq D_\tau \quad \left[\begin{array}{c} \text{DisjP} \\ \swarrow \quad \searrow \\ \text{A-hari/də} \quad \text{B-hari/də} \end{array} \right] \subseteq D_\tau = [[A]] \cup [[B]]$$

Based on (120), if we consider the two disjuncts as in (121-a), we will have the structure in (121-b).

- (121) a. Giita-hari/-də Maala-hari/-də
 b. [DISJP [DP₁ Giita-hari/-də] [DP₂ Maala-hari/-də]]

In our account of disjunction in alternative semantics, the two alternatives for the DisjP in (121) are {Giita, Maala} and the meaning of (119) is derived as shown in (122).



²⁴As a detailed analysis of the internal structure of disjunctions is not relevant for my analysis, I use a flat syntactic structure for disjunctions. See Slade (2011) and Szabolcsi (2015) for some analysis of the internal structures of disjunctions.

Here, in (122), the individual alternatives $\{\text{Giita, Maala}\}$ are collected at DP level by *-hari/-də*. Then, by way of point-wise function argument application (Hamblin functional application), the individual alternatives are combined with the denotation of V and will propagate up to the propositional level by combining with the denotation of the subject DP. At the propositional level we have two alternatives.

$$(123) \quad \{\lambda w. \text{John met Giita in } w, \lambda w. \text{John met Maala in } w\}$$

Following Kratzer and Shimoyama (2002) and Alonso-Ovalle (2006), I assume that the set of propositional alternatives are existentially closed at S level. The denotation of the existential operator as given in Kratzer and Shimoyama (2002) is represented here in (124).

$$(124) \quad \text{For All } [[\alpha]]^{w,g} \subseteq D_{\langle st \rangle} \\ [[\exists \alpha]]^{w,g} = \{\lambda w'. \exists p [p \in [[\alpha]]^{w,g} \ \& \ p(w')=1]\}$$

This amounts to the meaning that this is the proposition that is true in a world if at least one proposition in the set of alternatives (propositions) is true.

$$(125) \quad \exists [\{\lambda w. \text{John met Giita in } w, \lambda w. \text{John met Maala in } w\}]$$

As we saw above, the Hamblin framework allows us to maintain that the alternatives of a disjunctive phrase include each of the disjuncts separately that can grow up to be propositions on their own. The advantage of the implementation of the Hamblin framework is that, as we will see in the next section, it serves well in the case of exhaustification with respect to domain and scalar alternatives separately.

However, this is only a preliminary version of the derivation that does not account for inclusive and exclusive readings of *-hari* and *-də* disjunctions. An introduction to the derivation of these different readings by application of an exhaustivity operator is discussed in the next section.

2.5.2 The role of Exh in generating implicatures

Discussing Spector (2014) in Section 1.7.4, it was argued that PP status for *soit-soit* results from its obligatory association with an exhaustivity operator. I argue that the two particles *-hari* and *-də* as PPIs also associate with an exhaustivity operator. My proposal is that the exhaustivity operator placed at different positions in a syntactic structure is responsible for exhaustification with respect to domain and scalar alternatives. As it was discussed in detail in Section 1.7.3.3, I will adopt the formulation in Nicolae (2017) as in (126).

$$(126) \quad \text{Exh}(p) = p \wedge \forall q \in \text{IE}(p, \text{Alt}(p)): \neg q$$

where: $\text{IE}(p, \text{Alt}(p)) = \lambda q \in \text{Alt}(p). \neg \exists r \in \text{Alt}(p): (p \wedge \neg q) \longrightarrow r$.

As is also the case with any other *Exh* operator that includes innocent exclusion, (126) amounts to the meaning that p is true and any alternative q not entailed by p is false, as long as negating q is consistent with negating any other non-weaker alternatives (cf. Nicolae (2016; 2017)).

I also implement a system that *Exh* targets domain and scalar alternatives separately on an individual basis. As it will be discussed in Section 2.6, this is motivated by the distinctive effects generated. When *Exh* operator targets domain alternatives, I mark it as $\text{O}_{\text{Exh}}\text{D}$, and when *Exh* operator targets scalar alternatives, I mark it as $\text{O}_{\text{Exh}}\text{S}$.²⁵

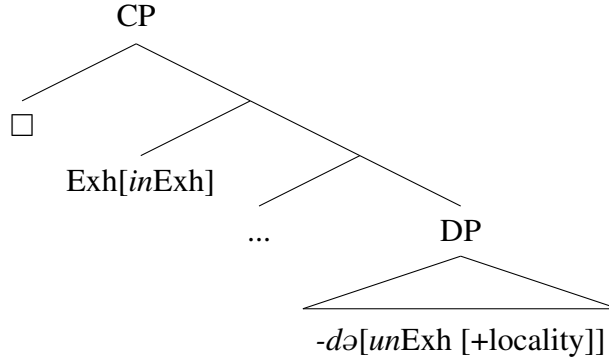
Now, as it was presented in Section 1.7.5, I argue that exhaustification is partially determined by the lexical requirements of the particles *-hari* and *-də* carrying an uninterpretable $[\text{unExh}]$ feature. I also argue that an implicit exhaustivity operator carrying an interpretable $[\text{inExh}]$ feature may occupy different positions in the syntactic structure of a *-hari* and *-də* disjunction sentence at LF. As we discussed in Section 1.7.5, Kratzer and Shimoyama (2002) and Kratzer (2005) argue for a syntactic agreement/feature movement relation between the operators such as $[\exists]$, $[\forall]$, $[\text{Neg}]$, $[\text{Q}]$, etc, and different types of indefinites with such interpretable or uninterpretable features. Thus, building on Kratzer and Shimoyama (2002) and Kratzer (2005), I assume that there is a feature agreement/movement relation between the exhaustivity operator and the particles *-hari* and *-də*.

The agreement system as implemented here allows us to derive the differences between *-hari* and *-də* disjunction sentences. Essentially, I argue that the particle *-də* comes with a $[+]$ morpho-syntactic locality requirement with respect to exhaustification of the scalar alternative/s. The particle *-hari* does not specify a $[+]/[-]$ locality requirement. I show that this requirement is a domain condition on feature checking: the $[\text{unExh}]$ feature of *-də* must be checked in the local domain with respect to the doxastic operator (i.e. below the doxastic operator and within the CP that contains it). This results in the scalar alternative/s associated with *-də* being negated locally (within the CP that contains it), as illustrated in the tree diagram in (127). On the other hand, the $[\text{unExh}]$ feature of *-hari* may be checked globally or locally with respect to the doxastic operator (i.e. above or below the doxastic operator), as illustrated in (128). These outcomes will have consequences for exclusive and inclusive interpretations of *-də* and *-hari* disjunctions (to be

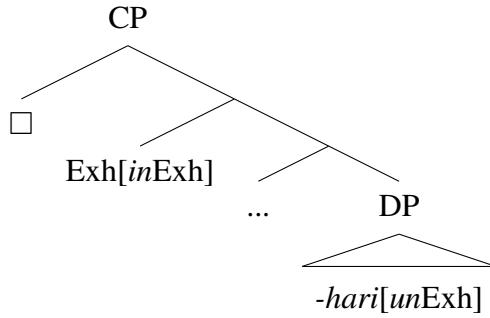
²⁵See Section 2.4.5 for definitions of “domain alternatives” and “scalar alternatives”.

discussed in Section 2.6.3).²⁶

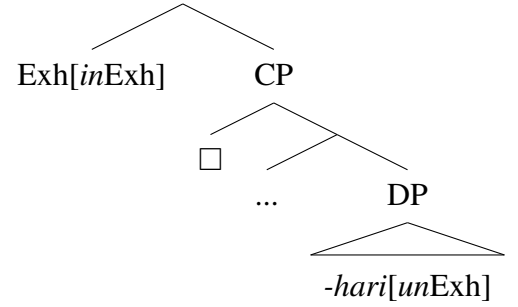
(127)



(128) a.



b.



In Section 1.7.6, we mentioned that assertions are implicitly modalized. Based on Alonso-Ovalle and Menéndez-Benito (2010), we also defined a doxastic operator to scope above a disjunction or indefinite expression at LF. In the next section, I explain the role of the implicit modal/doxastic operator used in the derivations with respect to *-hari* and *-də* disjunctions and indefinites.

2.5.3 Refining ASSERT

In this section, I propose that existential closure over alternatives takes place within the scope of the ASSERT operator (i.e.(130)). This is in line with the ideas proposed in Kratzer and Shimoyama (2002). For instance, Kratzer and Shimoyama (2002) note that

²⁶The [+ locality] condition of the particle *-də* does not hold for domain alternatives. For instance, exhaustification with respect to domain alternatives below the doxastic operator will lead to vacuous exhaustification (cf also. Nicolae (2017)). The domain alternatives associated with *-hari* may be exhausted locally or globally depending on the other operators such as the universal quantifier or modals that they interact with.

modals can be taken to be operators either over sets of propositional alternatives or singleton sets of propositions (where in the latter case their scope is immediately closed by the existential operator). In Section 1.7.6, we discussed the assertoric operator as in (129) as proposed in Alonso-Ovalle and Menéndez-Benito (2010).

$$(129) \quad [[\text{ASSERT}]]^c = \lambda p. \lambda w. \forall w': \text{Epistemic}_{\text{Speaker of } c} (w) [p (w')]$$

This amounts to the interpretation that the assertoric operator takes, as its arguments, a proposition p , a world w and asserts that this proposition is true in all worlds w' epistemically accessible to the speaker in w . While the assertoric operator as defined above takes a proposition as its argument, standard existential closure in the Hamblin framework will deliver a singleton set. This needs refining. For the sake of simplicity, I assume that alternatives propagate as sets only up to the level of the existential closure. I assume that the assertoric operator combines with a regular proposition after the existential closure. The advantage of assuming that the individual alternatives grow up to be propositions until up to the level of the existential closure is that it serves to derive and keep the domain alternatives of disjunction as separate individual alternatives. The advantage of using regular propositions after the existential closure is that it also serves well in the computation of exhaustivity implicatures of disjunction and scalar alternatives. For instance, as seen in (157) or (162), when the exhaustivity operator is combined with a disjunction, the exhaustivity operator can be sensitive to all the disjunction, sub-domain and scalar alternatives of the disjunction and can operate on them. This will also be discussed in detail in Sections 2.6.2 and 2.6.3 in application to the derivations (this is also the approach taken in the accounts of Meyer (2013) and Nicolae (2017) as discussed in the Sections 1.7.4, 2.4.5 and 2.8.1).

With all these tools, frameworks and assumptions in hand, it is now time to embark on deriving ignorance implicatures.

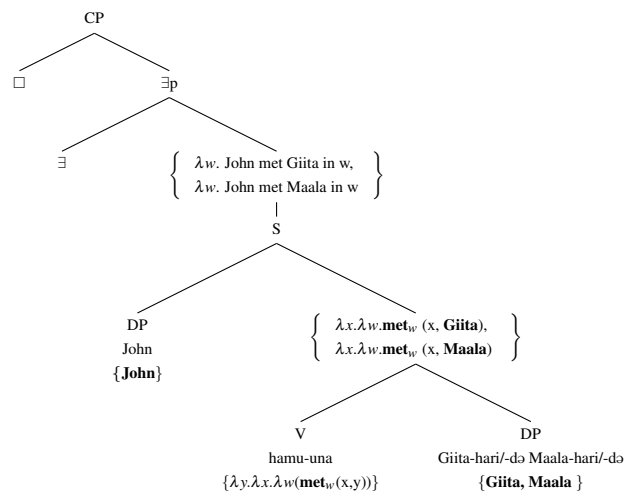
2.6 Computing ignorance with respect to *-hari* and *-də* disjunctions

In this section, I discuss the derivation of the ignorance component of disjunction expressions in Sinhala. Despite their differences in the behavior with respect to non/cancelability of the ignorance component, I make a proposal that can uniformly account for the derivation of the ignorance component of both *-hari* and *-də* disjunctions in a formal manner. I claim that ignorance inferences with respect to both *-hari* and *-də* disjunctions are derived by exhaustifying with respect to epistemically modalized domain alternatives. I show that exhaustification with respect to epistemically modalized domain alternatives serves to de-

rive the distribution requirement (cf. (134)) for ignorance inferences, which is responsible for uncertainty implicatures.²⁷

As illustrated with the tree diagram in (130), a doxastic operator is projected at the top. We also have the two domain alternatives: $\{\lambda w. \text{John met Giita in } w, \lambda w. \text{John met Maala in } w\}$ at the propositional level closed by the existential operator. Crucially, the doxastic operator akin to an epistemic necessity modal is adjoined at the matrix level at LF, based on the assumption that assertions are implicitly moralized.

(130)



Thus, at the matrix level at LF, the doxastic operator combines with the proposition as in (131). This means that in all of the speaker's epistemically accessible worlds, there is a proposition, a member of the propositions of S, that is true in them.

(131) $\{ \forall w \in \text{Dox}_{w'}, \exists p [p \in \{\lambda w. \text{John met Giita in } w, \lambda w. \text{John met Maala in } w\} \& p(w)=1] \}$

Simplifying it as in what follows, (131) is represented with a regular disjunction proposition with the doxastic operator scoping over it as in (132).

(132) $\Box [\lambda w. \text{John met Giita in } w \vee \text{John met Maala in } w]$

As it was briefly introduced in Section 2.4.7, I argue that there is a distribution requirement (DR) to derive ignorance implicatures of disjunctions and indefinites. I show that the positive polarity character of the two particles *-hari* and *-də* requires that the two par-

²⁷Compare also Meyer (2013) and Nicolae (2017) that propose to derive ignorance inferences by way of exhaustification with respect to domain and scalar alternatives. My account here goes beyond those of Meyer (2013) or Nicolae (2017) as I essentially argue for a DR based on exhaustification with respect to epistemically modalized domain alternatives to derive ignorance inferences. See Section 2.8 for more details.

ticles associate with an obligatory exhaustivity operator. I claim that we can derive the distribution requirement by way of the exhaustivity operator *Exh* which is responsible for exhaustification of alternatives. This is discussed in the next section.

2.6.1 A distribution requirement (DR) for ignorance inferences

The background and implications of the distribution requirement for ignorance implicatures is discussed as follows: First, I present a discussion of the distribution requirement for free choice effects of disjunctions and indefinites in the contexts of overt modals as in Zimmermann (2001), Kratzer and Shimoyama (2002), Alonso-Ovalle (2006), Fox (2007), among many others. Then, I discuss the distribution requirement presented for ignorance effects of disjunctions in overt and non-overt modal contexts as in Alonso-Ovalle (2006). I also review the proposal in Zimmermann (2001) which analyzes the epistemic component of non-modalized disjunction as derived from implicitly modalized disjunction. Finally, I present my case for a distribution requirement for disjunctions and indefinites in contexts where there is no overt modal but an implicit modal (i.e. in the form of a doxastic operator).

2.6.1.1 The distribution requirement for free choice effects

The requirement for the distribution of alternatives among accessible worlds has been much discussed for deriving free-choice effects of disjunction or indefinites under deontic necessity or possibility modals. (cf: Zimmermann (2001); Kratzer and Shimoyama (2002); Alonso-Ovalle (2006); Fox (2007); Menéndez-Benito (2010), among many others). For instance, Alonso-Ovalle (2006) notes that in a context for (133) where Mom knows what Sandy may and may not have for dessert, (133) conveys that all three dessert options are permitted.

(133) Mom, to Dad: Sandy may have cake, ice cream, or an apple.

Alonso-Ovalle (2006) argues that the standard semantics of *or* fails to capture this reading that Sandy has three permitted dessert options. He notes that the requirement for the modal *may* under standard assumptions is that the proposition that it operates over contain at least one permitted world. At the same time, the standard assumptions maintain that *or* (for (133)) operates over the union of the set of worlds where Sandy has cake, the set of worlds where she has ice cream, and the set of worlds where she has an apple. Thus, according to the standard assumptions, the sufficient conditions for this sentence to be true are at least one permitted world where John eats at least one of cake, ice cream, or an apple. However, as it was mentioned above, (133) expresses more than what the standard

semantics tells us of (133). It gives rise to the so called freedom of choice, which is known as the free choice effect. In deriving this free choice effect, it is required that there has to be a deontically accessible world for each of cake, ice cream, or an apple which is known as the ‘distribution requirement’. I represent this distribution requirement for free-choice as in (134) (given a disjunction of two alternatives p, q).

- (134) $\Diamond p \wedge \Diamond q$
 = There is at least one world w' accessible from w^0 , where p is true and there is at least one world w' accessible from w^0 , where q is true.

In the literature, there are several proposals as to how this reading could be derived. According to Zimmermann (2001) and Simons (2005), this is built into truth conditions. According to Kratzer and Shimoyama (2002), Alonso-Ovalle (2005) and Alonso-Ovalle (2006), this requirement is derived as a conversational/quantity implicature. Specifically, Alonso-Ovalle (2006) argues that this requirement is derived in the pragmatics as a quantity implicature after the semantic composition is done. In contrast to Alonso-Ovalle (2006), Fox (2007) claims that this is derived as a grammaticalized implicature (as part of the semantic meaning of the sentence) by way of an exhaustivity operator placed in the syntactic structure. This is responsible for generating exhaustivity implicatures that serve to derive the distribution requirement. Dealing with the interpretation and distribution of universal free-choice items like English *any* and Spanish *cualquiera*, Menéndez-Benito (2010) proposes that the distribution requirement can be derived as built into truth conditions by way of an exclusivity operator.²⁸

Building on the implications of the distribution requirement for free choice as discussed above and drawing insights from the distribution requirement for ignorance implicatures of disjunctions in contexts of overt modals as in Zimmermann (2001) and Alonso-Ovalle (2006), I argue that there is also a distribution requirement for generating ignorance implicatures of disjunctions and indefinites in contexts where there is no overt modal. Crucial insights are also drawn from the way ignorance/uncertainty implicatures are drawn in the accounts of Meyer (2013) and Nicolae (2016; 2017) which are discussed in Sections 2.4.5 and 2.8. In the next section, I argue for the case of the distribution requirement for ignorance implicatures.

²⁸It has to be noted that this is only a brief introduction to the derivation of free choice effects. The implications of the distribution requirement for free choice will be discussed in detail in the section dealing with free choice implicatures of *-hari* and *-də* disjunctions in Chapter 3.

2.6.1.2 The distribution requirement (DR) for ignorance effects

In the following, I present a brief review of Zimmermann's account to support the case for a distribution requirement for ignorance inferences.²⁹ Zimmermann (2001) notes that expressions of the kind in (135) are ambiguous between a deontic and epistemic reading.

(135) Detectives may go by bus or boat.

Zimmermann (2001) argues that sentences of the form as in (135) (represented as in (136-a)), may be understood as implying (136-b).

- (136) a. X may A or B
b. X may A and X may B,

He claims that in a free-choice permission reading of (136), the free-choice effect arises as a result of disjunctions being interpreted as a conjunctive lists of epistemic possibilities. Then differentiating between free choice and epistemic readings, he argues that a deontic free choice reading arises when epistemic modality involved in the expression is authoritative. An epistemic (ignorance) reading arises when non-authoritative epistemic modality is involved in the expression.

As it was also mentioned in Section 2.3.1.1, analyzing the epistemic variant of (137-a), Zimmermann (2001) argues that the wide disjunction as in (137-a) is understood as a conjunction of its modalized disjuncts as in (137-b).

- (137) a. Mr. X might be in Victoria or he might be in Brixton
b. Mr. X might be in Victoria and he might be in Brixton.

Zimmermann argues that the non-modalized disjunction as in (138-a) is understood as a conjunction of modals as in (138-b).

- (138) a. Mr. X is in Victoria or in Brixton
b. Mr. X might be in Victoria and he might be in Brixton.

Thus, he proposes to analyze the disjunctions as being understood as conjunctions of epistemic possibilities in the following way. First, he proposes to analyze all choice sentences (as in (139-a)) as wide disjunctions as in (139-b) being understood as p might be the case or q might be the case. Second, he proposes to interpret the wide disjunction of the form p

²⁹Zimmermann (2001) only analyses disjunctions as conjunctive lists of epistemic possibilities to account for what he refers to as the epistemic variant of FC effects. He does not explicitly refer to a distribution requirement or anything as such.

might be the case or *q* might be the case as conjoined epistemic possibilities as in (139-c) which is understood as *p* might be the case and *q* might be the case.

- (139) a. Mr. X might be in Victoria or in Brixton
 b. Mr. X might be in Victoria or he might be in Brixton
 c. Mr. X might be in Victoria and he might be in Brixton.

What we observe in (139-c) is exactly akin to the signature of a distribution requirement. As it was discussed above, the requirement for epistemic possibilities in Zimmermann (2001) for the ‘epistemic variant’ of a disjunction as in (139-c) is *p might be the case and q might be the case*. This can be represented as in (140).

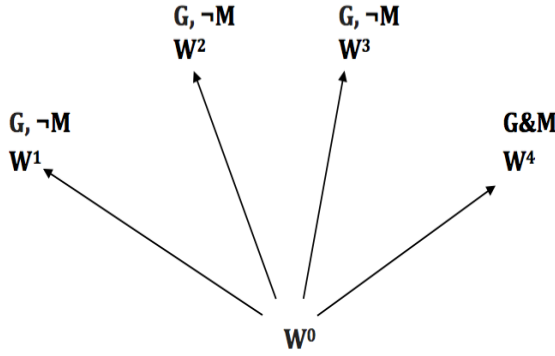
- (140) $\Diamond p \wedge \Diamond q$
 = There is at least one world w' accessible from w^0 , where *p* is true and there is at least one world w' accessible from w^0 , where *q* is true.

Note that (140) represents the distribution requirement to derive free choice implicatures that we discussed in the previous section (cf. (134)). I argue that (140) characterizes the free choice implicatures.³⁰, but it is too weak to characterize true ignorance inferences. For instance, the truth conditions in (140) are that in at least one of the accessible worlds *p* is true and in at least one of the accessible worlds *q* is true. This is compatible with ignorance but it is also compatible with knowledge. In other words, it does not express true ignorance. Nothing in the semantics in (140) tells us that one or both the alternatives can not be true in all the epistemically accessible worlds. For instance, as it will also be discussed in detail in Section 2.7.1, the situation depicted in (142) is compatible with the distribution requirement in (140) for (141). The situation depicted in (142) is one in which the speaker knows that John met Giita but is not sure about Maala.

- (141) John Giita-hari/-də Maala-hari/-də hamu-un-a.
 John Giita-hari/-də Maala-hari/-də meet-PAST-A
 “John met Giita or Maala”

³⁰This will be discussed in more detail in Chapter 3, dealing with free choice.

(142)



In (142), we have w_1 , w_2 , w_3 and w_4 epistemically accessible to the speaker in w_0 . And, in w_1 , w_2 and w_3 , the proposition that John met Giita is true. In w_4 , the proposition that John met Giita and Maala is true. Thus, the proposition that John met Giita is true in all the worlds epistemically accessible to the speaker in w_0 . In a situation where the proposition that John met Giita is true in all of the epistemically accessible worlds as in (142), the speaker knows that John met Giita. The situation depicted in (142) assures that the speaker knows John met Giita, but is not sure about Maala, which corresponds to partial knowledge. The LF in (140) is also compatible with a situation where the proposition that John met Giita and Maala is true in all the worlds epistemically accessible to the speaker, which conveys that the speaker knows that John met Giita and Maala.

Thus, it is clear that if we analyze the “epistemic variant” of disjunctions in Zimmermann (2001) in terms of a distribution requirement as in (140), that distribution requirement is not equivalent to ignorance. However, from Zimmermann’s account, I draw some crucial insights such as “disjunctions being interpreted as conjunctive lists of epistemic possibilities” to build an account for a distribution requirement to derive ignorance inferences. I also draw crucial insights from the distribution requirement proposed for ignorance implicatures in Alonso-Ovalle (2006). This is discussed next.

Alonso-Ovalle (2006) also discusses a distribution requirement for disjunction expressions of matrix clauses as in (143). He derives the epistemic distribution requirement by way of a strengthening mechanism $[[S]]^+$ as in (144), and a condition called ‘No Privilege’ as introduced in Kratzer (2005).

(143) Sandy is reading Moby Dick, Huckleberry Finn, or Treasure Island

According to Alonso-Ovalle (2006), the first instance of strengthening $[[S]]^+$ is a

process in the semantics by application of innocent exclusion as represented in (144).

- (144) For any disjunction S,
 Where $\heartsuit ([S]_{ALT}, \cap)$ is the set of innocently excludable propositions in $[S]_{ALT}, \cap$
 $[S]^+ = \lambda w. \exists p[p \in [S] \ \& \ p(w) \ \& \ \forall q[q \in \heartsuit ([S]_{ALT}, \cap) \rightarrow \neg q(w)]]$

This first instance of strengthening $[S]^+$ with the innocent exclusion yields the proposition that is true in a world w if and only if the proposition in (143) is true in w and all the conjunctive competitors are false in w . That rules out the possibility that Sandy is reading more than one of Moby Dick, Huckleberry Finn, or Treasure Island. Alonso-Ovalle (2006) notes that this does not give us the distribution requirement yet. The No Privilege implicature, the instance of the second strengthening as in (145) defines that either all the sub-domain competitors (i.e. individual disjuncts) or none of them are true, which is supposed to derive the distribution requirement.

(145)

$$[S]^{++} = \lambda w. [S]^+(w) \ \& \ \forall q \forall r \left[\left(\begin{array}{c} q \in ([S]_{ALT, U} - [S]) \\ \& \\ r \in ([S]_{ALT, U} - [S]) \end{array} \right) \rightarrow (q(w) \leftrightarrow r(w)) \right]$$

The second strengthened meaning (represented by $[S]^{++}$) conveys that if it is possible that Sandy is reading Moby Dick, it must also be possible that Sandy is reading Huckleberry Finn and it must also be possible that she is reading Treasure Island.

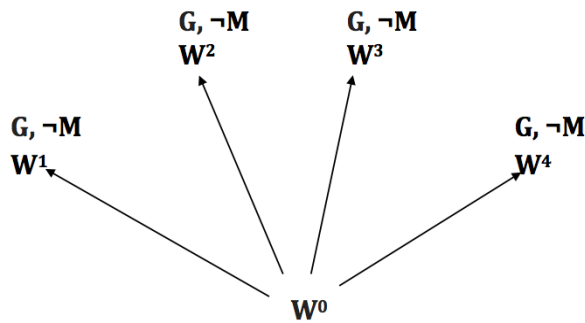
Now, note that this strengthened meaning gives rise to the following (presented only for two alternatives p, q).

- (146) $\Diamond p \wedge \Diamond q \wedge \neg \Diamond (p \ \& \ q)$
 = There is at least one world w' accessible from w^0 , where p is true and there is at least one world w' accessible from w^0 , where q is true and in none of the worlds w' accessible from w^0 , $(p \ \& \ q)$ is true.

We saw in Section 2.2.1 that ignorance inferences of *-hari* disjunctions can be canceled in a number of contexts such as teasing, correcting, etc. However, the strengthened meaning as derived in (145) and as represented in (146) does not leave room for cancelation of the ignorance inferences of *-hari* disjunctions. As it will be argued in detail in Section 2.7.1, for cancelation of ignorance inferences, at least one alternative has to be true in all epistemically accessible worlds. There are two types of situations that allow one alternative to be true in all accessible worlds. One is in a context with complete knowledge (i.e. in

our examples, the speaker knows who John met and who John did not meet) as depicted in (147).

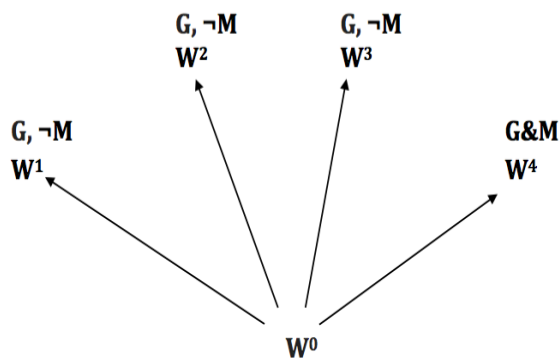
(147)



The situation depicted in (147) shows that the speaker knows that John met Giita and not Maala.

The other is a context where one domain alternative is true in all the epistemically accessible worlds and the scalar alternative is true in at least one accessible world, which conveys partial knowledge (i.e. in our examples, the speaker knows who John met, but does not know whether he met the other) as depicted in (148).

(148)



The situation depicted in (148) assures that the speaker knows John met Giita, which conveys partial knowledge. In a situation where the proposition that John met Giita is true in all of the epistemically accessible worlds as in (148), the speaker knows that John met Giita. However, given the distribution requirement as in (146), the enriched meaning as derived in (145) with the requirement that each alternative is true in at least one accessible world and its exclusion of the conjunctive alternative does not leave room for cancelation

of the ignorance inferences. This will be discussed in detail in Section 2.7.1.

Thus, building on Zimmermann (2001) and Alonso-Ovalle (2006), I argue that, like for free choice or ignorance inferences in contexts of overt modals, there is a distribution requirement for ignorance implicatures of disjunction and indefinite expressions in contexts where there is no overt modal, but an implicit modal which is assumed to be present. However, the distribution requirement that I am proposing is different from Alonso-Ovalle (2006) and Zimmermann (2001). As it was explained above, the truth conditions for the way the epistemic variant of free choice sentences is derived in Zimmermann (2001) are too weak for expressing true ignorance. On the other hand, as it was seen just above, the distribution requirement for ignorance implicatures in Alonso-Ovalle (2006) is too strong to account for ignorance inferences of *-hari* disjunction as it does not leave room for cancelability of ignorance inferences.³¹

I argue that the right distribution requirement for ignorance implicatures is: there is at least one world w' epistemically accessible from w^0 , where p is false and there is at least one world w' epistemically accessible from w^0 , where q is false as represented in (149).³²

- (149) $\Diamond \neg p \wedge \Diamond \neg q$ (given the assertion of a disjunction with two alternatives p, q)
 = Given the assertion of a disjunction with two alternatives p, q , there is at least one world w' epistemically accessible from w^0 , where p is false and there is at least one world w' epistemically accessible from w^0 , where q is false.

I justify the case for the distribution requirement for ignorance implicatures with the example in (150) and the explanation that follows. Consider the disjunction expression in (150).

- (150) John Giita-hari/də Maala-hari/də hamu-un-a.
 John Giita-hari/də Maala-hari/də meet-PAST-A
 “John met Giita or Maala”

³¹Ignorance inferences may be canceled if there is only the first instance of strengthening, $[[S]]^+$ which only gives rise to an exclusivity implicature with respect to the conjunctive alternative. This is similar to a situation depicted in (147). However, in such a case, one has to assume that domain alternatives are not taken into account. This does not apply to *-hari* or *-də* disjunctions/indefinites as exhaustification of domain alternatives is obligatory given their PP character.

³²In the formalization of this DR for ignorance inferences, I also draw crucial insights from the way ignorance/uncertainty implicatures are derived in the accounts of Meyer (2013) and Nicolae (2017) as discussed in Section 2.6.1.1.

- (152) a. $\Box$ [John Giita-hari/-də Maala-hari/-də hamuun-a]
 b. Assertion: $\Box$ [G $\vee$ M]
 c. Domain Implicature: $Alt_D(\Box[G \vee M]) = \{\Box G, \Box M\}$
 $Exh_D[\Box[G \vee M]] = \Box[G \vee M] \wedge \neg \Box G \wedge \neg \Box M$

In (152-a), we have the disjunction construction with the covert doxastic operator adjoined at the matrix level at LF. Assertion of (152-a) is represented in (152-b). The domain implicatures drawn by exhaustification of domain alternatives result in the uncertainty implicature as represented in (152-c). This serves to generate the ignorance component of meaning as uncertainty implicatures, that the speaker is not sure that John met Giita and the speaker is not sure John met Maala. Thus, we have the total meaning that John met one of the two individuals and the speaker is not sure which one.

Crucially, the LF derived in (152-c) serves to derive the distribution requirement that I argue for in the case of deriving ignorance inferences of epistemic disjunction or indefinite expressions. I argued above that as for the distribution requirement for free choice which is $\Diamond p \wedge \Diamond q$, there is also a distribution requirement for deriving ignorance inferences, which is represented as in (153). Crucially, the LF derived as in (152-c) is equivalent to (153).

- (153) $\Diamond \neg p \wedge \Diamond \neg q$ (given a disjunction assertion that includes two alternatives p,q)
 = Given a disjunction assertion that includes two alternatives p,q, there is at least one world w' epistemically accessible from w^0 , where p is false and there is at least one world w' epistemically accessible from w^0 , where q is false.

Thus, when the domain alternatives are exhaustified, we derive the LF in (152-c): $\Box[G \vee M] \wedge \neg \Box G \wedge \neg \Box M$. And, the LF in (152-c) is logically equivalent to $\Box[G \vee M] \wedge \Diamond \neg G \wedge \Diamond \neg M$, which is the DR for ignorance implicatures. This way, I account for the distribution requirement for derivation of ignorance inferences, which is one of the central points of this chapter.

It is important to note that Nicolae (2016; 2017) also proposes to derive the ignorance inferences of French plain disjunction *ou* as in (152), by exhaustification with respect to domain alternative. However, Nicolae (2016; 2017) does not link her analysis to a distribution requirement that I argue for here. In this way my account here builds on but goes beyond those of Nicolae (2016; 2017). Implications of the proposal of Nicolae (2017) are discussed in Section 2.8.2. As discussed in Section 2.8.1, the way Meyer (2013) derives

the ignorance inferences by matrix exhaustification or recursive exhaustification of alternatives is not able to account for or derive the distribution requirement in (149).

We observed in Section 2.2 that the ignorance inferences expressed by *-hari* and *-də* disjunctions are different. I argue that exhaustification with respect to scalar alternative/s plays a crucial role in accounting for the difference between *-hari* and *-də* disjunctions as well as non/cancelable behavior of the ignorance expressed by *-hari* and *-də* disjunctions. I show that the implicatures derived by way of exhaustification with respect to domain alternatives as in (152-c) are compatible with or leave room for two states of affairs. Note that implicatures derived by exhaustification of domain alternatives entail a weak claim with respect to the conjunctive alternative as presented in (154).

$$(154) \quad \Box [G \vee M] \wedge \neg \Box G \wedge \neg \Box M \Rightarrow \neg \Box (G \wedge M)$$

That is $\neg \Box [G \wedge M]$ (entailed by $\Box [G \vee M] \wedge \neg \Box G \wedge \neg \Box M$) only implies that the speaker does not know/believe that $G \wedge M$ is true. On the one hand, it is compatible with $\neg \Box \neg (G \wedge M)$ (i.e. the speaker does not believe that $G \wedge M$ is false), as shown in (155-b). On the other hand, it is also compatible with $\Box \neg (G \wedge M)$ (i.e. the speaker believes that $G \wedge M$ is false) as represented in (155-c).

$$(155) \quad \begin{array}{ll} \text{a.} & \Box [G \vee M] \wedge \neg \Box G \wedge \neg \Box M \Rightarrow \neg \Box G \wedge M \\ \text{b.} & \Box [G \vee M] \wedge \neg \Box G \wedge \neg \Box M \wedge \neg \Box \neg G \wedge M \\ \text{c.} & \Box [G \vee M] \wedge \neg \Box G \wedge \neg \Box M \wedge \Box \neg G \wedge M \end{array}$$

Thus, even though exhaustification with respect to domain alternatives as in (152-c) derives the distribution requirement for us, as obvious from the state of affairs in (155), the speaker state with respect to the scalar alternative leaves room for two sets of affairs. I argue that exhaustification with respect to the scalar alternative/s is crucial in deriving the difference between *-hari* and *-də* disjunctions as well as non/cancelable behavior of the ignorance expressed by *-hari* and *-də* disjunctions.

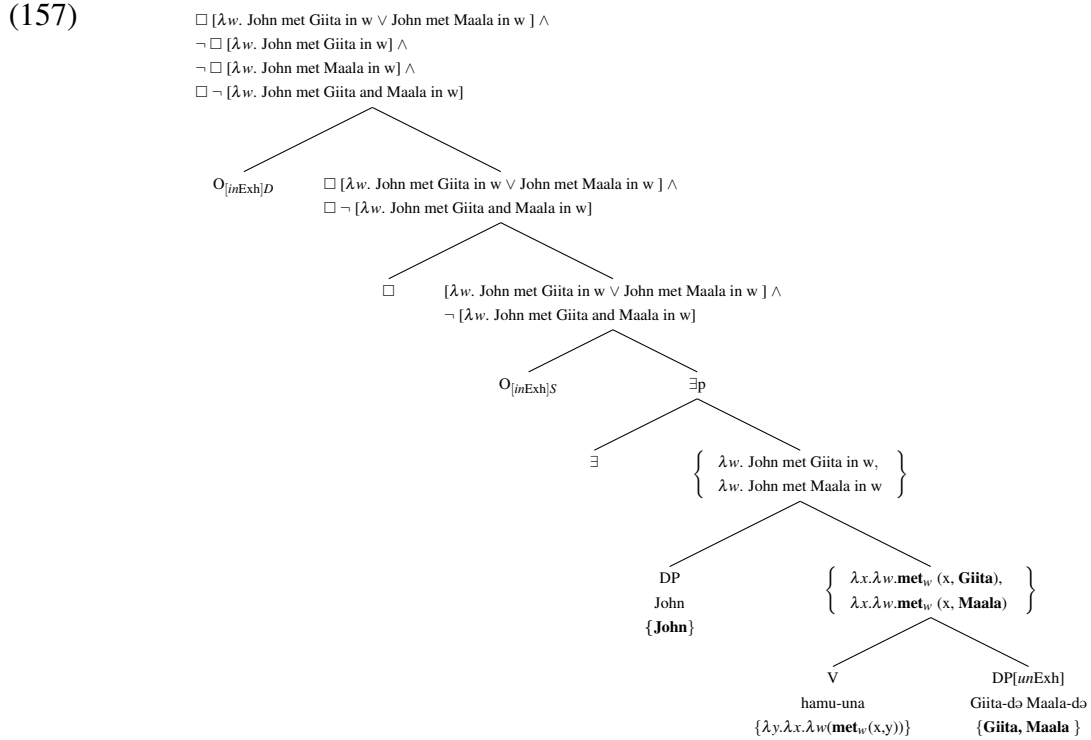
There are two ways that exhaustivity can be applied to scalar alternative/s: [1] Matrix exhaustification of the scalar alternative (i.e. exhaustification applied above the doxastic operator), [2] local exhaustification of the scalar alternative (i.e. exhaustification applied below the doxastic operator). This, I argue, has consequences on the differences in the ignorance inferences of *-hari* and *-də*. This is discussed next.

2.6.2 Computing ignorance with respect to *-də* disjunctions

As we discussed in Section 2.2.1, a disjunction expression as in (156), with *-də* will be true only in a situation where it amounts to the meanings that [i] John met exactly one of Giita or Maala and not both; [ii] The speaker does not know who/which.

- (156) John Giita-də Maala-də hamu-un-a.
 John Giita-də Maala-də meet-PAST-A
 “John met Giita or Maala.”

In this section, as it was discussed in detail in the previous section, I maintain that the ignorance inferences of a *-də* disjunction expression are generated by distributing the negated modalized domain alternatives among the accessible worlds (i.e. by way of exhaustification with respect to domain alternatives). I also show that the exclusivity (i.e. “exactly one”) component of the meaning of a *-də* disjunction expression is derived by way of the morphological requirement of the particle *-də* (i.e. [+locality]) entering into a local agreement with an exhaustivity operator below the doxastic operator (i.e. within the local domain of CP), as explained in Section 2.5.2. I claim that the structural representation of a *-də* disjunction will be as in (157).



Here, in (157), just before the existential closure, we have the two domain alternatives: $\{\lambda w. \text{John met Giita in } w, \lambda w. \text{John met Maala in } w\}$ at the propositional level. And, when these two alternatives are existentially closed, we will have the scalar alternative

pertaining to *or* (i.e. $\{or...and\}$) as: $Alt_S(\lambda w. \text{John met Giita in } w \vee \text{John met Maala in } w) = \{\lambda w. \text{John met Giita and Maala in } w\}$. Here, I argue that the scalar alternative is factored in at the right time as a clausal alternative to *or*. The [+locality] requirement of the particle *-də* with its uninterpretable exhaustivity feature [*unExh*] requires that it agrees with a local exhaustivity operator with an interpretable exhaustivity feature [*inExh*] to derive the exclusivity component of a *-də* disjunction. Thus, when exhaustivity applies to the proposition: $\lambda w. \text{John met Giita in } w \vee \text{John met Maala in } w$, that will negate the scalar alternative and we will have the implicature: $\neg \lambda w. \text{John met Giita and Maala in } w$. Here, as defined for the local *Exh* operator (as seen in the tree: $O_{Exh}S$), the alternative/s that it selects are only the scalar ones. Note also that when exhaustivity applies below the modal operator, the condition of innocent exclusion will serve to negate only the scalar (conjunctive) alternative, which is not one of the domain alternatives. Then, when the assertoric operator combines with the proposition: $\lambda w. \text{John met Giita in } w \vee \text{John met Maala in } w$, and the implicature: $\neg [\lambda w. \text{John met Giita and Maala in } w]$, we will have the assertion: $\Box [\lambda w. \text{John met Giita in } w \vee \lambda w. \text{John met Maala in } w]$ and the implicature $\Box \neg [\lambda w. \text{John met Giita and Maala in } w]$. And, when the instance of second exhaustification applies, it has to be noted that the alternative/s that it selects are only the domain ones (as defined for the matrix *Exh* operator (as seen in the tree: $O_{Exh}D$)). Exhaustification does not apply to the scalar implicature. Then, the exhaustivity operator ($O_{Exh}D$) with its interpretable feature [*inExh*] agreeing with the uninterpretable feature [*unExh*] of the particle *-də* applies exhaustification to the proposition: $\Box [\lambda w. \text{John met Giita in } w \vee \text{John met Maala in } w]$ and negates the domain alternatives. And, at the top we have the total meaning: $\Box [\lambda w. \text{John met Giita in } w \vee \text{John met Maala in } w] \wedge \neg \Box [\lambda w. \text{John met Giita in } w] \wedge \neg \Box [\lambda w. \text{John met Maala in } w] \wedge \Box \neg [\lambda w. \text{John met Giita and Maala in } w]$. This amounts to the meaning that John met exactly one of Giita or Maala and the speaker does not know/is not sure who/which one. This can also be represented as in (158).

- (158) a. $\Box [\text{John Giita-də Maala-də hamuun-a}]$
 “John met Giita or Maala.”
 b. Assertion: $\Box [G \vee M]$
 c. Scalar Implicatures: $Alt_S(G \vee M) = \{G \wedge M\}$
 $Exh_S(G \vee M) = (G \vee M) \wedge \neg (G \wedge M)$
 d. Matrix (domain) Implicatures: $Alt_D(\Box [G \vee M]) = \{\Box G, \Box M\}$
 $Exh_D(\Box [G \vee M]) = \Box [G \vee M] \wedge \neg \Box G \wedge \neg \Box M$
 e. Total meaning: $\Box [G \vee M] \wedge \neg \Box G \wedge \neg \Box M \wedge \Box \neg [G \wedge M]$

In (158-a), we have the *-də* disjunction expression with the covert doxastic operator

adjoined at the matrix level at LF. Assertion of (158-a) is represented in (158-b). When the two alternatives are existentially closed, and are combined with the *Exh* operator, the set of alternatives determined for the *ExhS* operator is the scalar alternative. Crucially, given the [+locality] requirement of the particle *-də* with respect to the scalar alternative, the scalar exhaustification is limited to occur only below the doxastic operator, thus locally as shown in (158-c) (due to the constraint of innocent exclusion on the set of alternatives only the scalar alternative would be negated). This serves to derive the exclusivity implicature of the disjunction and a meaning stronger than the assertion. The domain implicatures drawn by exhaustification of domain alternatives result in the uncertainty implicatures as represented in (158-d). This serves to generate the ignorance component of meaning as uncertainty implicatures, that the speaker is not sure that John met Giita and the speaker is not sure John met Maala. In (158-e), derived by the union of the domain and scalar implicatures, we have the total meaning that John met exactly one of the two individuals and the speaker is not sure which one.

Crucially, the LF in (158-e) is equivalent to (159).

$$(159) \quad \Box [G \vee M] \wedge \Diamond \neg G \wedge \Diamond \neg M \wedge \neg \Diamond [G \wedge M]$$

In other words,

- (160) In all of the speaker's doxastically accessible worlds John met Giita or Maala and in some of the speaker's doxastically accessible worlds John did not meet Giita and in some of the speaker's doxastically accessible worlds John did not meet Maala and in none of the speaker's doxastically accessible worlds John met Giita and Maala.

Thus, we derive the distribution requirement for the ignorance inferences of a *-də* disjunction expression by matrix exhaustification with respect to domain alternatives as we also do it for *-hari* disjunction expressions. However, the exclusivity component of a *-də* disjunction sentence is derived based on a locality (i.e. [+locality]) requirement of the particle *-də* that requires obligatory exhaustification of the scalar alternative below the doxastic operator. Thus, the LF in (158-e) not only derives the distribution requirement for the ignorance inferences of a *-də* disjunction expression but also accounts for the “exactly one” meaning of a *-də* disjunction expression by local exhaustification of the scalar alternative.

We observed in Section 2.2 that the meanings expressed by a *-hari* disjunction sentence are different from those expressed by a *-də* disjunction sentence. In the next section,

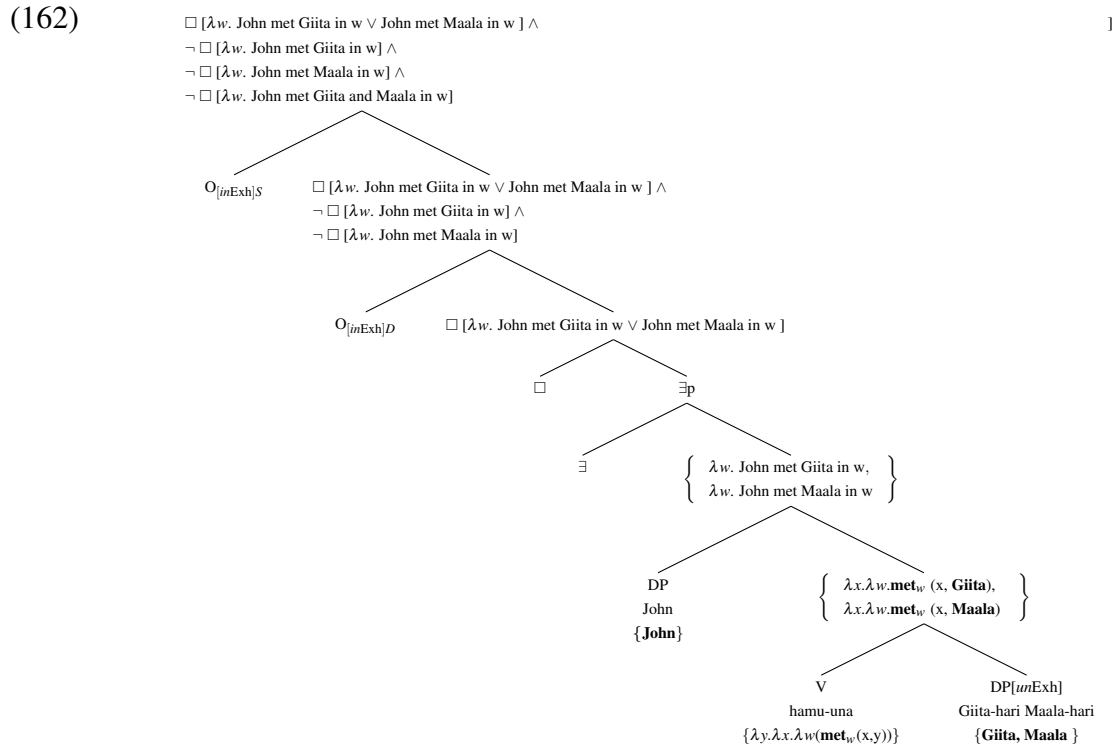
I account for the derivation of the meanings associated with *-hari* disjunction expressions.

2.6.3 Computing ignorance with respect to *-hari* disjunctions

As we discussed in Section 1.6.1, a disjunction expression as in (161), with *-hari* will be true in a situation where it amounts to the meaning that [i] John met one of Giita or Maala or both; [ii] The speaker does not know who/which.

- (161) John Giita-hari Maala-hari hamu-un-a.
 John Giita-hari Maala-hari meet-PAST-A
 “John met Giita or Maala.”

When a *-hari* disjunction expresses ignorance, I argue that it gives rise to ignorance implicatures with respect to both domain and scalar alternatives. I claim that for *-hari* disjunction, the exhaustification (or application of *Exh* to the scalar alternative) happens at the global level (i.e. above the doxastic operator and the CP that contains it). The structural representation of a *-hari* disjunction will be as in (162). And, the explanation follows.



Here, in (162), just before the existential closure, we have the two domain alternatives: $\{\lambda w. \text{John met Giita in } w, \lambda w. \text{John met Maala in } w\}$ at the propositional level. And when these two alternatives are existentially closed we will have the scalar alternative pertaining to *or* (i.e. $\{\text{or...and}\}$) as: $Alt_S(\lambda w. \text{John met Giita in } w \vee \text{John met Maala in } w) = \{\lambda w. \text{John met Giita and Maala in } w\}$. Here as a *-hari* disjunction also expresses ignorance with respect to the scalar alternative, the computation prevents exhaustification

from applying below the doxastic operator. When the assertoric operator combines with the proposition: $\lambda w. \text{ John met Giita in } w \vee \text{ John met Maala in } w$, we will have the assertion: $\Box [\lambda w. \text{ John met Giita in } w \vee \text{ John met Maala in } w]$. Then, the exhaustivity operator (O_{ExhD}) with its interpretable feature [*inExh*] agreeing with the uninterpretable feature [*unExh*] of the particle *-hari* applies exhaustification to the proposition: $\Box [\lambda w. \text{ John met Giita in } w \vee \text{ John met Maala in } w]$ and negates the domain alternatives. And, we derive $\Box [\lambda w. \text{ John met Giita in } w \vee \text{ John met Maala in } w] \wedge \neg \Box [\lambda w. \text{ John met Giita in } w] \wedge \neg \Box [\lambda w. \text{ John met Maala in } w]$ as domain implicatures. This results in the uncertainty implicatures. Then, exhaustification with respect to the scalar alternative applies above the doxastic operator, and serves to generate an ignorance implicature with respect to the scalar alternative. When the second instance of exhaustification (O_{ExhS}) applies to the disjunction, it only negates the scalar alternative.³⁴ And, at the top we have the total meaning that $\Box [\lambda w. \text{ John met Giita in } w \vee \text{ John met Maala in } w] \wedge \neg \Box [\lambda w. \text{ John met Giita in } w] \wedge \neg \Box [\lambda w. \text{ John met Maala in } w] \wedge \neg \Box [\lambda w. \text{ John met Giita and Maala in } w]$ as uncertainty implicatures. This amounts to the meaning that John met at least one of Giita or Maala and the speaker does not know/is not sure who/which. This can also be represented as in (163).

- (163) a. $\Box [\text{John Giita-hari Maala-hari hamuun-a}]$
 “John met Giita or Maala.”
 b. Assertion: $\Box [G \vee M]$
 c. Domain Implicatures: $Alt_D (\Box [G \vee M]) = \{\Box G, \Box M\}$
 $Exh_D [\Box [G \vee M]] = \Box [G \vee M] \wedge \neg \Box G \wedge \neg \Box M$
 d. Scalar Implicature: $Alt_S (\Box [G \vee M]) = \{\Box [G \wedge M]\}$
 $Exh_S (\Box [G \vee M]) = \Box [G \vee M] \wedge \neg \Box [G \wedge M]$
 e. Total meaning: $\Box [G \vee M] \wedge \neg \Box G \wedge \neg \Box M \wedge \neg \Box [G \wedge M]$

As illustrated in (163), in (163-a), we have the disjunction construction with the covert doxastic operator adjoined at the matrix level at LF. Assertion of (163-a) is represented in (163-b). The domain implicatures drawn by exhaustification with respect to domain alternatives result in the uncertainty implicatures as represented in (163-c). In (163-d), we have the scalar implicature derived by way of matrix exhaustification of scalar alternatives. In (163-e), we have the total meaning. Crucially (163-e) is equivalent to (164).

$$(164) \quad \Box [G \vee M] \wedge \Diamond \neg G \wedge \Diamond \neg M \wedge \Diamond \neg (G \& M)$$

In other words,

³⁴Since the weak scalar implicature is entailed by *ExhD*, it may be that one should argue that exhaustivity is missing here (after all, would it be allowed by economy?). I will set this aside here.

- (165) In all of the speaker's doxastically accessible worlds John met Giita or Maala and in some of the speaker's doxastically accessible worlds John did not meet Giita and in some of the speaker's doxastically accessible worlds John did not meet Maala and in some of the speaker's doxastically accessible worlds John did not meet Giita and Maala.

Essentially, the LF in (163-e), implicates that the speaker is ignorant not only about the status of the individual alternatives but also about the scalar alternative ($G \wedge M$). Thus, I claim that the LF derived in (163-e) is able to account for the meanings [1] John met at least one of Giita or Maala., [2] The speaker does not know which/who, which are expressed by a *-hari* disjunction.

As we discussed in section 2.2.2, the nature of ignorance expressed by the two types of disjunctions is also different with respect to their non/cancelability. The ignorance expressed by a *-hari* disjunction can be canceled while that expressed by a *-də* disjunction can not be canceled. The implications associated with non/cancelability of ignorance implicatures is discussed in the next section.

2.7 Accounting for non/cancelability of ignorance in disjunctions

In Section 2.2.2, we noted a correlation between the strength of a PPI and non/cancelability of ignorance implicatures. Following this evidence, I argue that the choice of cancellation of ignorance implicatures does not depend on the fact that the implicature is conversational or not, but rather on the strength of a PPI. I build this proposal on the insights drawn from Spector (2014) that provides an analysis for different types of PPIs based on their strength as discussed in 1.7.4. I extend his proposal of weak PPI disjunctions such as French *ou* and strong PPI disjunctions such as *soit-soit* to the analysis of the non/cancelability of ignorance implicatures of weak PPI disjunctions such as *-hari* and strong PPI disjunctions such as *-də* in Sinhala. As also discussed in the previous section, I argue that strong PPIs such as *-də* require local exhaustivity with respect to the scalar alternative. In other words, strong PPIs check their licensing conditions locally, and I claim that the [*unExh*] feature of *-də* must be checked locally too. This gives rise to obligatory exhaustivity, as we have seen. As we also saw above, a weak PPI such as *-hari* does not specify licensing conditions with respect to a domain, and this means that the [*unExh*] feature can be satisfied non-locally, as we have seen. There is thus a parallelism in the domains in which PPI licensing is evaluated and the domains in which [*Exh*] is checked. I show that these different licensing conditions for [*Exh*] of *-hari* and *-də* PPIs have consequences for their non/cancelability of ignorance inferences.

2.7.1 Accounting for cancelability of ignorance in *-hari* disjunctions

As we discussed in Section 2.2.2, a disjunction construction with *hari*, generates an ignorance implicature that can be canceled, as also shown in (166).

- (166) John Giita-hari Maala-hari hambəun-a. æththətəmə, mamə dannəwa
 John Giita-hari Maala-hari met-A. in fact I know
 kaawə-də kiyəla.
 who/which COMP
 “John met Giita or Maala. In fact, I know who/which.”

With respect to cancellation of an inference, it is assumed that we first derive the inference and then cancel it (i.e. in a context that it can be canceled). For example, in the case of (166), a hearer will first make inferences that the speaker is ignorant about who John met. Then, when the speaker utters the second sentence, the hearer will re-calibrate and reprocess the inferences by canceling previously drawn inferences. This is discussed in detail in the following.

I argued in the previous section that exhaustification with respect to domain alternatives only gives rise to uncertainty implicatures. Suppose, a speaker utters the disjunction sentence in (166) (without cancellation of ignorance) as in (167). The LF derived as in (168-c) serves for the distribution requirement and gives rise to ignorance inferences as uncertainty implicatures.

- (167) John Giita-hari Maala-hari hambəun-a.
 John Giita-hari Maala-hari met-A.
 “John met Giita or Maala.”
- (168) a. $\Box$ [John Giita-hari Maala-hari hamuun-a]
 b. Assertion: $\Box$ [$G \vee M$]
 c. Domain Implicatures: $Alt_D(\Box[G \vee M]) = \{\Box G, \Box M\}$
 $Exh_D[\Box[G \vee M]] = \Box[G \vee M] \wedge \neg \Box G \wedge \neg \Box M$

However, the *-hari* disjunction expression in (167), is compatible with any of the continuations in (169) or (170).

- (169) John Giita-hari Maala-hari hambəun-a. mamə dann-e næ kaawə-də kiyəla.
 John Giita-hari Maala-hari met-A. I know not who/which COMP
 “John met Giita or Maala. I don’t know who/which.”
- (170) John Giita-hari Maala-hari hambəun-a. mamə dannəwa kaawə-də kiyəla.
 John Giita-hari Maala-hari met-A. I know who/which COMP
 “John met Giita or Maala. I know who/which.”

I argue that cancelability of the ignorance inferences of a *-hari* disjunction as in (170), is related to the weak PP behavior of a *-hari* disjunction. As we saw in Chapter 1, the conjunctive interpretation of *-hari* disjunction under clause-mate negation can be recovered by extra clausal negation or rescued by a second downward entailing operator. For clarity, the examples in Chapter 1 are repeated as follows.

(171) Anti-licensing:

- a. John Gita-hari Mala-hari dækk-e næ.
 John Gita-hari Mala-hari saw-E not
 “John did not see Gita or he did not see Mala. or > not (This would be true in a context where John saw exactly one of Gita or Mala, but he is not sure which he did not see. Thus, not>or (i.e. John did not see any of them) is ruled out.)

(172) Locality of anti-licensing:

- a. mamə hithnne næ John Gitaə-hari Malaə-hari dækk-a kiyala.
 I think not John Gita-hari Mala-hari saw-A COMP
 “I do not think John saw Gita or Mala.” not > or
 (This would be true in a context where the speaker thinks that John did not see any of Giita or Maala.)³⁵

(173) Rescuing:

- a. John Gita-hari Mala-hari dækk-e næ kiyala penennə næ.
 John Gita-hari Mala-hari saw-E neg COMP appear neg
 “It is unlikely that John did not see Gita or Mala.”
 (This would be true in a context where it appears that John saw both Giita and Maala. Thus, or > not is ruled out.)

Thus, it is seen that the particle *-hari* is a mild PPI as it can be licensed under negation with extra clausal negation or with an even number of DE operators. I argue that there is a correlation between a *-hari* disjunction being a mild PPI (the recoverability of the conjunctive interpretation or the ‘cancelable’ behavior of the anti-licensing effect) and the cancelable behavior of the ignorance implicatures of a *-hari* disjunction. I argue that this is correlated to the weak claim with respect to the conjunctive alternative of a *-hari* disjunction. In other words, *-hari* can be in a globally DE environment and implicatures can be canceled. For instance, the ignorance inferences of a *-hari* disjunction expression derived prior to any kind of continuation like in (169) or (170) as in the LF in (168-c) entails a weak scalar implicature as shown in (174).

³⁵It is observed that when the subject of the matrix clause is speaker anchored, a *-hari* disjunction always receives a narrow scope reading with respect to negation.

$$(174) \quad \Box [G \vee M] \wedge \neg \Box G \wedge \neg \Box M \Rightarrow \neg \Box [G \wedge M]$$

That is $\neg \Box (G \wedge M)$ (entailed by $\Box [G \vee M] \wedge \neg \Box G \wedge \neg \Box M$) only implies that the speaker does not know/believe that $G \wedge M$ is true. On the one hand, it is compatible with $\neg \Box \neg (G \wedge M)$ (i.e. the speaker does not believe that $G \wedge M$ is false), as shown in (175-a). On the other hand, it is also compatible with $\Box \neg (G \wedge M)$ (i.e. the speaker believes that $G \wedge M$ is false) as represented in (175-b).

$$(175) \quad \begin{array}{ll} \text{a.} & \Box [G \vee M] \wedge \neg \Box \neg [G \wedge M] = \Box [G \vee M] \wedge \Diamond [G \wedge M] \\ \text{b.} & \Box [G \vee M] \wedge \Box \neg [G \wedge M] = \Box [G \vee M] \wedge \neg \Diamond [G \wedge M] \end{array}$$

I argue that the domain implicatures derived as in (168-c) can be re-analyzed/re-calibrated to derive an inclusivity implicature (as in (175-a)) or an exclusivity implicature (as in (175-b)), both of which are compatible with knowledge. This is discussed in detail in the following. Take (170) for example, when the speaker reaches the end of the first sentence, an inference as to the epistemic state of the speaker (here after “speaker state”, cf. Meyer (2013)), will be made as in (168-c) by exhaustification with respect to domain alternatives, which give rise to uncertainty implicatures signaling ignorance. Then, when the speaker continues with the sentence, “In fact, I know which/who.” that follows it, a reanalysis will be made about the speaker state and the uncertainty implicatures already derived will be canceled.

In a context where an inclusivity implicature is drawn by way of re-analysis/re-parsing with exhaustification with respect to domain alternatives, this is compatible with a continuation like “In fact, I know which/who.” An inclusivity implicature can be drawn by way of recursive exhaustification with respect to domain alternatives under reanalysis, as in (176). (This was motivated by recursive parsing strategies as in Fox (2007) and Nicolae (2016, 2017)). The speaker state after the reanalysis will be as in (176). Note here that the re-analysis/re-calibration/re-parsing in (176) involves a completely new parse. When the hearer continues with “In fact, I know which/who”, the hearer will have an LF as in (176-e) (which leads to (177)) about the epistemic state of the speaker, which is compatible with the speaker knowing who John met.

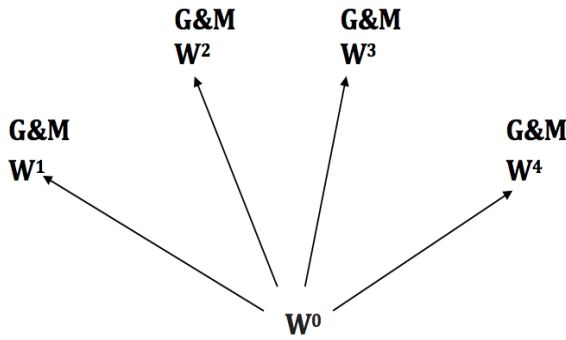
$$(176) \quad \begin{array}{ll} \text{a.} & \text{Exh}_D [\Box [\text{Exh}_D [G \vee M]]] \\ \text{b.} & \text{Alt}_D (G \vee M) = \{G, M\} \\ \text{c.} & \text{Exh}_D [G \vee M] = [G \vee M] \\ \text{d.} & \text{Alt}_D (\Box \text{Exh}_D [G \vee M]) = \{\Box \text{Exh}_D G, \Box \text{Exh}_D M\} \\ & = \{\Box [G \wedge \neg M], \Box [M \wedge \neg G]\} \\ \text{e.} & \text{Exh}_D \Box \text{Exh}_D [G \vee M] = \Box [G \vee M] \wedge \neg \Box [G \wedge \neg M] \wedge \neg \Box [M \wedge \neg G] \end{array}$$

The LF in (176-e) leads to (177).

$$(177) \quad \Box [G \vee M] \wedge \Diamond G \wedge \Diamond M$$

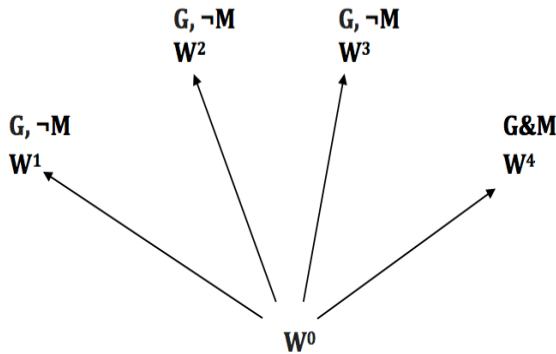
The LF in (177) is compatible with a situation where the conjunctive alternative is true in all of the epistemically accessible worlds, as depicted in (178). Such a situation is compatible with “In fact, he met both” and the ignorance inferences drawn in the first parse will be canceled.

(178)



The LF in (177) is also compatible with a situation similar to the one depicted in (179) where the proposition that John met Giita is true in all of the epistemically accessible worlds. Note that there is nothing in (177) to prevent the conjunctive alternative being true in at least one accessible world (we have already seen that there is nothing in (177) to prevent one alternative being true in all the accessible worlds, which serves to completely cancel ignorance). If the conjunctive alternative is true in at least one epistemically accessible world, it is possible for there to be knowledge about one of the alternatives (and in this sense ignorance is canceled).

(179)



The situation depicted in (179) assures that the speaker knows John met Giita, but s/he is not sure about Maala, which conveys partial knowledge. In a situation where the proposition that John met Giita is true in all of the epistemically accessible worlds as in (179), the speaker knows that John met Giita. Thus, a speaker can continue a *-hari* disjunction with “In fact, I know who” and the ignorance inferences already drawn will be canceled.

At the same time, if a speaker continues a *-hari* disjunction expression with “I don’t know who/which” as in (169), or a speaker just leaves the *-hari* disjunction expression as in (167), without any continuation, the ignorance inferences derived will be akin to the LF as in (180), as derived in (163-e) in Section 2.6.3.

$$(180) \quad \Box [G \vee M] \wedge \neg \Box G \wedge \neg \Box M \wedge \neg \Box [G \wedge M]$$

This way, I account for the cancelability of ignorance inferences of a *-hari* disjunction expression based on the weak PP character of the entailed scalar implicate of the particle *-hari*.

We observed in Section 2.2.2 that the ignorance inferences of *-də* disjunctions can not be canceled. In the next section, I account for the non-cancelability of ignorance inferences of *-də* disjunctions.

2.7.2 Accounting for non-cancelability of ignorance in *-də* disjunctions

As we discussed in section 2.2.2, a disjuncton construction as in (181) with *-də*, generates an ignorance implicature that can not be canceled.

- (181) John Giita-də Maala-də hamuun-a. #æththətəmə, mamə dannəwa kaawə-də
 John Giita-də Maala-də met-A in fact I know who-də
 kiyəla.
 COMP
 “John met Giita or Maala. In fact, I know who/which one.”

To account for the non-cancelability of the ignorance induced by *-də*, I again link the PP status of *-də* to the location of Exh. As we saw in chapter 1, anti-licensing for *-də* disjunction is strictly a universal phenomenon (i.e. its conjunctive interpretation can neither be recovered by extra clausal negation nor rescued by a second downward entailing operator). For clarity, the examples we saw in Chapter 1 are repeated as follows:

- (182) Locality of anti-licensing is not applicable:

- a. #mamə hithnne nə John Gita-də Mala-də dækk-a kiyala.
I think not John Gita-də Mala-də saw-A COMP
“I do not think John saw Gita or Mala.” (Under a narrow scope interpretation for disjunction)

(183) ‘Rescuing’ is not applicable:

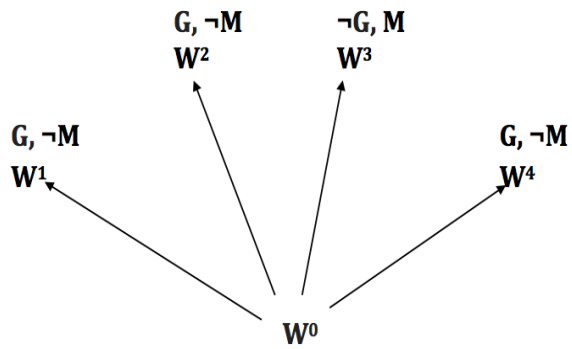
- a. #John Gitaə-də Malaə-də dækk-e nə kiyala penennə nə.
John Gita-də Mala-də saw-E neg COMP appear neg
“It is unlikely that John did not see Gita or Mala.” (Under a narrow scope interpretation for disjunction)

Thus, it is evident that the particle *-də* is a very strong PPI as its conjunctive interpretation can never be recovered or rescued or its anti-licensing effect can not be ‘canceled’. I argue that this is correlated with the exclusivity component derived by [+locality] requirement that the particle *-də* places for the scalar alternative on its domain of alternatives as discussed in Chapter 1 and as shown in (184).

- (184) a. John Giita-də Maala-də hamu-un-a.
“John met Giita or Maala.”
- b. #æththətəmə, eyaa ee dennawəma-th hamu-un-a
“In fact, he even met both.”

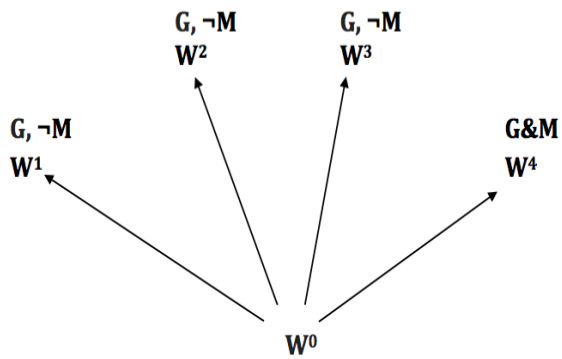
This follows naturally from the PP behavior of *-də* disjunctions. In Section 2.6.2, we derived the exclusivity component of a *-də* disjunction by way of an agreement requirement for local exhaustification with respect to the scalar alternative. When the scalar alternative is exhaustified under the doxastic operator, it gives rise to a strong scalar implicature. I argue that the strong scalar implicature based on obligatory local exhaustification prevents *-də* from being in a DE environment. Thus, a conjunctive interpretation can never be recovered or rescued for a *-də* disjunction. We saw in Section 2.6.2 that domain alternatives of a *-də* disjunction are also exhaustified to derive the uncertainty implicatures. We saw in the previous section with respect to *-hari* disjunction that when domain alternatives are exhaustified recursively, we need the conjunctive alternative to be true in at least one accessible world for the disjunction to be compatible with knowledge. Thus, a *-də* disjunction expression (with exhaustification of domain and scalar alternatives) is compatible only with a situation like that depicted in (185).

(185)

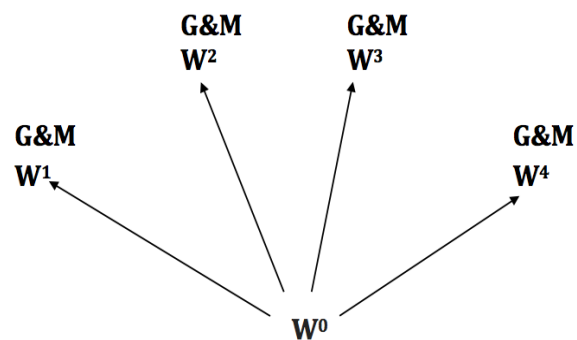


And, a $-d\partial$ disjunction can never be true in any of the contexts in (186) or (187), which are compatible with knowing which or knowing who.

(186) #



(187) #



The incompatibility of a $-d\partial$ disjunction expression in the situations depicted here is

because the conjunctive alternative of a *-də* disjunction can never be true in any of the epistemically accessible worlds. Thus, a disjunction expression can never lead to the knowledge of the speaker. For instance, recall how we canceled ignorance with respect to *-hari* disjunctions by way of recursive exhaustification with regard to domain alternatives in the previous section. Thus, I claim that when the conjunctive alternative is false in all the worlds epistemically accessible to the speaker, given the distribution requirement for ignorance inferences, there can never be a situation where one alternative is true in all the accessible worlds. At the same time, even if we assume that the domain alternatives of a *-də* disjunction undergo recursive exhaustification and derives the LF as in (188-a), given the obligatory scalar implicature, as presented in (188-b), a *-də* disjunction expression is incompatible with any of the situations depicted just above.

- (188) a. $\Box [G \vee M] \wedge \Diamond G \wedge \Diamond M$
b. $\Box [G \vee M] \wedge \Diamond G \wedge \Diamond M \wedge \neg \Diamond [G \wedge M]$

This way, I account for the non-cancelability of ignorance inferences of a *-də* disjunction expression based on the strong PP character (scalar implicate) of the particle *-də*.

Two most recent accounts that have made use of a doxastic operator and an exhaustivity operator to derive ignorance inferences of disjunction expressions in matrix clauses are Meyer (2013) and Nicolae (2017). In the next section, I present an overview of each of these proposals and discuss their implications for ignorance facts of *-hari* and *-də* disjunctions in Sinhala.

2.8 Meyer (2013) and Nicolae (2017) and implications for ignorance

In this section, I discuss the accounts in Meyer (2013) and Nicolae (2017) that have recently addressed issues associated with derivation of ignorance inferences of disjunctions. In the two sections that follow, I first present an overview of the main data points, arguments and claims in Meyer (2013) and Nicolae (2017) relevant for our analysis. Then, I evaluate the merits and demerits of the analysis of ignorance inferences in Meyer (2013) and Nicolae (2017) in light of the ignorance facts in Sinhala *-hari* and *-də* disjunctions.

2.8.1 Meyer (2013) and implications for ignorance implicatures

To the best of my knowledge, Meyer (2013) is the first to apply both a doxastic operator and an exhaustivity operator to account for ignorance inferences associated with disjunction or indefinite expressions in detail. Meyer starts out drawing attention to examples as

in (189).

- (189) a. Al drank some or all of the beers.
 b. They have locations in Alewife or Braintree, or both.

She argues that ignorance inferences of the sentences as in (189) (involving surface redundancy) or (190) can be accounted for in terms of grammatical ignorance implicatures. She claims that all kinds of implicatures: weak; scalar and ignorance are derived in the grammar.

- (190) a. Al drank some of the beers.
 b. They have locations in Alewife or Braintree.

She abbreviates (190) (i.e. *Al drank some of the beers.*) as *W* and *Al drank all of the beers.* as *S* as shown in (191).

- (191) a. W = Al drank some of the beers.
 b. S = Al drank all of the beers.

Noting that *S* is stronger than *W* and referring to the Gricean way of reasoning out and deriving implicatures, she argues that the reason for the speaker not to assert *S* is the speaker's epistemic state: that the speaker is not sure that Al drank all of the beers. She presents this by way of a Matrix *K* operator as shown in (192). *K* represents a doxastic operator expressing necessity relative to the speaker as subscripted with *s* as K_s .

- (192) $\neg K_s$ (Al drank all of the beers.)

She paraphrases (192) as in (193).

- (193) The speaker is (not) sure that ψ .

Following Fox (2007), Meyer (2013) refers to implicatures of the form $\neg K_s \psi$ as weak implicatures. She claims that a speaker would assert a weak sentence *W* instead of the stronger relevant alternative *S* when a speaker is not sure that *S* is true. She argues that such an implicature is called a weak implicature because it makes a weak claim. She notes that it is compatible with two sets of affairs as both $K_s (\neg S)$ and $(\neg K_s (S) \wedge \neg K_s (\neg S))$ asymmetrically entail $\neg K_s (S)$ as shown in (194) (Fox (2007; 2011) also note this).

- (194) a. $K_s (\neg S) \Rightarrow \neg K_s (S)$
 b. $(\neg K_s (S) \wedge \neg K_s (\neg S)) \Rightarrow \neg K_s (S)$

Meyer (2013) refers to the inferences of the form $K_s (\neg S)$ as *Scalar implicatures* and the inferences of the form $(\neg K_s (S) \wedge \neg K_s \neg (S))$ as *Ignorance implicatures*.

Meyer then notes that based on Gricean reasoning a hearer may strengthen $\neg K_s (S)$ into a scalar implicature or into an ignorance implicature. If the hearer thinks the speaker is informed, s/he will strengthen $\neg K_s (S)$ into a scalar implicature. If the hearer thinks the speaker is not informed, s/he will strengthen $\neg K_s (S)$ into ignorance implicatures. She also argues that a hearer cannot always be sure about the informativeness/competence of a speaker. S/he will ultimately be left with the inference $\neg K_s (S)$.

She proposes a radical grammatical approach to derivation of ignorance implicatures by way of application of the exhaustivity operator as proposed in Fox (2007). She argues that there are two ways to derive ignorance implicatures: by way of matrix exhaustification over the doxastic operator as shown in (195-a) and by way of recursive exhaustification as shown in (195-b).

- (195) a. $[EXH K[A \vee B]] =$
 $K(A \vee B) \wedge \neg K(A \wedge B) \wedge \neg KA \wedge \neg K \neg A \wedge \neg KB \wedge \neg K \neg B$
- b. $[EXH K EXH[A \text{ or } B]] =$
 $K(A \vee B) \wedge K \neg (A \wedge B) \wedge \neg K(A \wedge B) \wedge \neg KA \wedge \neg K \neg A \wedge \neg KB \wedge \neg K \neg B$

She claims that ignorance implicatures of the form: $\neg K \psi \wedge \neg K \neg \psi$ are “true ignorance implicatures”.

Meyer bases her claim for (195) on a principle that she calls epistemic transparency. She claims that Epistemic Transparency as spelled out in (196) predicts that the only acceptable LFs for disjunction are the two LFs in (195).

- (196) EPISTEMIC TRANSPARENCY
 An LF of the form $[... K_s \Phi]$ is licensed iff it entails S’s state of mind about every $\psi \in ALT(\Phi)$
 States of mind are: (i) $K \psi$ (ii) $\neg K \neg \psi$ (Meyer 2013, p. 58)

Meyer claims that the LFs in (197) and (198) do not satisfy the epistemic transparency.

- (197) $[K [A \text{ or } B]] = K (A \vee B)$
- (198) $[K Exh [A \text{ or } B]] = K (A \vee B) \wedge K \neg (A \wedge B)$

She argues that (198) or (197) is not informative about the state of mind of the speaker concerning any of the elements in the set $ALT(A \text{ or } B) = \{A, B\}$.

What is most crucial in Meyer (2013) is the claim that true ignorance implicatures are in the form of the LF: $\neg K \psi \wedge \neg K \neg \psi$. The notions of “speaker state” and “epistemic transparency” introduced and defined in the thesis are also applicable to any analysis dealing with ignorance implicatures/inferences. In the next section, I evaluate the applicability of these notions and claims to the ignorance facts of *-hari* and *-də* disjunctions in Sinhala.

2.8.1.1 Evaluating Meyer (2013)

Meyer (2013) claims that true ignorance implicatures are in the form of the LF: $\neg K \psi \wedge \neg K \neg \psi$. Crucially, I argue that the LF: $\neg K \psi \wedge \neg K \neg \psi$ makes correct predictions for the ignorance inferences of *-hari* disjunctions in Sinhala, but not for *-də* disjunctions in Sinhala. I layout my arguments as follows: First, I begin analyzing the ignorance component of *-də* disjunctions in light of Meyer (2013). Next, I analyze the ignorance component of *-hari* disjunctions in light of Meyer (2013).

As we discussed in Section 2.6.2, the components of meaning/facts we want to account for in the case of *-də* disjunctions as in (199) are: [1] John met exactly one of Giita or Maala; [2] the speaker does not know who/which.

- (199) John Giita-də Maala-də hamu-un-a. mamə danne næ kaawə-də kiyəla
 John Giita-də Maala-də meet-PAST-A I know not who-də COMP
 “John met Giita or Maala. I don’t know which/who.”

CONTEXT: This will be used in a context where the speaker knows John met exactly one of Giita or Maala and speaker does not know who/which.

I argue that the LF in $\neg K \psi \wedge \neg K \neg \psi$ as in Meyer (2013) is not able to account for the right truth conditions of ignorance inferences of *-də* disjunction expressions. As it was derived in Section 2.6.2, the truth conditions for a *-də* disjunction expression are as in (200) (The LF in (200-a) is equivalent to the LF in (200-b) given the disjunction assertion of the two alternatives M, G).

- (200) a. $\Box [G \vee M] \wedge \neg \Box G \wedge \neg \Box M \wedge \Box \neg [G \wedge M]$
 b. $\Box [G \vee M] \wedge \Diamond \neg G \wedge \Diamond \neg M \wedge \neg \Diamond [G \& M]$

The truth conditions for the LF in $\neg K \psi \wedge \neg K \neg \psi$ can be stated as in (201) (Note that, as it was explained in the previous section, $\neg K \psi \wedge \neg K \neg \psi = \neg K (S) \wedge \neg K \neg$

(S), where S stands for the conjunctive/scalar alternative and $K = \square$ in our formulations).

- (201) $\diamond \neg (G \& M) \wedge \diamond (G \& M)$ (Given the disjunction assertion of the two alternatives: M, G)

As it was discussed in Section 2.6.2, and as it is evident from the LF in (200), a *-də* disjunction expression gives rise to exclusivity inferences (i.e. a *-də* disjunction expression will only be true of exactly one individual in the domain). However, it is clear that the LF in $\neg K \psi \wedge \neg K \neg \psi$ does not deliver us these truth conditions for *-də* disjunction expressions in Sinhala (cf. (200)). Thus, the LF in $\neg K \psi \wedge \neg K \neg \psi$, which, Meyer (2013) claims to account for “true ignorance inferences” of disjunction, can not capture the right truth conditions for *-də* disjunction expressions in Sinhala.

As we discussed in Section 2.6.3, unlike *-də* disjunctions, *-hari* disjunctions do not give rise to an at most one reading. But, they give rise to ignorance implicatures. Thus, the components of meaning/facts we want to account for in the case of *-hari* disjunctions as in (202) are: [1] John met at least one of Giita or Maala; [2] the speaker does not know who/which.

- (202) John Giita-hari Maala-hari hamu-un-a.
John Giita-hari Maala-hari meet-PAST-A
“John met Giita or Maala.”

CONTEXT: This will be used in a context where the speaker knows John met at least one of Giita or Maala and the speaker does not know who/which.

We can examine whether we are able to account for these meanings by way of the LF in $\neg K \psi \wedge \neg K \neg \psi$. As it was derived in Section 2.5.3, the truth conditions for a *-hari* disjunction expression are as in (203) (The LF in (203-a) is equivalent to the LF in (203-b) given the disjunction assertion of the two alternatives M, G).

- (203) a. $\square [G \vee M] \wedge \neg \square G \wedge \neg \square M \wedge \neg \square [G \wedge M]$
b. $\square [G \vee M] \wedge \diamond \neg G \wedge \diamond \neg M \wedge \diamond \neg [G \wedge M]$

Now, as it was discussed in detail in Section 2.6.3 and as seen in (203) a *-hari* disjunction expresses ignorance with respect to conjunctive alternative as well as individual alternatives. The LF in (203) is compatible with the LF in $\neg K \psi \wedge \neg K \neg \psi$, which Meyer (2013) claims is true ignorance implicatures.

So, it is clearly seen that there are gaps in the proposal in Meyer (2013) that can not account for the full range of facts of Sinhala *-də* and *-hari* disjunctions. Building on

Meyer (2013) and Nicolae (2016), Nicolae (2017) has recently proposed that ignorance implicatures can be derived by way of exhaustification with respect to domain alternatives and has stressed the significance of exhaustification with respect to domain alternatives in the generation of ignorance implicatures in plain disjunctions. The implications of the proposal in Nicolae (2017) are discussed next.

2.8.2 Nicolae (2017) and implications for ignorance implicatures

Building on Nicolae (2016) (as it was introduced in Section 2.4.5), Nicolae (2017) claims that the difference between the inclusive (non-enriched) and exclusive (enriched) meaning of a disjunction is determined by the alternative set that an exhaustivity operator selects.

Following Fox & Katzir (2011), and Crnić, Chemla & Fox (2015)), Nicolae (2017) argues that exhaustification can proceed with respect to a subset of the set of innocently excludable alternatives. She claims that for plain disjunction, the scalar alternative may be pruned from its alternative set, but not for the complex disjunction. According to Nicolae (2017), a plain disjunction can associate with either of the alternative sets in (204-a) or (204-b), while the complex disjunction can associate only with the alternative set in (204-a).

- (204) a. $Alt_S(p \vee q) = \{p, q, p \wedge q\}$
 b. $Alt_D(p \vee q) = \{p, q\}$

Nicolae (2017) claims that plain disjunction PPIs such as French *ou* trigger obligatory exhaustivity in a manner similar to complex disjunction PPIs such as French *soit – soit*. However, English *or* is a non-PPI and does not trigger obligatory exhaustivity. The obligatory exhaustivity is in keeping with an economy condition for strengthening as claimed in Spector (2014) and given in (205).

- (205) An occurrence of *exh* in a given sentence *S* is not licensed if eliminating this occurrence leads to a sentence *S'* such that *S'* entails *S*.

And, she argues that plain disjunction PPIs generate exhaustivity with respect to a set of alternatives like in (204-b) by pruning the conjunctive alternative.

Nicolae also shows that exhaustification of the domain alternatives without the scalar alternative leads to vacuous exhaustification in UE contexts as seen in (206).

- (206) $\text{Exh}[p \vee q]$
- a. $\text{Alt}_D(p \vee q) = \{p, q\}$
 - b. $\text{Exh}_D[p \vee q] = p \vee q$

She claims that if a doxastic operator is employed, the problem of vacuous exhaustification as shown in (206) can be solved. With the doxastic operator and the exhaustivity operator, an uncertainty implicature is derived as in (207).

- (207) $\text{Exh}_D[\Box[p \vee q]]$
- a. $\text{Alt}_D(\Box[p \vee q]) = \{\Box p, \Box q\}$
 - b. $\text{Exh}_D[\Box[p \vee q]] = \Box[p \vee q] \wedge \neg \Box p \wedge \neg \Box q$

She shows that the enriched meaning in (207) is stronger than the non-enriched meaning, so exhaustification is not vacuous. She claims that adopting this approach will serve to derive both scalar and uncertainty implicatures in a uniform manner for both plain and complex disjunctions.

Thus, she argues that if we analyse plain PPI disjunctions as triggering obligatory exhaustivity and allowing pruning of the scalar alternative, this will explain the difference between *ou* and *soit...soit*. She argues that this will also explain the reason for unacceptability of plain PPI disjunctions in DW environments and their acceptability in UW environments.

Nicolae (2017) claims that matrix exhaustification of the scalar alternative of complex disjunction will still derive the uncertainty implicatures. She, however, shows that matrix exhaustification of the scalar alternative results in a weakened scalar implicature, i.e. that “it is possible not both”, as shown in (208).

- (208) $\text{Exh}_S[\Box[p \vee q]]$
- a. $\text{Alt}_S(\Box[p \vee q]) = \{\Box p, \Box q, \Box(p \wedge q)\}$
 - b. $\text{Exh}_S[\Box[p \vee q]] = \Box[p \vee q] \wedge \neg \Box p \wedge \neg \Box q \wedge \neg \Box[p \wedge q]$

She considers that this is problematic. The reason, she claims is, (208-b) is also compatible with the uncertainty implicatures of plain *ou* disjunction and does not explain the difference between plain and complex disjunction. She claims that embedded exhaustification applied to the scalar alternative will derive the strengthened meaning for a disjunction with an exclusivity inference as illustrated in the following.

- (209)
- a. $Exh_S [\Box [Exh_S [p \vee q]]]$
 - b. $Alt_S (p \vee q) = \{p, q, p \wedge q\}$
 - c. $Exh_S [p \vee q] = [p \vee q] \wedge \neg [p \wedge q]$
 - d. $Alt_S (\Box Exh_S [p \vee q]) = \{\Box Exh_S p, \Box Exh_S q, \Box Exh_S [p \wedge q]\}$
 $= \{\Box [p \wedge \neg q], \Box [q \wedge \neg p], \Box [p \wedge q]\}$
 - e. $Exh_S \Box Exh_S [p \vee q] = \Box [p \vee q] \wedge \Box \neg [p \wedge q] \wedge \neg \Box [p \wedge \neg q] \wedge \neg \Box [q \wedge \neg p]$

Thus, Nicolae (2017) primarily relies on pruning of the conjunctive alternative for *ou* to account for the difference between the plain disjunction *ou* and the complex disjunction *soit...soit* in French. Nicolae also proposes to derive the ignorance implicatures of *ou* disjunction based on exhaustification limited to domain alternatives (by pruning or excluding the conjunctive alternative). She also proposes to derive the ignorance implicatures of complex disjunction *soit...soit* by way of embedded and recursive exhaustification. In Section 1.6.4, we observed a similarity in behavior between Sinhala *-hari* disjunction and French *ou* disjunction and a similarity in behavior between Sinhala *-də* disjunction and French *soit...soit* disjunction. Then, I compared Sinhala *-hari* disjunction with French *ou* disjunction and Sinhala *-də* disjunction with French *soit...soit* disjunction. If we compare Sinhala *-hari* disjunction with French *ou* disjunction, it might seem reasonable to assume that the conjunctive alternative can be pruned for *-hari* disjunction in Sinhala. However, I not only argue against pruning of the conjunctive alternative, but also show that it is essential in accounting for the exact meanings of *-hari* disjunction. Nicolae also proposes to derive the uncertainty implicatures of French complex disjunction *soit...soit* by way of embedded and recursive exhaustification. I show that we can derive the uncertainly implicatures for Sinhala *-də* disjunction in the manner they are derived for French complex disjunction *soit...soit* as in Nicolae (2017). I discuss the implications of these claims in detail in the following section.

2.8.2.1 Evaluating Nicolae (2017)

As it was introduced and discussed in detail in the previous section, Nicolae (2017) proposes to derive ignorance implicatures in two ways based on the nature of the disjunction. She proposes that ignorance implicatures of a plain disjunction such as French *ou* are derived by way of exhaustification of domain alternatives. She also proposes that ignorance implicatures of complex disjunction *soit-soit* are derived by way of embedded and recursive exhaustification of domain and scalar alternative/s.

In what follows here, I investigate whether we can account for the facts related to

the ignorance implicatures of both *-hari* and *-də* disjunctions in the spirit of Nicolae (2017). As we saw in the previous section, she proposes to derive ignorance implicatures of French *ou* by way of matrix exhaustification of domain alternatives. As we discussed in Section 2.6.3, (exhaustification of domain alternatives) is not sufficient to derive the truth conditions for the full range of meanings and ignorance inferences of *-hari* disjunctions in Sinhala. We discussed that a *-hari* disjunction expresses ignorance with respect to both domain and scalar alternatives. So, I argue that inclusion and matrix exhaustification of the conjunctive alternative is a must to derive the truth conditions for *-hari* disjunction.

As we discussed in Section 2.6.3, the components of meaning/facts we want to account for in the case of *-hari* disjunctions as in (210) are: [1] John met one of Giita or Maala or both; [2] the speaker does not know who/which.

- (210) John Giita-hari Maala-hari hamu-un-a.
 John Giita-hari Maala-hari meet-PAST-A
 “John met Giita or Maala.”

CONTEXT: This will be used in a context where the speaker knows John met at least one of Giita or Maala or even both and the speaker does not know who/which.

As it was argued and derived in Section 2.6.3, the correct LF to account for the meanings for *-hari* disjunction is as in (211). The LF in (211-a) is equivalent to the LF in (211-b) given the disjunction assertion of the two alternatives M, G.

- (211) a. $\Box [G \vee M] \wedge \neg \Box G \wedge \neg \Box M \wedge \neg \Box [G \wedge M]$
 b. $\Diamond \neg G \wedge \Diamond \neg M \wedge \Diamond \neg [G \wedge M]$ (Given the disjunction assertion of the two alternatives M, G)

As it was discussed in Section 2.6.3 and as seen in (211), a *-hari* disjunction expresses ignorance with respect to the conjunctive alternative as well as individual alternatives, which is realized as a derived meaning. This, I argue, is part of the distribution requirement for *-hari* disjunction. Thus, it is seen that exhaustification limited to domain alternatives does not serve to derive the right implicatures for *-hari* disjunction in Sinhala.

On the other hand, I claim that the ignorance inferences of *-də* disjunctions can be derived by way of embedded and recursive exhaustification of domain and scalar alternative/s as proposed for French *soit...soit* in Nicolae (2017).

As we discussed in Section 2.5.1, the components of meaning/facts we want to account

for in the case of *-də* disjunctions as in (212) are: [1] John met exactly one of Giita or Maala; [2] the speaker does not know who/which.

- (212) John Giita-də Maala-də hamu-un-a. (mamə danne næ kaawə-də kiyəla)
 John Giita-də Maala-də meet-PAST-A I know not who-də COMP
 “John met Giita or Maala. I don’t know which/who.”
 CONTEXT: This will be used in a context where the speaker knows John met exactly one of Giita or Maala and speaker does not know who/which.

As derived by way of embedded and recursive exhaustification of alternatives as in (213), the LF in (213-e) delivers us the right truth conditions for the meanings expressed by a *-də* disjunction as shown above.

- (213) a. $Exh_S [\Box [Exh_S [G \vee M]]]$
 b. $Alt_S (G \vee M) = \{G, M, G \wedge M\}$
 c. $Exh_S [G \vee M] = [G \vee M] \wedge \neg [G \wedge M]$
 d. $Alt_S (\Box Exh_S [G \vee M]) = \{\Box Exh_S G, \Box Exh_S M, \Box Exh_S [G \wedge M]\}$
 $= \{\Box [G \wedge \neg M], \Box [M \wedge \neg G], \Box [G \wedge M]\}$
 e. $Exh_S \Box Exh_S [G \vee M] = \Box [G \vee M] \wedge \Box \neg [G \wedge M] \wedge \neg \Box [G \wedge \neg M] \wedge \neg \Box [M \wedge \neg G]$

Overall, it is clear that we can not account for the whole range of meanings of a *-hari* disjunction if we prune the conjunctive alternative from the set of alternatives as proposed for French *ou* disjunction in Nicolae (2017). At the same time, in a context where recursive exhaustification of domain alternatives occurs, the global exhaustification of a *-hari* disjunction will still keep the ignorance inferences. On the other hand, we can utilize embedded and recursive exhaustification to account for the whole range of facts for *-də* disjunction expressions as proposed for French *soit...soit* disjunction in Nicolae (2017).

Essentially, my account goes beyond that of Nicolae (2017). Nicolae’s account links the differences between *ou* and *soit...soit* with the set of alternatives selected (i.e. alternative pruning) for the two items. In my account, I link the differences between the particles *-hari* and *-də* to the morpho-syntax of the two particles. That is, the two particles carry different morpho-syntactic requirements realized by way of a feature agreement/checking relation in the derivation of ignorance inferences (i.e. [+locality] for *-də* and [+/-locality] for *-hari*). The differences in the morphological requirements/feature checking are linked to differences in the PP behavior of the two particles.

In the next section, I account for the derivation and non/cancelability of ignorance

inferences of indefinites formed with the particles *-hari* and *-də*.

2.9 Computing ignorance with respect to *-hari* and *-də* indefinites

We observed in Section 2.2 at the beginning of this chapter that similar to disjunctions with the particles *-hari* and *-də*, indefinites with the particles *-hari* and *-də* also give rise to ignorance inferences. At the same time, we observed that the ignorance inferences of *-hari* indefinites can be canceled while the ignorance inferences of *-də* indefinites can not be canceled. The goal of this section is to account for the derivation and non/cancelability of the ignorance inferences of *-hari* and *-də* indefinites. Crucially, I account for these facts of *-hari* and *-də* indefinites based on the analysis of the derivation and non/cancelability of the ignorance inferences of *-hari* and *-də* disjunctions. This comes out straightforwardly when we assume that the general function of indefinites is to introduce alternatives (cf. Kratzer and Shimoyama, 2002) and the particles *-hari* and *-də* impose the same kind of syntactic/semantic requirements on the structure and alternatives in the domain.³⁶

This section is organized as follows. Section 2.9.1 deals with derivation of ignorance inferences of *-də* indefinites. Section 2.9.2 is concerned with computing ignorance inferences of *-hari* indefinites. Section 2.10.1 accounts for the cancelability of ignorance inferences of *-hari* indefinites. Section 2.10.2 accounts for the non-cancelability of ignorance inferences of *-də* indefinites.

2.9.1 Computing ignorance with respect to *-də* indefinites

As we discussed in Section 1.6.3, an indefinite expression as in (214), with *-də* gives rise to an exhaustivity (“specific”) as well as an ignorance inference of the individual associated with the existential claim of the indefinite.

- (214) a. John kaawə-də hambə-un-a.
 John who-də meet-PAST-A
 “John met somebody.”
 EXHAUSTIVITY IMPLICATURE: John met some one (specific) person.
 EPISTEMIC IMPLICATURE: The speaker does not know who.

Keeping all the theoretical tools and assumptions utilized in the derivation of *-də* disjunctions, I show that the ignorance inferences of a *-də* indefinite expression are generated

³⁶Note that I am following the grammatical approach to derivation of implicatures (cf. Fox, 2007; Chierchia et al., 2012; Nicolae, 2017) rather than the conversational implicatures approach in Kratzer and Shimoyama (2002). However, the idea that the general function of indefinites is to introduce alternatives was first proposed in Kratzer and Shimoyama (2002).

by distributing the negated modalized domain alternatives among the accessible worlds (i.e. by way of exhaustification with respect to domain alternatives). I also show that the exclusivity/exhaustivity (i.e. “exactly one”/“specific”) component of meaning of a *-də* indefinite is derived by way of the morphological requirement [+locality] of the particle *-də* with respect to the scalar alternative/s entering into a local agreement relationship with the exhaustivity operator below the doxastic operator. Assume that we have three alternatives {Giita, Maala, Siita} in the contextual domain of the indefinite in (214). The above components of meaning can be derived as illustrated in (215).³⁷

- (215) a. $\Box$ [John kaawə-də hamuun-a]
 “John met somebody.”
 b. Assertion: $\Box$ [$G \vee M \vee S$]
 c. Scalar Implicatures: $Alt_S (G \vee M \vee S) = \{G \wedge M, G \wedge S, M \wedge S, G \wedge M \wedge S\}$
 $Exh_S (G \vee M \vee S) = (G \vee M \vee S) \wedge \neg (G \wedge M) \wedge \neg (G \wedge S) \wedge \neg (M \wedge S) \wedge \neg (G \wedge M \wedge S)$
 d. Matrix (domain) Implicatures: $Alt_D (\Box [G \vee M \vee S]) = \{\Box G, \Box M, \Box S\}$
 $Exh_D [\Box [G \vee M \vee S]] = \Box [G \vee M \vee S] \wedge \neg \Box G \wedge \neg \Box M \wedge \neg \Box S$
 e. Total meaning: $\Box [G \vee M \vee S] \wedge \neg \Box G \wedge \neg \Box M \wedge \neg \Box S \wedge \Box \neg [G \wedge M]$
 $\wedge \Box \neg [G \wedge S] \wedge \Box \neg [M \wedge S] \wedge \Box \neg [G \wedge M \wedge S]$

In (215-a), we have the *-də* indefinite expression with the covert doxastic operator adjoined at the matrix level at LF. Assertion of (215-a) is represented in (215-b). The set of scalar alternatives determined for the *Exh_S* operator are in (215-c). Crucially, the scalar exhaustification is limited to occur only below the doxastic operator, thus locally as seen in (215-c). Due to the constraint of innocent exclusion on the set of alternatives only the scalar alternatives will be negated. This serves to derive the exclusivity/exhaustivity/specificity inference of the individual associated with the existential claim of the indefinite. The domain implicatures drawn by exhaustification with respect to domain alternatives result in the uncertainty implicature as represented in (215-d). This serves to generate the ignorance component of meaning as uncertainty implicatures, that the speaker is not sure that John met Giita and the speaker is not sure John met Maala and the speaker is not sure John met Siita. In (215-e), derived by the union of the domain and scalar implicatures, we have the total meaning that John met exactly one of the three individuals and the speaker is not sure which one.

Crucially, the LF derived by exhaustification with respect to domain alternatives as in

³⁷See (157) for the syntactic/structural representation of the derivation of these components with respect to a *-də* disjunction in a tree diagram.

(215-c) is equivalent to (216).

$$(216) \quad \Box [G \vee M \vee S] \wedge \Diamond \neg G \wedge \Diamond \neg M \wedge \Diamond \neg S$$

In other words,

- (217) In all of the speaker's doxastically accessible worlds John met Giita or Maala or Siita and in some of the speaker's doxastically accessible worlds John did not meet Giita and in some of the speaker's doxastically accessible worlds John did not meet Maala and in some of the speaker's doxastically accessible worlds John did not meet Siita

This derives the distribution requirement for ignorance inference that I argue for in my account. Crucially, the LF in (215-e) as the total meaning is equivalent to (218).

$$(218) \quad \Box [G \vee M \vee S] \wedge \Diamond \neg G \wedge \Diamond \neg M \wedge \Diamond \neg S \wedge \neg \Diamond [G \wedge M] \wedge \neg \Diamond [G \wedge S] \wedge \neg \Diamond [M \wedge S] \wedge \neg \Diamond [G \wedge M \wedge S]$$

In other words,

- (219) In all of the speaker's doxastically accessible worlds John met Giita or Maala or Siita and in some of the speaker's doxastically accessible worlds John did not meet Giita and in some of the speaker's doxastically accessible worlds John did not meet Maala and in some of the speaker's doxastically accessible worlds John did not meet Siita and in none of the speaker's doxastically accessible worlds John met Giita and Maala, Giita and Siita, Maala and Siita, and Giita and Maala and Siita.

Thus, we derive the distribution requirement for the ignorance inferences of a *-də* indefinite expression by matrix exhaustification with respect to domain alternatives. However, the exclusivity component of a *-də* indefinite sentence is derived based on a locality constraint [+locality] of the particle *-də* that requires obligatory exhaustification of the scalar alternative/s below the doxastic operator. Thus, the LF in (215-e) not only derives the distribution requirement for the ignorance inferences of a *-də* indefinite expression but also accounts for the “exactly one”/“specific” meaning of a *-də* indefinite expression by local exhaustification of the scalar alternative/s.

We observed in Section 2.2 that the meanings expressed by a *-hari* indefinite sentence are different from those expressed by a *-də* indefinite sentence. In the next section, I account for the derivation of the meanings associated with *-hari* indefinite expressions.

2.9.2 Computing ignorance with respect to *-hari* indefinites

As we discussed in Section 1.6.3, an indefinite expression as in (220) with *-hari* gives rise to an inclusivity as well as ignorance inferences of the individual/s associated with the existential claim of the indefinite.

- (220) John kaawə-hari hamu-un-a.
 John who-hari meet-PAST-A
 “John met somebody.”

EXHAUSTIVITY IMPLICATURE: John met at least one person.

EPISTEMIC IMPLICATURE: The speaker does not know who.

When a *-hari* indefinite expresses ignorance, I argue that it gives rise to ignorance inferences with respect to both domain and conjunctive (scalar) alternative/s. I claim that for *-hari* indefinites the exhaustification (or application of *Exh* to the scalar alternative/s) happens at the global level. As explained in the following, matrix exhaustification of the scalar alternative of a *-hari* disjunction results in it being negated globally. This will serve to derive the inclusivity as well as the ignorance inferences with respect to scalar alternative/s. Keeping all the theoretical tools and assumptions utilized in the derivation of *-hari* disjunctions, I show the ignorance inferences of *-hari* indefinite expressions are generated by distributing the negated modalized domain as well as scalar alternatives among the accessible worlds (i.e. by way of exhaustification with respect to both domain and scalar alternatives). Assume that we have three alternatives {Giita, Maala, Siita} in the contextual domain of the indefinite in (220). The above components of meaning can be derived as illustrated in (221).³⁸

- (221) a. $\Box$ [John kaawə-hari hamuun-a]
 “John met somebody.”
 b. Assertion: $\Box$ [$G \vee M \vee S$]
 c. Domain Implicatures: $Alt_D(\Box [G \vee M \vee S]) = \{\Box G, \Box M, \Box S\}$
 $Exh_D(\Box [G \vee M \vee S]) = \Box [G \vee M \vee S] \wedge \neg \Box G \wedge \neg \Box M \wedge \neg \Box S$
 d. Scalar Implicature: $Alt_S(\Box [G \vee M \vee S]) = \{\Box [G \wedge M], \Box [G \wedge S], \Box [M \wedge S], \Box [G \wedge M \wedge S]\}$
 $Exh_S(\Box [G \vee M \vee S]) = \Box [G \vee M \vee S] \wedge \neg \Box [G \wedge M] \wedge \neg \Box [G \wedge S] \wedge \neg \Box [M \wedge S] \wedge \neg \Box [G \wedge M \wedge S]$
 e. Total meaning: $\Box [G \vee M \vee S] \wedge \neg \Box G \wedge \neg \Box M \wedge \neg \Box S \wedge \neg \Box [G \wedge M] \wedge \neg \Box [G \wedge S] \wedge \neg \Box [M \wedge S] \wedge \neg \Box [G \wedge M \wedge S]$

³⁸See (162) for the syntactic/structural representation of the derivation of these components with respect to a *-hari* disjunction in a tree diagram.

As illustrated in (221), in (221-a), we have the indefinite construction with the covert doxastic operator adjoined at the matrix level at LF. Assertion of (221-a) is represented in (221-b). The domain implicatures drawn by exhaustification with respect to domain alternatives result in the uncertainty implicatures as represented in (221-c). In (221-d), we have the scalar implicature derived by way of matrix exhaustification with respect to the scalar alternative/s. In (221-e), we have the total meaning. Crucially (221-e) is equivalent to (222).

$$(222) \quad \Box [G \vee M] \wedge \Diamond \neg G \wedge \Diamond \neg M \wedge \Diamond \neg S \wedge \Diamond \neg [G \wedge M] \wedge \Diamond \neg [G \wedge S] \wedge \Diamond \neg [M \wedge S] \wedge \Diamond \neg [G \wedge M \wedge S]$$

In other words,

- (223) In all of the speaker's doxastically accessible worlds John met Giita or Maala or Siita and in some of the speaker's doxastically accessible worlds John did not meet Giita and in some of the speaker's doxastically accessible worlds John did not meet Maala and in some of the speaker's doxastically accessible worlds John did not meet Siita and in some of the speaker's doxastically accessible worlds John did not meet Giita and Maala and in some of the speaker's doxastically accessible worlds John did not meet Giita and Siita and in some of the speaker's doxastically accessible worlds John did not meet Maala and Siita and in some of the speaker's doxastically accessible worlds John did not meet Giita and Maala and Siita.

Essentially, the LF in (221-e), implicates that the speaker is ignorant of not only the status of the individual alternatives but also the conjunctive (scalar) alternative/s. Thus, I claim that the LF derived in (221-e) is able to account for the meanings [1] John met at least one of Giita or Maala or Siita; [2] The speaker does not know which/who, which are expressed by a *-hari* indefinite. The domain implicatures generated by *ExhD* lead to strengthening (the global implicatures are actually entailed and are present in the absence *ExhS*).

As we discussed in section 2.2.2, the nature of ignorance expressed by the two types of indefinites is also different with respect to their non/cancelability. The ignorance expressed by a *-hari* indefinite can be canceled while that expressed by a *-də* indefinite can not be canceled. The implications associated with non/cancelability of ignorance inferences in the domain of *-hari* and *-də* indefinites are discussed in the next section.

2.10 Accounting for non/cancelability of ignorance in indefinites

In Section 2.2.2, we noted a correlation between the strength of a PPI and non/cancelability of ignorance implicatures. In Section 2.7, I accounted for the non/cancelability of the ignorance inferences of *-hari* and *-də* disjunctions based on the PP status of *-hari* or *-də*. I extend the same analysis to account for the non/cancelability of the ignorance inferences of *-hari* and *-də* indefinites based on the PP status of *-hari* or *-də*, as explained in the following sections.

2.10.1 Accounting for cancelability of ignorance in *-hari* indefinites

As we discussed in Section 2.2.2, an indefinite construction with *hari*, generates an ignorance implicature that can be canceled, as also shown in (224).

- (224) John kaawə-hari hambəun-a. æththətəmə, mamə dannəwa kaawə-də kiyəla.
John who-hari met-A. in fact I know who/which COMP
“John met somebody. In fact, I know who/which.”

In Section 2.7.1, we accounted for the cancelability character of a *hari* disjunction based on a re-analysis/re-parsing of the implicatures derived by exhaustification with respect to domain alternatives. The re-parsing strategy involved recursive exhaustification of domain alternatives. I propose the same analysis to account for the cancelability character of a *hari* indefinite. This is illustrated with the following example and the explanation that follows.

- (225) a. $\square$ [John kaawə-hari hamuun-a]
“John met somebody.”
b. Assertion: $\square$ [$G \vee M \vee S$]
c. Domain Implicatures: $Alt_D(\square [G \vee M \vee S]) = \{\square G, \square M, \square S\}$
 $Exh_D[\square [G \vee M \vee S]] = \square [G \vee M \vee S] \wedge \neg \square G \wedge \neg \square M \wedge \neg \square S$

In the indefinite expression in (224), before the speaker continues with the expression similar to *In fact, I know who/which*, a hearer will draw ignorance inferences as uncertainty implicatures derived by way of exhaustification with respect to domain alternatives as in (225). When the speaker continues with *In fact, I know who/which*, the ignorance inferences drawn will be canceled and a re-analysis of the implicatures will be made for implicatures to be compatible with knowledge. This can happen by recursive exhaustification of domain alternatives as illustrated in (226) and the explanation that follows.

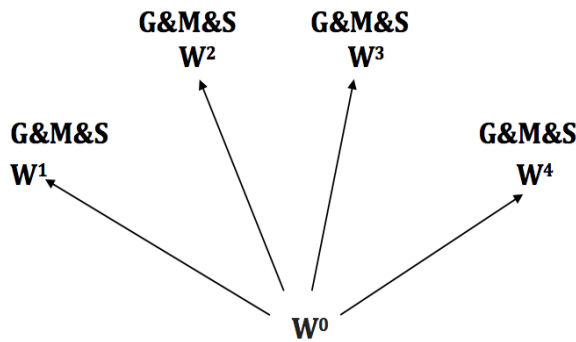
- (226)
- a. $Exh_D [\Box [Exh_D [G \vee M \vee S]]]$
 - b. $Alt_D (G \vee M \vee S) = \{G, M, S\}$
 - c. $Exh_D [G \vee M \vee S] = [G \vee M \vee S]$
 - d. $Alt_D (\Box Exh_D [G \vee M \vee S]) = \{\Box Exh_D G, \Box Exh_D M, \Box Exh_D S\}$
 $= \{\Box [G \wedge \neg M \wedge \neg S], \Box [M \wedge \neg G \wedge \neg S], \Box [S \wedge \neg M \wedge \neg G]\}$
 - e. $Exh_D \Box Exh_D [G \vee M \vee S] = \Box [G \vee M \vee S] \wedge \neg \Box [G \wedge \neg M \wedge \neg S] \wedge$
 $\neg \Box [M \wedge \neg G \wedge \neg S] \wedge \neg \Box [S \wedge \neg M \wedge \neg G]$

The LF in (226-e) is compatible with (227).

(227) $\Box [G \vee M] \wedge \Diamond G \wedge \Diamond M \wedge \Diamond S$

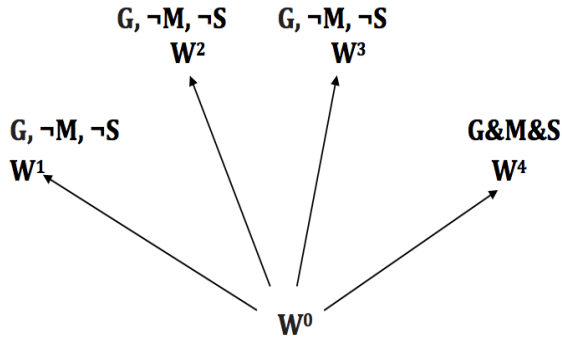
The LF in (226-e) as represented in (227) is compatible with a situation where a conjunctive alternative is true in all of the epistemically accessible worlds, as depicted in (228). Such a situation is compatible with a situation where the speaker knows who John met and the ignorance inferences already drawn will be canceled. Here, in the situation depicted in (228), the conjunctive alternative is true in all the worlds epistemically accessible to the speaker. This shows that the speaker knows that John met Giita, Maala and Siita.

(228)



The LF in (227) is also compatible with a situation similar to the one depicted in (229) where the proposition that John met Giita is true in all of the epistemically accessible worlds. Note that there is nothing in (227) to prevent a conjunctive alternative being true in one accessible world (as there is nothing in (227) to prevent one alternative being true in all the accessible worlds, which serves to cancel ignorance).

(229)



The situation depicted in (229) ensures that the speaker knows John met Giita, but s/he is not sure about Maala or Siita, which conveys partial knowledge. In a situation where the proposition that John met Giita is true in all of the epistemically accessible worlds as in (229), the speaker knows that John met Giita. Thus, a speaker can continue a *-hari* indefinite with “In fact, I know who” and the ignorance inferences already drawn will be canceled.

2.10.2 Accounting for non-cancelability of ignorance in *-də* indefinites

As we discussed in section 2.2.2, an indefinite construction as in (230) with *-də*, generates an ignorance implicature that can not be canceled.

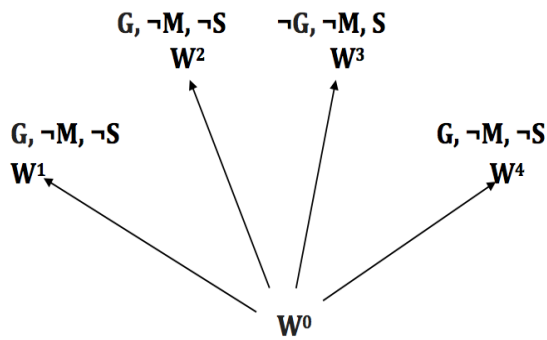
- (230) John kaawə-də hamuun-a. #æththətəmə, mamə dannəwa kaawə-də kiyəla.
 John who-də met-A in fact I know who-də COMP
 “John met somebody. In fact, I know who/which one.”

To account for the non-cancelability of the ignorance induced by *-də*, like in the *-də* disjunction, I again link the PP status of *-də* (the strength of PP) to the non-cancelability of ignorance.

It was seen that the particle *-də* is a very strong PPI as its conjunctive interpretation can never be recovered or rescued (i.e. its anti-licensing effect can not be ‘canceled’). I argue that this is correlated with the exclusivity component derived by [+locality] requirement that the particle *-də* places for the scalar alternative/s on its domain of alternatives as discussed in Section 2.7.2. This follows naturally from the PP behavior of *-də* disjunctions. In Section 2.9.1, we derived the exclusivity component of a *-də* by way of an agreement requirement for local exhaustification with respect to the scalar alternative/s. When the scalar alternative is exhaustified under the doxastic operator, it gives rise to a strong scalar implicature. I argue that the strong scalar implicature of *-də* prevents it from being in a DE environment. Thus, a conjunctive interpretation can never be recovered or rescued for

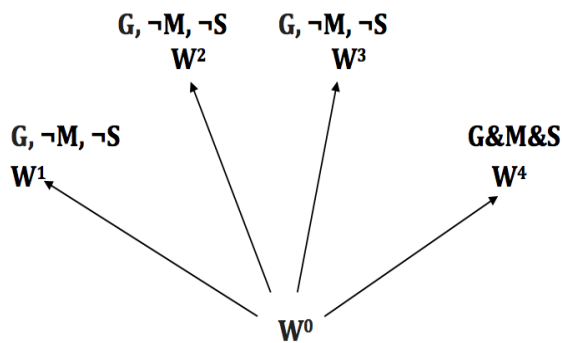
a *-də* disjunction. We saw in Section 2.9.1 that domain alternatives of a *-də* indefinites are also exhaustified to derive the uncertainty implicatures. We saw in the previous section with respect to *-hari* disjunction that when domain alternatives are exhaustified, we need the conjunctive/s alternative to be true in at least one accessible world for the indefinite to be compatible with knowledge. Thus, a *-də* indefinite expression (with exhaustification of domain and scalar alternatives) is compatible only with a situation similar to the one that is depicted in (231). In the situation depicted in (231), a conjunctive alternative is not true in any of the accessible worlds.

(231)

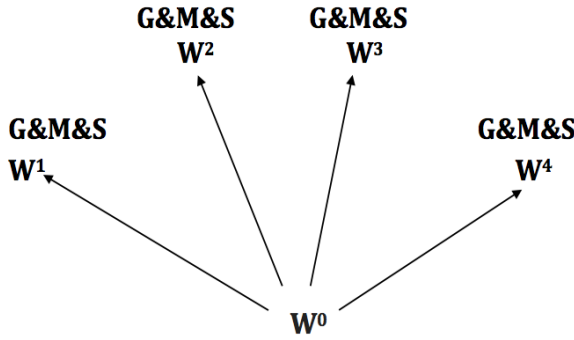


And, a *-də* indefinite can never be true in any of the contexts in (232) or (233), which are compatible with knowing which/ who.

(232) #



(233) #



Thus, a *-də* indefinite expression can never lead to the knowledge of the speaker. For instance, recall how we canceled ignorance with respect to *-hari* indefinites by way of recursive exhaustification with respect to domain alternatives in the previous section. Thus, I claim that when domain alternatives are exhaustified and the conjunctive alternative/s are false in all the worlds epistemically accessible to the speaker, there can never be a situation where one alternative is true in all the accessible worlds.

2.11 Summary and conclusions

In this chapter, we saw that both disjunctions and indefinites formed with the particles *-hari* and *-də* give rise to ignorance inferences. At the same time, we observed that the nature of ignorance that disjunctions and indefinites formed with the particles *-hari* and *-də* give rise to is different. For instance, a *-də* disjunction or indefinite gives rise to an exhaustivity (i.e. exactly one) inference of the individual/s associated with the disjunction/indefinite while giving rise to ignorance inferences. On the other hand, a *-hari* disjunction or indefinite gives rise to an inclusivity (i.e. one or more) inference of the individual/s associated with the disjunction/indefinite while giving rise to ignorance inferences. It was also seen that the ignorance inferences of *-hari* disjunctions and indefinites can be canceled while those of *-də* disjunctions and indefinites can not be canceled.

Accounting for derivation of ignorance inferences associated with disjunctions and indefinites formed with the particles *-hari* and *-də*, we claimed that exhaustification (based on the PP character of the two particles) with respect to an anti-singleton domain of alternatives is responsible for generation of ignorance inferences. We argued for a distribution requirement for deriving the right truth conditions for ignorance inferences as represented in (234).

(234) $\Diamond \neg p \wedge \Diamond \neg q$

Given a disjunction/indefinite assertion that includes two alternatives p, q , there is at least one world w' epistemically accessible from w^0 , where p is false and there is at least one world w' epistemically accessible from w^0 , where q is false.

This distribution requirement for both *-hari* and *-də* disjunctions and indefinites was shown to be derived from a common source: by way of exhaustification with respect to epistemic domain alternatives.

Accounting for the differences between the meanings expressed in the disjunctions and indefinites formed with the particles *-hari* and *-də*, we derived the differences based on a morphological requirement of [+/-locality] with respect to exhaustification of the scalar alternative/s associated with the particles *-hari* and *-də*. The exclusivity/exhaustivity implicatures of *-də* disjunctions and indefinites were derived by way of local exhaustification of scalar alternative/s with respect to the doxastic operator, based on the [+locality] morphological requirement of the particle *-də*. The inclusivity meaning of *-hari* disjunctions/indefinites were derived by way of matrix exhaustification of both domain and scalar alternative/s with respect to the doxastic operator.

We argued that the choice of non/cancelation of implicatures does not depend on the fact that an implicature is conversational or not, but rather on the strength of the positive polarity item (whether it is a strong PPI or weak PPI). Thus, a correlation was shown between non/cancelability of ignorance implicatures and the strength of a PPI (or exhaustivity). We saw that, based on the [+locality] morphological requirement of the particle *-də*, the scalar alternative/s of a *-də* disjunction/indefinite are exhaustified under the doxastic operator, thus giving rise to a strong scalar implicature. In other words, the strong PP character of *-də* prevents it from being in a DE environment. We showed that the strong scalar implicature of *-də* prevents the conjunctive alternative from being true in any of the worlds epistemically accessible to the speaker. We claimed that the strong scalar implicature together with the domain implicatures prevent any alternative from being true in all the worlds epistemically accessible to the speaker. This accounted for the non-cancelability of ignorance inferences of a *-də* disjunction/indefinite. We accounted for the cancelability of ignorance inferences of a *-hari* disjunction/indefinite by a reanalysis and recursive exhaustification of domain alternatives. The LFs derived by way of recursive exhaustification of domain alternatives were shown to be compatible with a situation that amounts to knowledge.

Thus, we showed that not only the derivation but also the non/cancelability of the ignorance implicatures of *-hari* and *-də* disjunctions and indefinites are predicted in the grammar of these expressions.

Chapter 3

Exhaustivity and Scope

3.1 Introduction

In Chapter 2, we discussed the implications associated with generation and cancellation of ignorance inferences with respect to *-hari* and *-də* disjunctions and indefinites in matrix contexts. This chapter investigates semantic effects pertaining to *-hari* and *-də* disjunctions and indefinites in the embedded contexts of the universal quantifier, modals and attitude verbs. It is observed that *-hari* and *-də* disjunctions and indefinites give rise to different scope effects with respect to the universal quantifier, modals and attitude verbs. Crucially, differences in the epistemic effects are also observed relative to the differences in the scope effects. In the contexts of deontic modals, *-hari* and *-də* disjunctions/indefinites give rise to free-choice and no-choice effects respectively relative to the scope effects. Disjunctions and indefinites with the particles *-hari* and *-də* also trigger non-specific *de re* and *de dicto* readings of indefinites with respect to attitude verbs (crucially, a specific *de re* reading is missing for these indefinites).

The chapter accounts for a link between scope and epistemic effects based on the PP character and exhaustivity implicatures associated with *-hari* and *-də* disjunctions and indefinites with respect to the universal quantifier and deontic modals. It argues that there is no overt or covert movement of a “disjunction element”, “scope indicator” (cf. Rooth and Partee (1982); Larson (1985)) or “quantifier” over the universal quantifier or a deontic modal. It proposes to derive the scope effects and related ignorance inferences as implicatures, particularly as ‘wide/narrow scope implicatures’ by way of exhaustification with respect to alternatives associated with a disjunction/indefinite. It proposes to derive these implicatures by way of exhaustivity feature agreement between the particles *-hari* or *-də* and an exhaustivity operator placed in the syntactic structure of a *-hari* or *-də* disjunction/indefinite construction. Thus, it follows the grammatical approach to derivation of implicatures.

It has to be noted that *-hari* and *-də* disjunctions and indefinites in relation to the universal quantifier, modals and propositional attitude verbs take us into a less studied empirical domain. Some of the proposals presented here are tentative/speculative pointing towards areas for further research. The main contribution made by this chapter is to highlight the complexity of the data when more than one operator is considered.

The chapter shows that a *-hari* disjunction/indefinite in the context of the universal quantifier, a deontic modal or an attitude verb gives rise to a narrow scope reading of the disjunction/indefinite. The narrow scope reading of a *-hari* disjunction/indefinite with respect to the universal quantifier is ambiguous between one with an ignorance inference and one without. At the same time, the narrow scope reading of a *-hari* disjunction/indefinite with respect to a deontic modal is ambiguous between one with an ignorance inference and one with a free-choice effect (without an ignorance inference). The readings with ignorance inferences in contexts of both the universal quantifier and modals are derived by way of exhaustification with respect to epistemically modalized domain and scalar alternatives. Obviation of ignorance inferences with respect to the universal quantifier is accounted for by way of exhaustification with respect to non-modalized domain and scalar alternatives. The reading with a free-choice effect is derived by way of recursive exhaustification with respect to deontically modalized domain alternatives.

The chapter also shows that the application of the Exh operator incorporating innocent exclusion on a set of alternatives in Sauerland's procedure (cf. Sauerland (2004)) as in Fox (2007) seems to fall short of deriving the wide-scope effects of a *-də* disjunction/indefinite with respect to the universal quantifier or a deontic modal. The chapter explores two alternative solutions. The first one of these is to work with the exhaustivity operator as in Fox (2007) and to assume that the alternatives are closed under conjunction (cf. Spector (2016)), which will derive a stronger meaning to account for the wide scope effects. One of the interesting upshots of this discussion is that we assume that the [+locality] requirement of the particle *-də* is adopted to derive the strongest meaning. The second one is to account for the wide scope effect of a *-də* disjunction/indefinite by way of a felicity condition on epistemic access (pragmatic constraint) that the particle *-də* places on the alternatives in the domain, as we observed in Section 1.6.3.

The chapter proposes to account for the non-specific aspect of both *-hari* and *-də* indefinites with respect to an attitude verb by way of distributing individuals among the belief worlds of the subject. This is derived by exhaustification with respect to domain

alternatives introduced by the indefinite. As mentioned just above, the particle *-də* is marked for a pragmatic constraint that it places on the alternatives in its domain. Building on this, the *de re* aspect of the meaning of a *-də* indefinite is derived by way of this pragmatic constraint that *-də* places on alternatives in a domain. As we also observed in Section 1.6.3 (and we will also see in Section 3.4.2), the particle *-hari* is not marked for a pragmatic constraint (i.e. that *-hari* indefinites are felicitous in any kind of context). And I show that a *-hari* indefinite gives rise to a narrow scope reading of the indefinite with respect to an attitude verb and is compatible with both non-specific *de re* and *de dicto* readings.

The chapter is organized as follows: Section 3.2 deals with the background, data, implications and derivations associated with wide/narrow scope readings and the differences in the epistemic effects of *-hari* and *-də* disjunctions and indefinites with respect to the universal quantifier. Section 3.3 is concerned with the background, data, issues and derivations associated with wide/narrow scope effects and free/no-choice readings of *-hari* and *-də* disjunctions and indefinites with respect to deontic necessity and possibility modals. Section 3.4 deals with the derivations of the *de re* and *de-dicto* readings of *-də* and *-hari* indefinites with respect to attitude verbs. Section 3.5 presents the conclusions.

3.2 The universal quantifier and *-hari* and *-də* disjunctions/indefinites

In Chapter 1, we saw that both *-hari* and *-də* disjunctions and indefinites give rise to different scope effects with respect to a DP universal quantifier. We saw that *-hari* and *-də* disjunctions and indefinites with the universal quantifier give rise to different epistemic effects relative to these different scope configurations. The goal of this section is to formally account for the observed differences in scope effects, and especially to account for the differences in the ignorance inferences relative to the scope effects. First, I repeat the data that we saw briefly in Chapter 1 with more details in order to make the empirical facts clearer. Second, I discuss the implications of some of the existing accounts that have analyzed the scope of disjunction in the contexts of the universal quantifier or intensional operators with the force of universal quantification. The goal of this exercise is to draw insights into the analysis of Sinhala *-hari* and *-də* disjunctions and indefinites with respect to the universal quantifier. Next, I offer a semantic analysis and derivations to account for the link between scope and epistemic effects based on the PP character and exhaustivity implicatures of the *-hari* and *-də* disjunctions and indefinites in the context of the universal quantifier.

3.2.1 Crucial Data

Disjunctions with the particle *-də* give rise to obligatory wide scope effects and ignorance inferences of the associated alternatives with respect to the universal quantifier. For instance, consider the two contexts given in (1-a) and (1-b).

- (1) a. CONTEXT 1: I am at a party thrown by our department. The department had also invited two professors: Giita and Maala from nearby universities to the party. The students at our department were eager to meet with the two professors. I saw/heard that every student talked with at least one of Giita or Maala. I know/do not know who met who.
- b. CONTEXT 2: I am at a party thrown by our department. The department had also invited two professors: Giita and Maala from nearby universities to the party. I saw there was exactly one professor (either Giita or Maala) that all the students were talking with. But, I do not know/remember which one.

As illustrated in (2), a *-də* disjunction is used only in a context like that in (1-b) claiming that there was exactly one professor (either Giita or Maala) that every student met and the speaker does not know who met who.

- (2) hæmə gooləy-ek-mə Giita-də Maala-də hambə-un-a. mamə danne næ
every student-INDF-EMPH Giita-də Maala-də meet-past-A I know not
kaawə-də kiyəla.
who-də COMP.
“Every student met Giita or Maala. I do not know who/which.”
#CONTEXT 1: Every student met at least one of Giita or Maala.
SCOPE EFFECT : $\forall > -də(\text{or})$.
EPISTEMIC IMPLICATURE: The speaker may/may not know who met who.
✓CONTEXT 2: There was exactly one professor (either Giita or Maala) that every student met.
SCOPE EFFECT: $-də(\text{or}) > \forall$.
EPISTEMIC IMPLICATURE: The speaker does not know who met who.¹

The situation with the particle *-hari* is different. It gives rise to narrow scope effects of the associated alternatives with respect to the universal quantifier. At the same time, a *-hari* disjunction with its narrow scope interpretation may be compatible with a reading with ignorance inferences and one without. For instance, as illustrated in (3), a *-hari* disjunction is used only in a context such as that in (1-a) claiming that every student met

¹I am using $\checkmark$ and # symbols to indicate that the sentence above is felicitous/not felicitous in these contexts.

at least one of Giita or Maala and the speaker may/may not know who met who.

- (3) hæmə goolə-ek-mə Giita-hari Maala-hari hamu-un-a.

every student-INDF-EMPH Giita-hari Maala-hari meet-past-A

“Every student met Giita or Maala.”

✓CONTEXT 1: Every student met at least one of Giita or Maala.

SCOPE EFFECT : $\forall > \text{-hari/or}$.

EPISTEMIC IMPLICATURE: The speaker may/may not know who met who.

#CONTEXT 2: There was exactly one professor (either Giita or Maala) that every student met.

SCOPE EFFECT: $\text{-hari/or} > \forall$.

EPISTEMIC IMPLICATURE: The speaker does not know who met who.

Thus, it is seen that the scope and epistemic effects of disjunctions with the two particles *-hari* and *-də* are different with respect to the universal quantifier. In a similar fashion, the scope and epistemic effects of indefinites with the two particles *-hari* and *-də* are different with respect to the universal quantifier. Consider the following two scenarios.

- (4) a. CONTEXT 1: I am at a party thrown by our department. The department had also invited some professors from nearby universities to the party. The students at our department were eager to meet with the professors. I saw/heard that every student talked with at least one professor. I know/do not know who met who.
- b. CONTEXT 2: I am at a party thrown by our department. The department had also invited some professors from nearby universities to the party. I saw there was one professor that all the students were talking with. But, I do not know/remember who.

In a manner similar to a *-də* disjunction, a *-də* indefinite triggers obligatory wide scope and ignorance effects of alternatives associated with the indefinite with respect to the universal quantifier. For instance, as illustrated in (5), a *-də* indefinite can only be used in a context like that in (4-b), claiming that there was a professor that all the students talked with. But, the speaker does not know/remember who.

- (5) hæmə goolə-ek-mə kaawə-də hambə-un-a.

every student-INDF-EMPH who-də meet-past-A

“Every student met someone.”

#CONTEXT 1: Every student met at least one professor.

SCOPE EFFECT : $\forall > \exists \text{ (-də (or))}$.

EPISTEMIC IMPLICATURE: The speaker may/may not know who met who.

√CONTEXT 2: There was one professor that Every student met.

SCOPE EFFECT: $\exists(-d\partial(\text{or})) > \forall$.

EPISTEMIC IMPLICATURE: The speaker does not know who met who.

On the other hand, in a manner similar to a *-hari* disjunction, a *-hari* indefinite gives rise to narrow scope effects of the alternatives associated with the indefinite with respect to the universal quantifier. A *-hari* indefinite with its narrow scope interpretation is compatible with a reading with ignorance inferences and one without. For instance, as illustrated in (6), a *-hari* indefinite is used only in a context like that in (4-a) claiming that every student met at least one professor and the speaker may/may not know who met who.

- (6) hǎmǎ goolǎ-ek-mǎ kaawǎ-hari hambǎ-un-a.
every student-INDF-EMPH who-hari meet-past-A
“Every student met someone.”

√CONTEXT 1: Every student met at least one professor.

SCOPE EFFECT : $\forall > \exists (-\text{hari (or)})$.

EPISTEMIC IMPLICATURE: The speaker may/may not know who met who.

#CONTEXT 2: There was one professor that Every student met.

SCOPE EFFECT: $\exists(-\text{hari (or)}) > \forall$.

EPISTEMIC IMPLICATURE: The speaker does not know who met who.

Thus, it is evident that the scope and epistemic effects of disjunctions and indefinites with the two particles *-hari* and *-dǎ* are different with respect to the universal quantifier. A *-dǎ* disjunction/indefinite triggers obligatory wide scope and ignorance effects of the associated alternatives with respect to the universal quantifier. On the other hand, a *-hari* disjunction/indefinite triggers narrow scope effects of the associated alternatives with respect to the universal quantifier. At the same time, it may or may not give rise to ignorance inferences. Thus, for a *-hari* disjunction/indefinite, the ignorance inferences may be obviated. In Section 3.2.3, I make a proposal to formally account for these facts. In the next section, I review some of the existing accounts on disjunction/indefinite scope to draw insights to analyze the scope and epistemic effects of *-hari* and *-dǎ* disjunctions and indefinites under the universal quantifier.

3.2.2 Theoretical background

Scope and epistemic effects of disjunction/indefinites with respect to the universal quantifier or intensional operators with the universal quantificational force have received much

attention in the literature of disjunction scope (cf. Rooth and Partee (1982); Larson (1985); Fox (2007); Alonso-Ovalle and Shimoyama (2014); Alonso-Ovalle and Menéndez-Benito (2017); among many others). In this section, I lay out a review of a sample of existing accounts. I first discuss some of the landmark proposals (i.e. Rooth and Partee (1982); Larson (1985)) to draw insights from some of the implications associated with disjunction scope.² Then, I discuss some accounts (i.e. Fox (2007); Alonso-Ovalle and Shimoyama (2014); Alonso-Ovalle and Menéndez-Benito (2017)) that have focused on the generation and obviation of the ignorance effects of disjunction with respect to the universal quantifier. In this section, I also analyze the scope facts of *-hari* and *-də* disjunctions in light of the proposals in these existing accounts to investigate whether the existing accounts can handle the disjunction scope facts in Sinhala. I begin by discussing Rooth and Partee (1982) in the next section.

3.2.2.1 Rooth and Partee (1982)

Rooth and Partee (1982) offers an analysis of scope of disjunction in intensional contexts such as the one in (7).³ In the account of Rooth and Partee (1982), it is suggested that the English disjunction *or* has a scope bearing element. They claim that a sentence like that in (7) is ambiguous between at least three readings.

(7) Mary is looking for a maid or a cook.

According to Rooth and Partee (1982), first, there is a *de re* meaning that Mary is looking for a specific person, and that person is a maid or a cook. They also note that there is a *de dicto* reading which means that Mary will be satisfied if she meets a person *x* satisfying the description “maid or cook”. Furthermore, they note that there is a second *de dicto* reading with the meaning that Mary has a particular kind of person in mind and the speaker does not know which kind of a person that is. Especially, they note that this third reading has to be facilitated with a phrase similar to “...I don’t know which.” They note that this reading is equivalent to (8), which is a wide scope reading of *or* disjunction.

(8) Mary is looking for a maid or looking for a cook.

²It has to be noted that Rooth and Partee (1982) and Larson (1985) focus on a quite different set of data (particularly, the scope of disjunction with respect to intensional operators) and I begin with a review of these accounts as they provide some crucial insights into the analysis of disjunction scope with respect to the universal quantifier.

³Rooth and Partee (1982) is a very detailed account of semantics of conjunction, type ambiguity and scope of disjunction. I am, however, taking only some of the useful examples for our analysis. See Rooth and Partee (1982) for more details.

Rooth and Partee account for the reading of (7) with wide scope disjunction followed by “I do not know which” as in (9). Here in (9), they argue that what they call the “disjunction specification of the variable” (i.e. $\{\wp_2\}$) is brought in at the sentence level. The variable is bound by the discourse level existential closure, according to Rooth and Partee (1982).

$$(9) \quad \exists \{\wp_2\} [\text{look for}' (m, \wp_2) \wedge [\wp_2 = \wedge \text{a maid}' \vee \wp_2 = \wedge \text{a cook}']]$$

The account of Rooth and Partee (1982) is an early discussion of scope properties of disjunction in relation to intensional operators. Rooth and Partee do not discuss data particularly with respect to the universal quantifier. However, there are similarities with respect to the universal quantifier. One of the significant implications of Rooth and Partee (1982) for our account is the idea that wide scope disjunction gives rise to obligatory ignorance inferences. This analysis of wide scope disjunction makes the right empirical predictions for *-da* disjunctions in Sinhala. We observed in (2) that a *-da* disjunction gives rise to obligatory wide scope effects against the universal quantifier and it obligatorily gives rise to ignorance inferences. We also observed that when *-hari* disjunction is interpreted under the universal quantifier, it may or may not give rise to ignorance inferences.

Larson (1985) builds his account on Rooth and Partee (1982) to include more examples and offers an analysis based on syntactic movement.

3.2.2.2 Larson (1985)

Like Rooth and Partee (1982), Larson also analyses *or* as a scope bearing element. Larson (1985) argues that the scope of *or* is closely tied with the syntax of *either* or *whether*. He proposes an analysis where *or* scope is assigned by the movement of “scope indicators” syntactically.⁴

Larson compares Rooth and Partee examples as in (10) with *either* included in them as in (11).

(10) Mary is looking for a maid or a cook.

- (11) a. Mary is looking for either a maid or a cook.
b. Either Mary is looking for a maid or a cook.

Larson claims that the syntactic position of *either* as in the examples in (11) interacts in

⁴Larson (1985) is a very detailed account of syntax and semantic properties of scope of disjunction. I am, however, taking only some of the useful examples for our analysis. See Larson (1985) for more details.

an interesting way with different interpretations of the disjunction *or*. He claims that all three readings (i.e., *de re*, *de dicto* and the third *de dicto* readings) of (10) as discussed in the previous section are preserved in the construction in (11-a). On the other hand, for (11-b), he claims, the narrow scope reading is absent and only the wide scope *de dicto* reading is available, which gives rise to ignorance inferences.

What we can import from this analysis for the disjunction scope facts in Sinhala is that a construction with *-hari* disjunction may be compared with a construction like in (11-a), where it can give rise to different readings under the universal quantifier as we saw in (3) (but, excluding a specific reading). On the other hand, an expression with a *-də* disjunction may be compared with that of (11-b), where it triggers an obligatory wide scope reading and ignorance inferences of disjunction. However, while Larson (1985) proposes an analysis of wide scope disjunction with respect to intensional operators with universal quantificational force by way of syntactic movement of “scope indicators”, I investigate an analysis to account for the wide scope effect of a *-də* disjunction under the universal quantifier without syntactic movement. I propose to derive the scope effects based on the positive polarity behavior of the particles *-hari* and *-də* and agreement of these particles with an exhaustivity operator placed in the syntactic structure of a disjunction construction. At the same time, Larson’s syntactic movement analysis accounts for the wide scope effects of disjunction, but does not account for the related ignorance inferences in the wide scope readings. An account based on syntactic movement of the particles *-hari* or *-də* may be explored as in Kishimoto (2005) for the particle *-də*. However, such an account based on the syntactic movement of the particles will have to say more about how to derive the ignorance inferences. The advantage of utilizing the exhaustivity based approach is that it serves to straightforwardly derive the distribution requirement to account for the differences in the scope and epistemic effects, as discussed in Section 3.2.3.

As we have seen, most of the examples used for the analysis of disjunction scope in both Rooth and Partee (1982) and Larson (1985) are intensional contexts. As a more recent account, Fox (2007) analyses examples with the English disjunction *or* with respect to the universal quantifier. This is discussed next.

3.2.2.3 Fox (2007)

Fox (2007) proposes to derive the distribution of individual disjuncts with respect to the universal quantifier by way of exhaustification of alternatives. For this, Fox compares Sauerland’s (2004) account of deriving implicatures (by way of conversational maxims) with that of application of an exhaustivity operator. For instance, as discussed in detail in

Section 3.3.3.2, Sauerland (2004) in his Neo-Gricean approach to implicature calculation employs a knowledge or belief operator which he dubs as κ to derive ignorance as well as scalar implicatures in terms of primary and secondary implicatures.⁵ Fox (2007) notes that when disjunction is embedded under an upward monotone/belief operator dubbed as B (similar to κ in Sauerland's system), it can give rise to ignorance as well as scalar inferences with respect to the universal quantifier, as shown in (12).

- (12) $\forall x (P(x)) \vee Q(x)$
 PRIMARY IMPLICATURES: $\neg B_s (\forall x P(x))$, $\neg B_s (\forall x Q(x))$ ($\neg B_s \forall x (P(x)) \wedge Q(x)$), follows)
 SECONDARY IMPLICATURES: $B_s (\neg \forall x P(x))$, $B_s (\neg \forall x Q(x))$ ($B_s \neg \forall x (P(x)) \wedge Q(x)$), follows)

Fox (2007) notes that the implicatures in Sauerland's system in (12) are derived by means of conversational maxims. He also notes that if Sauerland's system is adopted to derive free-choice effects of disjunction under modals, the ignorance inferences derived contradict with free-choice (This will be discussed in detail in Section 3.3.4). Instead of deriving the implicatures by way of conversational maxims, Fox (2007) proposes to derive them as grammatical implicatures by way of an exhaustivity operator. Fox notes that a disjunction embedded under a universal quantifier may give rise to the implicatures as illustrated here in (13).

- (13) Every friend of mine has a boyfriend or a girlfriend.
 Implicatures:
 a. It is not true that every friend of mine has a boyfriend.
 b. It is not true that every friend of mine has a girlfriend. (Fox (2007))

Fox claims that the implicatures of disjunction as in (13) can be derived by way of exhaustification of the alternatives as shown in (14).

- (14) $Exh (Alt (\forall x P(x) \vee \forall x Q(x)), (\forall x P(x) \vee \forall x Q(x))) = \neg (\forall x P(x)) \wedge \neg (\forall x Q(x))$
 (Fox (2007))

What we can conclude from Fox's (2007) analysis of disjunction with respect to the universal quantifier is that we can adopt a doxastic operator (similar to the knowledge or belief operator in Sauerland's (2004) system as in (12)) to derive the ignorance inferences. I follow Fox (2007) in the application of *Exh* to derive implicatures as grammaticalized implicatures based on the empirical evidence of the PP character of the two particles.

⁵For more details of a discussion of Sauerland (2004), see Section 3.3.3.2.

However, as Fox's (2007) primary interest is in how to derive FC implicatures, he does not discuss any further implications associated with the implicatures in disjunction under the universal quantifier. Moreover, he does not discuss the link between scope effects and the ignorance inferences of disjunction with the universal quantifier. Neither does he discuss the loss of ignorance effects when the disjunction is interpreted under the universal quantifier. In Section 3.2.3, I propose an analysis to fill in these gaps.

Alonso-Ovalle and Shimoyama (2014) and Alonso-Ovalle and Menéndez-Benito (2017) discuss scope and ignorance effects of Japanese *wh-ka* and Spanish *algún* indefinites with respect to the universal quantifier. I discuss the accounts in Alonso-Ovalle and Shimoyama (2014) and Alonso-Ovalle and Menéndez-Benito (2017) to draw insights for *-hari* and *-dø* disjunction/indefinites from the way they analyze the scope and ignorance components of indefinites.

3.2.2.4 Alonso-Ovalle and Shimoyama (2014)

Alonso-Ovalle and Shimoyama (2014) is perhaps the first to account for both derivation and obviation of ignorance component of indefinites with respect to the universal quantifier. They claim that a Japanese *wh-ka* indefinite interacting with the universal quantifier as in (15) conveys an ignorance effect.

- (15) *Dono kyooju-mo dare-ka gakusee-to odotteru.*
 which professor-MO who-KA student-with is.dancing
 “Every professor is dancing with some student.”

They argue that the ignorance implicatures of (15) are derived via the maxims of quality and quantity. They illustrate this as represented in (16). They note that the proposition in (16-a) (with the doxastic operator scoping over the sentence) contrasts with the stronger propositions that result from restricting the domain to a singleton (i.e. the effect of the quantity implicature). They argue that if the actual students are *s1*, *s2*, and *s3* and the professors are *p1*, *p2*, and *p3*, the ignorance component is derived by way of ‘primary implicatures’ as in (16-b). They claim that the ignorance inferences as in (16-b) can be obviated if a secondary implicature is drawn as in (16-c). They note that the implicatures in (16-c) can be true in a situation where the speaker knows who is dancing with whom. (i.e. the speaker knows that *p1* is dancing with *s1*, that *p2* is dancing with *s2*, and that *p3* is dancing with *s3*.)

- (16) a. $\Box$ [Every professor is dancing with s1 or s2 or s3]
 b. $\neg \Box$ [Every professor is dancing with s1], $\neg \Box$ [Every professor is dancing with s2], $\neg \Box$ [Every professor is dancing with s3]
 c. $\Box \neg$ [Every professor is dancing with s1], $\Box \neg$ [Every professor is dancing with s2], $\Box \neg$ [Every professor is dancing with s3]

Thus, they claim that the ignorance inferences can be obviated by way of ‘secondary implicatures’ as in (16-c).

As it was discussed above, Alonso-Ovalle and Shimoyama (2014) derive the ignorance implicatures by application of a doxastic operator akin to a necessity modal represented with $\Box$. In the derivation of ignorance inferences, I also implement the application of the doxastic operator akin to a necessity modal represented with $\Box$, as in Alonso-Ovalle and Shimoyama (2014). However, Alonso-Ovalle and Shimoyama (2014) derive the ignorance inferences via the maxims of quality and quantity as conversational implicatures, I derive the ignorance inferences via application of an exhaustivity operator. At the same time, it is observed that the account in Alonso-Ovalle and Shimoyama (2014) falls short of establishing a clear link between wide/narrow scope effect of disjunction/indefinites and generation/obviation of ignorance inferences. For instance, the implicatures derived as primary implicatures as in (16-b) rightly derives the desired ignorance inferences of a disjunction/indefinite interacting with the universal quantifier. However, the derivation in (16-b) does not rightly capture the wide scope effect of *-dē* disjunctions/indefinites, as illustrated with respect to *-dē* disjunctions/indefinites in the examples and contexts in Section 3.2.1. I make a proposal to account for the link between wide/narrow scope effect of disjunction/indefinites and generation/obviation of ignorance inferences, as discussed in Sections 3.2.3 and 3.2.4.

Alonso-Ovalle and Menéndez-Benito (2017) note that the same effects as for Japanese *Wh-ka* indefinites can be observed of Spanish *algún* indefinites under the universal quantifier and propose that both the derivation and the disappearance of the epistemic effect can be accounted for in terms of a quantity implicature. This is discussed in the next section.

3.2.2.5 Alonso-Ovalle and Menéndez-Benito (2017)

Alonso-Ovalle and Menéndez-Benito (2017) analyze examples as in (17). They note that when *algún* is interpreted with scope over the universal quantifier, it conveys an ignorance effect. This is in the sense that in a context where every professor is dancing with the same

student, it gives rise to an ignorance effect. They claim that when *algún* is interpreted in the scope of the universal quantifier, (i.e. in a context where different professors are dancing with different students), the speaker can utter the sentence even if s/he knew well which professors were dancing with which students. Thus, the ignorance effect is shown to disappear when *algún* is interpreted in the scope of the universal quantifier.

- (17) Todos los profesores están bailando con algún estudiante.
 All the professors are dancing with algún student
 “Every professor is dancing with some student.” Alonso-Ovalle and Menéndez-Benito (2017)

Alonso-Ovalle and Menéndez-Benito (2017) refer to the above as co-variation contexts and argue that the quantity implicature based approach (as discussed in Section 2.4.1) is able to derive the absence of the epistemic effect in such co-variation contexts. They claim that when the domain of students for *algún* include { Juan, Lola, Sara}, the pragmatic competitors will be as those in (18).

- (18) Every professor is dancing with a student in {Juan, Lola, Sara}
 a. Every professor is dancing with a student in {Juan}
 b. Every professor is dancing with a student in {Lola}
 c. Every professor is dancing with a student in {Sara}

They argue that the pragmatic competitors in (18) rule out a situation where the speaker can commit to any of them. Then the ignorance effect is derived. They also argue that (18) is compatible with a context where different professors are dancing with different students and the speaker knows who is dancing with who, which is compatible with the narrow scope reading of disjunction with respect to the universal quantifier.

As we can see here, Alonso-Ovalle and Menéndez-Benito (2017) derives the ignorance inferences via a pragmatic competition between a proposition and alternative stronger propositions to that proposition. However, I propose to derive both the wide scope effects and ignorance inferences via application of an exhaustivity operator appended in the syntactic structure of a disjunction/indefinite. Thus, I follow the grammatical approach to derivation of ignorance implicatures of disjunctions/indefinites under the universal quantifier. This approach provides us with a better strategy to explain the difference between *-hari* and *-də*. I show that these differences can be accounted for based on a distribution requirement derived by way of exhaustification with respect to domain and scalar alternatives.

3.2.3 Accounting for the differences in scope and epistemic effects

In this section, I show that we can account for the differences in the scope and epistemic effects of a disjunction or indefinite with the particles *-hari* and *-də* interacting with the universal quantifier based on the positive polarity behavior and obligatory exhaustification of alternatives associated with *-hari* and *-də* disjunctions or indefinites.

With all the tools and assumptions presented earlier in hand, I first account for the derivation of narrow scope and generation/obviation of ignorance inferences of a *-hari* disjunction under the universal quantifier.

3.2.3.1 The case of *-hari* in disjunction

As it was discussed in Section 3.2.1, a *-hari* disjunction as in (19) can only be true in the context in (1-a).

- (19) hǝmə goolə-ek-mə Giita-hari Maala-hari hamu-un-a.
every student-INDF-EMPH Giita-hari Maala-hari meet-past-A
“Every student met Giita or Maala.”

CONTEXT 1: I am at a party thrown by our department. The department had also invited two professors: Giita and Maala from nearby universities to the party. The students at our department were eager to meet with the two professors. I saw/heard that every student talked with at least one of Giita or Maala. But, I know/do not know who met who.

SCOPE EFFECT: $\forall > \text{-hari(or)}$.

EPISTEMIC IMPLICATURE: The speaker may/may not know who met who.

Thus, a *-hari* disjunction with a narrow scope reading of the disjunction is true in two different contexts: [1] Every boy met at least one of Giita or Maala. The speaker does not know who met who. [2] Every boy met at least one of Giita or Maala. The speaker knows who met who. Crucially, as seen in (20), in the case of *-hari* disjunction, I show that, matrix exhaustification of the scalar alternative (i.e. outside the CP domain) serves to derive a narrow scope effect of disjunction. I also show that the ignorance effect of *-hari* disjunction when it is interpreted under the universal quantifier is derived by global exhaustification with respect to both domain and scalar alternatives as illustrated in (20).

- (20) a. $\Box$ [hæmə gooləy-ek-mə Giita-hari Maala-hari hambə-un-a.]
 “Every student met Giita or Maala.”
- b. Assertion: $\Box$ [$\forall x (G(x) \vee M(x))$]
- c. Domain Implicatures: $Alt_D(\Box [\forall x (G(x) \vee M(x))]) = \{ \Box \forall x G(x), \Box \forall x M(x) \}$
 $Exh_D [\Box [\forall x (G(x) \vee M(x))]] = \Box [\forall x (G(x) \vee M(x))] \wedge \neg \Box [\forall x G(x)] \wedge \neg \Box [\forall x M(x)]$
- d. Scalar Implicature: $Alt_S(\Box [\forall x (G(x) \vee M(x))]) = \{ \Box [\forall x (G(x) \wedge M(x))] \}$
 $Exh_S(\Box [\forall x (G(x) \vee M(x))]) = \Box [\forall x (G(x) \vee M(x))] \wedge \neg \Box [\forall x (G(x) \wedge M(x))]$
- e. Total meaning: $\Box [\forall x [G(x) \vee M(x)]] \wedge \neg \Box [\forall x G(x)] \wedge \neg \Box [\forall x M(x)] \wedge \neg \Box \forall x [G(x) \wedge M(x)]$

In (20-a), we have the *-hari* disjunction sentence with the universal quantifier with the covert doxastic operator adjoined at the matrix level at LF. Assertion of (20-a) is represented in (20-b). The domain implicatures drawn by exhaustification with respect to domain alternatives result in the uncertainty implicatures as represented in (20-c). This serves to generate the ignorance component of meaning as uncertainty implicatures, that the speaker is not sure that all the students met Giita and the speaker is not sure that all the students met Maala. Crucially, the scalar exhaustification occurs above the doxastic operator, thus globally as shown in (20-d).⁶ This serves to derive a narrow scope effect for the disjunction with respect to the universal quantifier. In (20-e), derived by the union of the domain and scalar implicatures, we have the total meaning that all the boys met at least one of the two individuals and the speaker does not know whether they all met Giita or whether they all met Maala or whether they all met Giita and Maala.

Note that the derivation in (20-e) is equivalent to the following.

- (21) $\Box [\forall x (G(x) \vee M(x))] \wedge \Diamond \neg [\forall x G(x)] \wedge \Diamond \neg [\forall x M(x)] \wedge \Diamond \neg [\forall x (G(x) \wedge M(x))]$

In other words,

- (22) In all of the speaker's doxastically accessible worlds every student met Giita or Maala and in some of the speaker's doxastically accessible worlds it is false that every student met Giita and in some of the speaker's doxastically accessible worlds it is false that every student met Maala (which gives rise to the ignorance aspect of the meaning) and in some of the speaker's doxastically accessible

⁶Remember, however, the discussion in Section 2.6.3 regarding entailment of the scalar implicature from domain implicatures.

worlds it is false that every student met Giita and Maala (which gives rise to the narrow scope effect of the meaning).

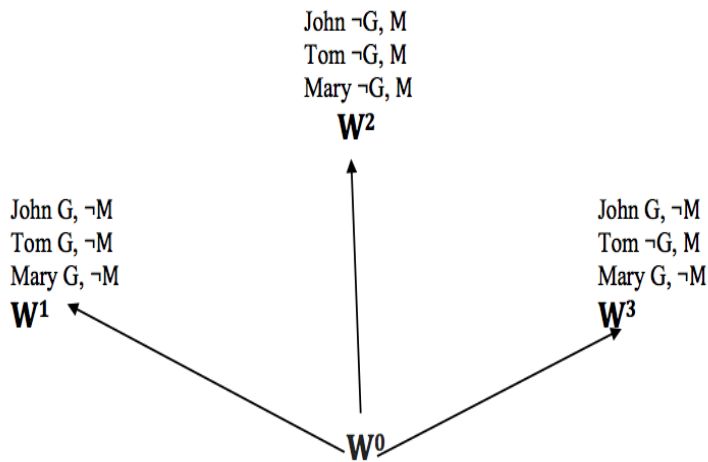
As I argued in Section 2.5.2, there is a distribution requirement for deriving ignorance inferences as re-stated in (23).

- (23) $\Diamond \neg p \wedge \Diamond \neg q$ (given the assertion of a disjunction with two alternatives p, q)
 = Given the assertion of a disjunction with two alternatives p, q , there is at least one world w' epistemically accessible to the speaker from w^0 , where p is false and there is at least one world w' epistemically accessible to the speaker from w^0 , where q is false.

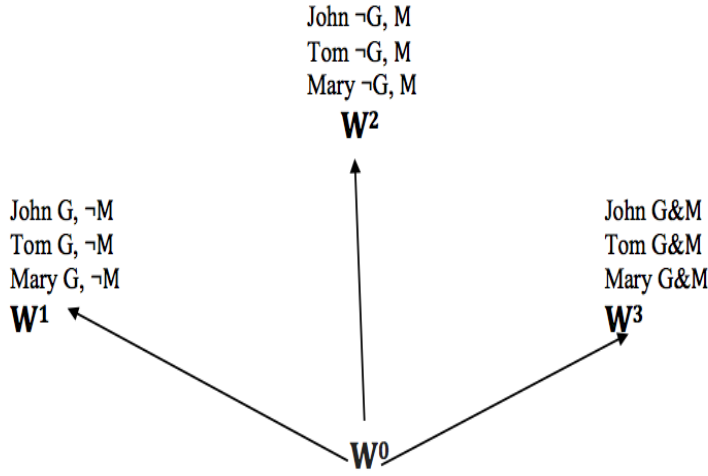
The LF derived by exhaustification with respect to domain alternatives as in (20-c) satisfies the distribution requirement for ignorance inferences as presented in (23).

Note also that the weak scalar implicature as derived in (20-d) amounts to the meaning that in at least one world epistemically accessible to the speaker, the conjunctive alternative is false which is also compatible with a situation where the conjunctive alternative is true in at least one world epistemically accessible to the speaker. For instance, the LF as derived in (20-e) is compatible with any of the situations depicted in (24) or (25). In (24) and (25), we have the worlds $W1$, $W2$ and $W3$ epistemically accessible to the speaker from $W0$. In both the situations depicted in (24) and (25), no alternative is true in all the worlds epistemically accessible to the speaker, which gives rise to ignorance inferences.

(24)



(25)



This way, I account for the derivation of both the narrow scope and ignorance effects of *-hari* disjunction under the universal quantifier based on a distribution requirement derived by way of exhaustification with respect to domain alternative/s and the weak scalar implicature.

I show that the narrow scope effect and obviation of ignorance effect (i.e. [2] Every boy met atleast one of Giita or Maala. The speaker knows who met who) can be accounted for by way of exhaustification of non-modalized domain alternatives. As illustrated in (26), in a situation where obviation of ignorance is implicated, I claim that exhaustification with respect to non-modalized domain alternatives happens below the doxastic operator.

- (26)
- $\Box$ [hæmə gooləy-ek-mə Giita-hari Maala-hari hambə-un-a.]
“Every student met Giita or Maala.”
 - Assertion: $\Box[\forall x (G(x) \vee M(x))]$
 - Domain Implicatures: $Alt_D(\forall x (G(x) \vee M(x))) = \{ \forall x G(x), \forall x M(x) \}$
 $Exh_D(\forall x (G(x) \vee M(x))) = \forall x (G(x) \vee M(x)) \wedge \neg \forall x G(x) \wedge \neg \forall x M(x)$
 - Scalar Implicature: $Alt_S(\forall x (G(x) \vee M(x))) = \{ \forall x (G(x) \wedge M(x)) \}$
 $Exh_S(\forall x (G(x) \vee M(x))) = \forall x (G(x) \vee M(x)) \wedge \neg \forall x (G(x) \wedge M(x))$
 - Total meaning: $\Box[\forall x [G(x) \vee M(x)]] \wedge \Box \neg \forall x G(x) \wedge \Box \neg \forall x M(x) \wedge \Box \neg \forall x [G(x) \wedge M(x)]$

In (26-a), we have the *-hari* disjunction sentence with the universal quantifier with the

covert doxastic operator adjoined at the matrix level at LF. Assertion of (26-a) is represented in (26-b). The domain implicatures are drawn by exhaustification with respect to non-modalized domain alternatives as represented in (26-c). This serves to generate the narrow scope effect of meaning as a distribution effect, that some students did not meet with Giita and some students did not meet with Maala. The scalar exhaustification occurs above the universal quantifier as shown in (26-d). In (26-e), derived by the union of the domain and scalar implicatures, we have the total meaning that all the students met at least one of the two individuals.

Note that the derivation in (26-e) is equivalent to the following.

$$(27) \quad \Box [\forall x (G(x) \vee M(x))] \wedge \Box \exists(x) \neg G(x) \wedge \Box \exists(x) \neg M(x) \wedge \Box \exists(x) \neg [G(x) \wedge M(x)]$$

The LF derived in (26-e) is also compatible with (28).

$$(28) \quad \Box [\forall x (G(x) \vee M(x))] \wedge \Box \exists(x) M(x) \wedge \Box \exists(x) G(x)$$

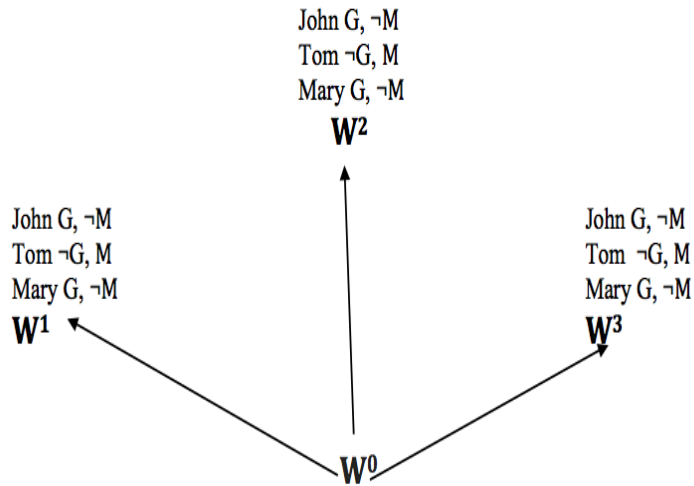
In other words,

$$(29) \quad \text{In all of the speaker's doxastically accessible worlds every student met Giita or Maala and in all of the speaker's doxastically accessible worlds some students met Maala and in all of the speaker's doxastically accessible worlds some students met Giita.}$$

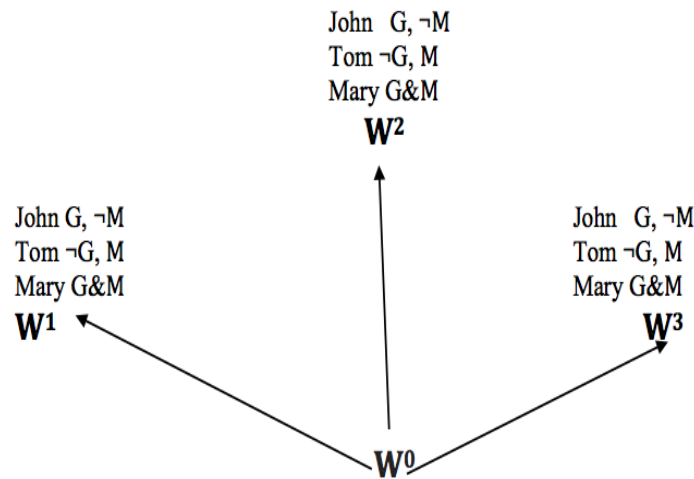
Note that as in the LF in (28), the distribution of the alternatives among the accessible worlds is different from that in (21). As we discussed in Section 2.7.1 and as explained in (29), the LF in (28) is compatible with a situation where one or both the alternatives are true in all the worlds epistemically accessible to the speaker. Thus, the meaning of a *-hari* disjunction as derived in (26-e) is compatible with a narrow scope reading of disjunction with respect to the universal quantifier and with a reading where the speaker knows who met who. For instance, the LF as derived in (26-e) is compatible with any of the situations depicted in (30) or (31). In (30) and (31), we have the worlds W1, W2 and W3 epistemically accessible to the speaker from W0. In (30), in all the worlds epistemically accessible to the speaker, the proposition : John met Giita is true, and the proposition: John met Maala is false. This shows that the speaker knows that John met Giita and not Maala. The situation in (30) also shows that the speaker knows that Mary met Giita and not Maala and Tom met Maala not Giita. In (31), in all the worlds epistemically accessible to the speaker, the proposition : John met Giita is true, and the proposition: John met

Maala is false. This shows that the speaker knows that John met Giita and not Maala. The situation in (30) also shows that the speaker knows that Mary met both Giita and Maala and Tom met Maala not Giita.

(30)



(31)



Thus, the situations depicted in (31) and (30) are situations where the speaker knows who met who.

This way, I account for the derivation of both the narrow scope reading and obviation of ignorance effects of a *-hari* disjunction under the universal quantifier based exhaustification with respect to both domain and scalar alternatives below the doxastic operator.

Thus, an important component of this section is the move to scalar-exhaustify below the doxastic operator to cancel ignorance. In the next section, I explain the derivation of obligatory wide scope effect and the ignorance inferences of *-də* disjunctions under the universal quantifier.

3.2.3.2 The case of *-də* in disjunction

As it was discussed in Section 3.2.1, the situation with *-də* is different. A *-də* disjunction gives rise to obligatory wide scope and ignorance effects with respect to the universal quantifier. A *-də* disjunction as in (2) is only true in a context as in (1-b) as repeated here in (32).

- (32) *hæmə gooləy-ek-mə* *Giita-də Maala-də hambə-un-a. məmə danne næ*
 every student-INDF-EMPH *Giita-də Maala-də meet-past-A I* know not
 kaawə-də kiyəla.
 who-də COMP.

“Every student met Giita or Maala. I do not know who/which.”

CONTEXT: I am at a party thrown by our department. The department had also invited two professors: Giita and Maala from near by universities to the party. I saw that there was one professor that all the students were talking with. But, I do not know/remember which one.

SCOPE EFFECT: *-də(or)* > $\forall$.

EPISTEMIC IMPLICATURE: The speaker does not know who/which.

Thus, a *-də* disjunction interacting with the universal quantifier as in the example in (32) gives rise to the following meanings: [1] There was one professor (either Giita or Maala) that all the students met with. [2] The speaker does not know who/which. I propose to derive the ignorance aspect of the meaning by way of exhaustification with respect to domain alternatives. However, I show that local exhaustification of the scalar alternative with the exhaustivity operator as defined in Fox (2007) operating on a set of alternatives as in Sauerland’s procedure (cf. Sauerland (2004)) does not deliver us the wide scope/no choice effects as expected. I show that it still leaves room for distributivity effects. I present this as a challenge for Fox’s Exh operator (here after Fox-Sauerland inspired/defined Exh) to derive wide scope effects. I show that by application of an Exh operator on a set of alternatives closed under conjunction (cf. Spector (2016)), we can derive the wide scope effects as expected. I also present, as an alternative proposal, the idea that a pragmatic constraint that the particle *-də* places on its alternatives may also serve to derive the wide scope effect of *-də* disjunction. In (33) and the discussion that follows, I first explains how Fox-Sauerland inspired Exh operator fails to account for the wide scope effects.

- (33) a. $\Box$ [hæmə gooləy-ek-mə Giita-də Maala-də hambə-un-a. mamə danne næ kaawə-də kiyəla.]
 “Every student met Giita or Maala. I do not know who/which.”
- b. Assertion: $\Box[\forall x (G(x) \vee M(x))]$
- c. Domain Implicatures: $Alt_D(\Box[\forall x (G(x) \vee M(x))]) = \{\Box \forall x G(x), \Box \forall x M(x)\}$
 $Exh_D[\Box[\forall x (G(x) \vee M(x))]] = \Box[\forall x (G(x) \vee M(x))] \wedge \neg \Box[\forall x G(x)] \wedge \neg \Box[\forall x M(x)]$
- d. Scalar Implicature: $Alt_S(G(x) \vee M(x)) = \{G(x) \wedge M(x)\}$
 $Exh_S[G(x) \vee M(x)] = G(x) \vee M(x) \wedge \neg(G(x) \wedge M(x))$
- e. Total meaning: $\Box[\forall x [G(x) \vee M(x)]] \wedge \neg \Box[\forall x G(x)] \wedge \neg \Box[\forall x M(x)] \wedge \Box \forall x \neg [G(x) \wedge M(x)]$

In (33-a), we have the *-də* disjunction sentence with the universal quantifier with the covert doxastic operator adjoined at the matrix level at LF. Assertion of (33-a) is represented in (33-b). The domain implicatures drawn by exhaustification with respect to epis-temic domain alternatives result in the uncertainty implicatures as represented in (33-c). This serves to generate the ignorance component of meaning as uncertainty implicatures, that the speaker is not sure that all the boys met Giita and the speaker is not sure all the boys met Maala. In Chapter 2, we argued that the particle *-də* carries a morpho-syntactic requirement of [+locality] with respect to exhaustification of scalar alternative/s. Here, we propose that scalar exhaustification occurs below the universal quantifier, thus locally as shown in (33-d). This serves to derive the exclusivity implicature of the disjunction and a meaning stronger than the assertion. In (33-e), derived by the union of the domain and scalar implicatures, we have the total meaning that all the boys met exactly one of the two individuals and the speaker is not sure which one.

Note that the derivation in (33-e) is equivalent to the following.

- (34) $\Box[\forall x (G(x) \vee M(x))] \wedge \Diamond \neg [\forall x G(x)] \wedge \Diamond \neg [\forall x M(x)] \wedge \Box \forall x \neg [G(x) \wedge M(x)]$

In other words,

- (35) In all of the speaker’s doxastically accessible worlds every student met Giita or Maala and in some of the speaker’s doxastically accessible worlds it is false that every student met Giita and in some of the speaker’s doxastically accessible worlds it is false that every student met Maala (which gives rise to the ignorance aspect of the meaning) and in none of the speaker’s doxastically accessible worlds every student met Giita and Maala (which gives rise to the exactly one

effect of the meaning).

As I showed for *-hari* disjunction in the previous section, there is a distribution requirement for deriving ignorance inferences as presented in (23). Note that the derivation in (33-c) as represented in (36) derives the distribution requirement for ignorance.

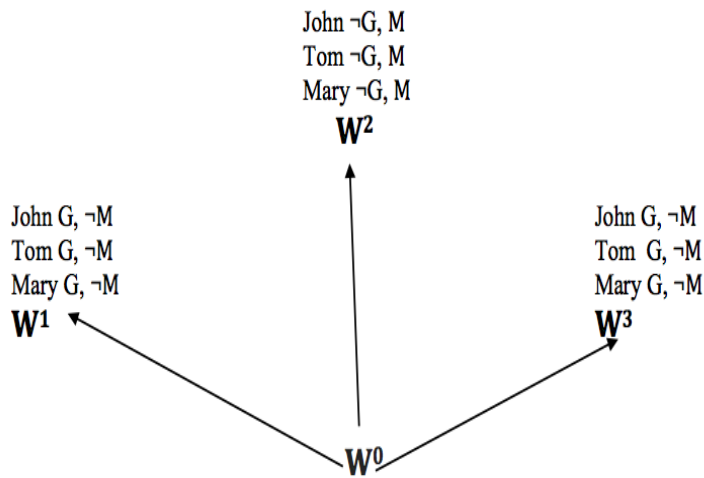
$$(36) \quad \Box [\forall x (G(x) \vee M(x))] \wedge \Diamond \neg [\forall x G(x)] \wedge \Diamond \neg [\forall x M(x)]$$

The scalar implicature as derived in (33-d) (represented in (37)) serves to derive the exclusivity effect of the meaning.

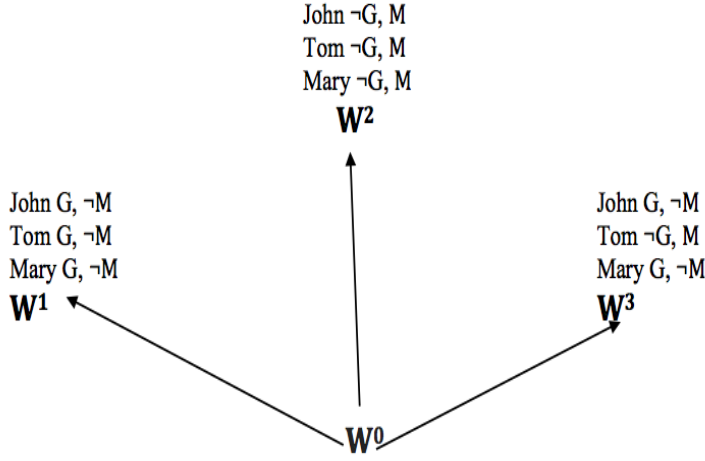
$$(37) \quad \Box [\forall x (G(x) \vee M(x))] \wedge \Box \forall x \neg [G(x) \wedge M(x)]$$

However, the LF as derived in (33-e) and as represented in (34) could be true in both the situations as depicted in (38) and (39).

(38)



(39)



The situation depicted in (38) is one where a wide scope effect of disjunction in relation to the universal quantifier is true while the the situation depicted in (39) is one where a narrow scope effect of disjunction with a distributive reading (i.e. for each student there is exactly one professor that s/he met) is true. What this shows is that the LF as derived in (33-e) is merely compatible with a wide scope reading of disjunction, but does not derive it. Thus, I claim that Fox-Sauerland inspired Exh does not seem to derive the wide scope effects of disjunction with respect to the universal quantifier.

In the following, I explore two alternative proposals to account for the wide scope and ignorance effects of a *-d ∂* disjunction under the universal quantifier.

ALTERNATIVE PROPOSAL 1: As we observed above, the exhaustivity operator as in Fox (2007) gives rise to a distributive reading of alternatives. For instance, the set of alternatives that we considered for the derivation in (33) are: $\{\forall x (G(x) \vee M(x)), \forall x G(x), \forall x M(x), \forall x (G(x) \wedge M(x))\}$. We saw that the result of the exhaustivity operator incorporating innocent exclusion operating on this set of alternatives was compatible with a distributivity effect. However, I show that if we have the Fox inspired Exh operating on a set of alternatives closed under conjunction (i.e. $\{\forall x G(x) \wedge \forall x M(x)\}$: cf. Spector (2016)), we can account for the wide scope effects of a *-d ∂* disjunction with respect to the universal quantifier. For instance, the desired effect (LF) for the wide scope reading of a *-d ∂* disjunction should incorporate the enrichment in (40).

$$(40) \quad \Box [\forall x (G(x) \vee M(x))] \wedge \Box \neg [\exists x G(x) \wedge \exists x M(x)]$$

I speculate regarding the derivation of this enrichment as follows. The full set of alternatives for $\forall x (G(x) \vee M(x))$ can be defined as in (41).

$$(41) \quad Alt(\forall x (G(x) \vee M(x))) = \{\forall x (G(x) \vee M(x)), \forall x G(x), \forall x M(x), \forall x (G(x) \wedge M(x))\}$$

Note that $\forall x (G(x) \wedge M(x))$ is equivalent to $\forall x G(x) \wedge \forall x M(x)$

Fox (2007) (following a conversation with Gennaro Chierchia) notes that $Alt(\forall x (P(x) \vee Q(x)))$ contains additional members: $\exists x (P(x) \vee Q(x))$, $\exists x (P(x))$, $\exists x (Q(x))$. Now, observe the entailment patterns in (42).

$$(42) \quad \begin{aligned} \forall x G(x) &\rightarrow \exists x (G(x)) \\ \forall x M(x) &\rightarrow \exists x (M(x)) \\ \forall x (G(x) \wedge M(x)) &\rightarrow \exists x (G(x) \wedge M(x)) \\ \forall x G(x) \wedge \forall x M(x) &\rightarrow \exists x G(x) \wedge \exists x M(x) \end{aligned}$$

When alternatives are closed under conjunction, the set of $Alt(\forall x (G(x) \vee M(x)))$ will include those in (43).

$$(43) \quad \{\forall x (G(x) \wedge M(x)), \exists x G(x) \wedge \exists x M(x)\}$$

Note that the negation of the alternative $\exists x G(x) \wedge \exists x M(x)$ gives rise to a stronger inference than the negation of the $\forall x (G(x) \wedge M(x))$. The strongest meaning could be derived by excluding (exhaustivity applied to) $\exists x G(x) \wedge \exists x M(x)$.

Now, the derivation could proceed as in (44). In (44-a), we have the *-də* disjunction sentence with the universal quantifier and with the covert doxastic operator adjoined at the matrix level at LF. Assertion of (44-a) is represented in (44-b). The implicatures drawn by exhaustification with respect to the alternatives closed under conjunction result in the stronger exclusivity implicatures as represented in (44-c). The total meaning with the doxastic operator appended at the matrix level is presented in (44-d). This serves to generate the wide scope effects of the meaning.

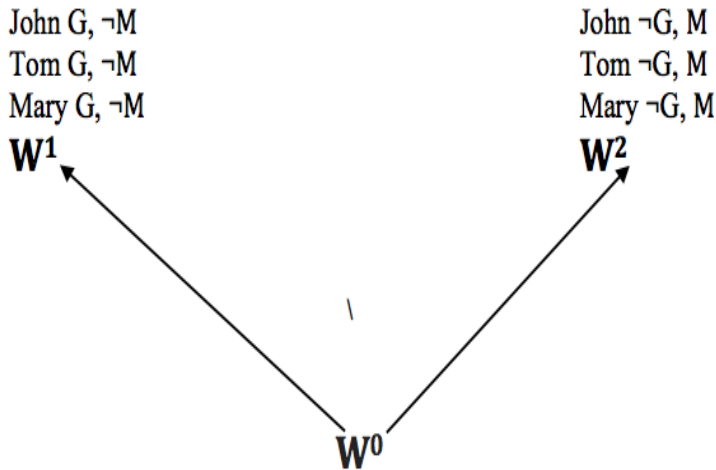
$$(44) \quad \begin{aligned} \text{a.} \quad &\Box [\text{hæmə gooləy-ek-mə Giita-də Maala-də hambə-un-a. mamə danne næ kaawə-də kiyəla.}] \\ &\text{“Every student met Giita or Maala. I do not know who/which.”} \\ \text{b.} \quad &\text{Assertion: } \Box[\forall x (G(x) \vee M(x))] \\ \text{c.} \quad &\text{Scalar Implicatures: } Alt_S(\forall x (G(x) \vee M(x))) = \{\forall x (G(x) \vee M(x)), \exists x G(x) \wedge \exists x M(x)\} \end{aligned}$$

$$Exh_S (\forall x (G(x) \vee M(x))) = \forall x (G(x) \vee M(x)) \wedge \neg (\exists x G(x) \wedge \exists x M(x))$$

d. Enrichment: $\Box \forall x (G(x) \vee M(x)) \wedge \Box \neg (\exists x G(x) \wedge \exists x M(x))$

So, the result of applying the Exh as in Fox (2007) with a set of alternatives closed under conjunction is that it returns an exclusivity implicature which is stronger than that in (37). The LF as derived in (44-d) accounts for the wide scope effects of disjunction as depicted in the situation in (45). In (45), we have two worlds W1 and W2 epistemically accessible to the speaker in W0. In W1, the proposition that all the boys met Giita is true and the proposition that all the boys met Maala is false. In W2, the proposition that all the boys met Maala is true and the proposition that all the boys met Giita is false. The LF as derived in (44-d) is only felicitous in a context similar to one in (45), where it amounts to the meaning that in all the world systemically accessible to the speaker either all the students met Giita or they met Maala.

(45)



This way, I speculate that we could apply the Exh operator as in Fox (2007) with a set of alternatives closed under conjunction to account for the wide scope effects of a *-də* disjunction with respect to the universal quantifier. The wide scope effects derived this way together with the ignorance inferences derived by way of exhaustification with respect to domain alternatives as in (33-c) amounts to the total meaning of a *-də* disjunction with respect to the universal quantifier. I present this as a possible solution to the problems that are faced when attempting to derive wide scope effects by way of a Fox-Sauerland inspired Exh operator.⁷ Next, I present the second alternative proposal.

⁷The reader is referred to Spector (2016) for a discussion of different formulations of Exh. As Spector notes, closing alternatives under conjunction blocks free-choice effects. This needs to be considered.

ALTERNATIVE PROPOSAL 2: We discussed in Section 1.6.3, that an indefinite with the particle *-də* places a pragmatic constraint on the alternatives in the domain: the speaker must have some special kind of epistemic access to the context/some property of the individual/s associated with the indefinite. As I discuss in Section 3.4, in such a context, some property/background information of the individuals associated with the disjunction/indefinite can be evaluated with respect to the speaker and the actual world and giving rise to the effects of wide scope (i.e quite similar to the manner of a *de re* reading).⁸ For instance, for the *-də* disjunction as in (32), expressing a wide-scope effect with respect to the universal quantifier, the speaker has “privileged” epistemic access to the context. This is in the sense that the speaker has seen that all the students met with only one of the two professors: Giita and Maala (see the context in (32)). The epistemic access will serve to evaluate the disjunction/indefinite with respect to the speaker’s belief worlds (relative to the actual world) over the universal quantifier, thus giving rise to a wide-scope effect of disjunction over the universal quantifier. At the same time, we can account for the ignorance inferences by distributing the individuals among the doxastic worlds of the speaker by way of exhaustification with respect to epistemically modalized domain alternatives as we did in (33-c). The implementation of this process/procedure would be similar to the process of deriving non-specific *de re* reading of a *-də* disjunction/indefinite with respect to an attitude verb as I discuss and present in Section 3.4. While this solution has simply been sketched, it would provide a solution to the wide scope problem.

I have presented two alternative proposals to account for the derivation of both the obligatory wide scope and obligatory ignorance effects of a *-də* disjunction under the universal quantifier.

In the next section, I propose to account for the derivation of wide/narrow scope and generation/obviation of ignorance inferences of *-hari* and *-də* indefinites under the universal quantifier in the same manner that we did for *-hari* and *-də* disjunctions under the universal quantifier.

3.2.4 Indefinites with *-hari* and *-də* and the universal quantifier

In Section 3.2.1, we discussed that *-hari* and *-də* indefinites give rise to different scope and ignorance effects with respect to the universal quantifier. Crucially, I assume that we can

⁸We saw that *-də* indefinites, for example, require visual access (or some kind of epistemic background) by the speaker. The same holds for *-də* disjunctions.

account for these facts of *-hari* and *-də* indefinites based on the analysis of the derivation of scope effects and generation/obviation of the ignorance inferences of *-hari* and *-də* disjunctions. This comes out straightforwardly when we assume that the general function of indefinites is to introduce alternatives (cf. Kratzer and Shimoyama, 2002) and the particles *-hari* and *-də* impose the same kind of morpho-syntactic/semantic requirements on the structure and alternatives in the domain.

3.3 Deontic modals and *-hari* and *-də* disjunctions/indefinites

This section deals with the implications associated with the background, data and derivation of free-choice and no-choice implicatures of *-hari* and *-də* disjunctions and indefinites with respect to deontic modals. As with the universal quantifier, we will see interesting scope interactions of *-hari* and *-də* disjunctions/ indefinites with deontic necessity and possibility modals and relative ignorance inferences.

It has long been noted that there is an implicature associated with a disjuncton embedded under a deontic possibility modal (cf. Kamp (1973); Zimmermann (2001); Alonso-Ovalle (2006); Fox (2007); among many others). This is illustrated with examples from English below.

- (46)
- a. John may eat an apple or a pear.
 - b. John may eat an apple and he may eat a pear.
 - c. FREE CHOICE IMPLICATURE: John may eat any of the apple or the pear.
 - d. EPISTEMIC IMPLICATURE: The speaker knows what John is allowed to eat (i.e. any of the two).

A disjunction under a deontic possibility modal as in (46-a) in a certain context tells us more than *in at least one permitted world John eats at least one of apple or pear*. As seen in (46-b), it asserts that *John has the freedom to eat any of apple or pear*. This is known as the free-choice (FC) effect and is usually called “free-choice implicatures”.⁹

As also seen in (46-d), when free choice is expressed by a disjunction under a modal, the epistemic implicature is that the speaker knows what John is allowed to eat. A disjunction under a deontic possibility modal as in (46-a) in another context may constrain free-choice and give rise to ignorance inferences as represented in (47-c) and (47-d). As also seen in (47-b), such a context involves a wide scope interpretation of disjunction.

⁹(46-b) is a paraphrase of the FC implicature of (46-c).

- (47)
- a. John may eat an apple or a pear. I have forgotten which.
 - b. John may eat an apple or he may eat a pear.
 - c. NO CHOICE IMPLICATURE: There is something (an apple or a pear) John may eat.
 - d. IGNORANCE IMPLICATURE: The speaker does not know which.

Thus, a wide scope interpretation of disjunction gives rise to a “no-choice” implicature (i.e. the speaker knows/believes that there is something (an apple or a pear) John has the permission to eat) and ignorance inferences (i.e. the speaker does not know which one).¹⁰

As it was introduced in Chapter 1, *-hari* disjunctions and indefinites take narrow scope with respect to deontic necessity and possibility modals. In their narrow scope readings, *-hari* disjunctions or indefinites can give rise to ignorance or free-choice implicatures. On the other hand, *-də* disjunctions and indefinites always take wide scope with respect to deontic necessity and possibility modals and can generate only no-choice readings. The goal of this section is to account for these readings. First, the data that we saw briefly in Chapter 1 is repeated here with more details in order to make the empirical facts clearer. Then, I discuss the implications of some of the existing accounts that have analyzed disjunctions and indefinites in the contexts of deontic necessity and possibility modals to draw insights into the analysis of *-hari* and *-də*. Afterwards, I offer a semantic analysis to account for free-choice and no-choice effects based on a distribution requirement derived by way of exhaustification with respect to domain and scalar alternatives.

3.3.1 Data of interest: wide scope effects of *-də*

It is observed that disjunctions and indefinites formed with the particle *-də* only give rise to obligatory wide scope/no-choice and ignorance implicatures with respect to deontic necessity and possibility modals. This is discussed with examples in the following.

3.3.1.1 Necessity modals and *-də* disjunctions/indefinites

A *-də* disjunction or indefinite only generates a wide scope/no-choice reading and ignorance inferences with respect to a deontic necessity modal as shown in (48) (for disjunction) and (49) (for indefinite).

¹⁰Zimmermann (2001) notes that even in an expression as in (47) when wide scope disjunction is involved, it may give rise to a choice effect. This is discussed in Section 3.3.3.

- (48) John-tə dæn bath-də paan-də kannə wenəw-a, mamə danne næ mokak-də
 John-DAT now rice-də bread-də eat has-to I know not what-də
 kiyəla.
 COMP

“John has to eat either rice or bread now, I don’t know which one.” (only one of them unknown to the speaker)

CONTEXT 1: NO-CHOICE READING: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned one thing that John has to eat (i.e. rice, in a context where rice and bread are available). The speaker has either forgotten or does not know which one.

SCOPE EFFECT: $-də (or) > \Box_{De}$

EPISTEMIC IMPLICATURE: The speaker does not know what/which.

CONTEXT 2: FREE-CHOICE READING:¹¹ John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John has to eat rice or bread now and he is permitted to eat any of rice or bread.

SCOPE EFFECT: $\Box_{De} > -də (or)$

EPISTEMIC IMPLICATURE: The speaker knows what John is permitted to eat.

- (49) John-tə dæn monəwa-də kannə wenəw-a.
 John-DAT now what-də eat has to

“John has to eat something now” (one thing unknown to the speaker)

CONTEXT 1: NO-CHOICE READING: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned something that John has to eat, he further said that John has to eat only that and nothing else. The speaker has either forgotten or does not know what.

SCOPE EFFECT: $\exists (-də (or)) > \Box_{De}$

EPISTEMIC IMPLICATURE: The speaker does not know what/which.

CONTEXT 2: FREE-CHOICE READING: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John has to eat something now and he is permitted to eat anything in the context.

SCOPE EFFECT: $\Box_{De} > \exists (-də (or))$

EPISTEMIC IMPLICATURE: The speaker knows what John is permitted to eat.

Thus, we see that disjunctions and indefinites formed with the particle *-də* can gener-

¹¹I use # to mean that the sentence above is not felicitous in this context.

ate only a no-choice reading, giving rise to obligatory ignorance inferences with respect to a deontic necessity modal (comparable to scope effects with the universal quantifier).

3.3.1.2 Possibility modals and *-də* disjunctions/indefinites

As seen in (50) and (51), a *-də* disjunction or indefinite only generates a wide scope/no-choice reading and ignorance inferences with respect to a deontic possibility modal.

- (50) John-tə dən bath-də paan-də kannə puluwan, mamə danne nə mokak-də
 John-DAT now rice-də bread-də eat can I know not what-də
 kiyəla.
 COMP

“John can eat either rice or bread now, I don’t know which one.” (only one of them unknown to the speaker)

CONTEXT 1: NO-CHOICE READING: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned something that John could eat (i.e. rice in a context where rice and bread are available). The speaker has either forgotten or does not know which one.

SCOPE EFFECT: $-də$ (or) $> \Diamond_{De}$

EPISTEMIC IMPLICATURE: The speaker does not know what/which.

CONTEXT 2: FREE-CHOICE READING: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John could eat rice or bread now and he is permitted to eat any of rice or bread.

SCOPE EFFECT: $\Diamond_{De} > -də$ (or))

EPISTEMIC IMPLICATURE: The speaker knows what John is allowed to eat.

- (51) John-tə dən monəwa-də kannə puluwan.
 John-DAT now what-də eat can
 “John can eat something now” (one thing unknown to the speaker)

CONTEXT 1: NO-CHOICE READING: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned something that John could eat, he further said that John could eat only that and nothing else. The speaker has either forgotten or does not know what.

SCOPE EFFECT: $\exists (-də$ (or)) $> \Diamond_{De}$

EPISTEMIC IMPLICATURE: The speaker does not know what/which.

CONTEXT 2: FREE-CHOICE READING: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John could eat something now and he is permitted to eat

anything in the context.

SCOPE EFFECT: $\Diamond_{De} > \exists (-d\partial \text{ (or)})$

EPISTEMIC IMPLICATURE: The speaker knows what John is allowed to eat.

Thus, it is seen that disjunctions and indefinites formed with the particle *-də* with respect to a deontic possibility modal can generate only a no-choice reading giving rise to ignorance inferences.

3.3.2 Data of interest: narrow scope effects of *-hari*

Disjunctions and indefinites formed with the particle *-hari* take narrow scope with respect to a deontic necessity or possibility modal and can generate an ignorance or free-choice reading with respect to deontic necessity and possibility modals as discussed in the following.

3.3.2.1 Necessity modals and *-hari* disjunctions/indefinites

The behavior of *-hari* disjunctions/indefinites with respect to deontic modals is different. As illustrated in (52) and (53), a *-hari* disjunction/indefinite can give rise to a narrow scope reading with ignorance inferences or one with free-choice effects with respect to a deontic necessity modal.

- (52) John-tə dæn bath-hari paan-hari kannə wenəw-a.
John-DAT now rice-hari bread-hari eat has to
“John has to eat rice or bread now.”

CONTEXT 1: READING WITH IGNORANCE : John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John has to eat rice or bread now. The speaker has either forgotten or does not know whether John is obliged to eat rice or bread, or both.

SCOPE EFFECT: $\Box_{De} > \text{-hari (or)}$

EPISTEMIC IMPLICATURE: The speaker has forgotten/does not know what.

CONTEXT 2: READING WITH FREE-CHOICE: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John has to eat rice or bread now and he is permitted to eat any of rice or bread.

SCOPE EFFECT: $\Box_{De} > \text{-hari (or)}$

EPISTEMIC IMPLICATURE: The speaker knows what John is permitted to eat.

- (53) John-tə dæn monəwa-hari kannə wenəw-a.
John-DAT now what-hari eat has to

“John has to eat something now. ”

CONTEXT 1: READING WITH IGNORANCE : John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John has to eat something now and he is permitted to eat at least one thing in the context. But, the speaker has forgotten or does not know what (i.e. whether he is allowed to eat rice or bread or both in a context where there is bread and rice).

SCOPE EFFECT: $\Box_{De} > \exists$ (-hari (or))

EPISTEMIC IMPLICATURE: The speaker has forgotten/does not know what.

CONTEXT 2: READING WITH FREE-CHOICE: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John has to eat something now and he is permitted to eat anything in the context.

SCOPE EFFECT: $\Box_{De} > \exists$ (-hari (or))

EPISTEMIC IMPLICATURE: The speaker knows what John is permitted to eat.

Thus, we see that disjunctions and indefinites formed with the particle *-hari* can generate a narrow scope reading with an ignorance inference and one with free-choice implicatures with respect to a deontic necessity modal.

3.3.2.2 Possibility modals and *-hari* disjunctions/indefinites

We will now examine the scope and ignorance/free-choice effects of *-hari*. As seen in (54) or (55), a *-hari* disjunction or indefinite with respect to a deontic possibility modal can also generate a narrow scope reading with an ignorance inference and one with free choice.

- (54) John-tə dæn bath-hari paan-hari kannə puluwan.
John-DAT now rice-hari bread-hari eat can
“John can eat rice or bread now. ”

CONTEXT 1: READING WITH IGNORANCE: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John could eat rice or bread now and he is permitted to eat any of rice or bread. But, the speaker has forgotten or does not know whether he is allowed to eat rice or bread, or both.

SCOPE EFFECT: $\Diamond_{De} > -$ hari (or)

EPISTEMIC IMPLICATURE: The speaker has forgotten/does not know what.

CONTEXT 2: READING WITH FREE-CHOICE : John has just had a surgery and

the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John could eat rice or bread now and he is permitted to eat any of rice or bread.

SCOPE EFFECT: $\Diamond_{De} > \text{-hari (or)}$

EPISTEMIC IMPLICATURE: The speaker knows what John is allowed to eat.

- (55) John-tə dæn monəwa-hari kannə puluwan.
 John-DAT now what-hari eat can
 “John can eat something now.”

CONTEXT 1: READING WITH IGNORANCE: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John could eat something now and he is permitted to eat at least one thing in the context. But, the speaker has forgotten or does not know what (i.e. whether he is allowed to eat rice or bread or both in a context where there is bread and rice).

SCOPE EFFECT: $\Diamond_{De} > \exists \text{ (-hari (or))}$

EPISTEMIC IMPLICATURE: The speaker has forgotten/does not know what.

CONTEXT 2: READING WITH FREE-CHOICE: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John could eat something now and he is permitted to eat anything in the context.

SCOPE EFFECT: $\Diamond_{De} > \exists \text{ (-hari (or))}$

EPISTEMIC IMPLICATURE: The speaker knows what John is allowed to eat.

Thus, it is seen that disjunctions and indefinites formed with the particle *-hari* can generate a narrow scope reading with an ignorance inference and one with free-choice effect with respect to a deontic possibility modal.

In this section we saw that *-hari* and *-də* disjunctions and indefinites give rise different types of implicatures with respect to deontic necessity and possibility modals. In the next section, I critically review the implications of some of the existing accounts that have focused on derivation of free-choice implicatures to draw insights into the analysis of free/no choice implicatures of *-hari* and *-də* disjunctions and indefinites. Then, I analyze the free/no-choice facts of *-hari* and *-də* disjunctions in light of the proposals in these existing accounts to investigate whether the existing accounts can handle the no/free-choice facts of *-hari* and *-də* disjunctions and indefinites in Sinhala. Finally, I offer my analysis to derive no/free-choice effects as implicatures based on a distribution requirement derived by way of exhaustification with respect to domain and scalar alternatives.

3.3.3 Existing approaches

Implicatures of disjunctions and indefinites under modals have received much attention in the literature (cf. Kamp (1973); Zimmermann (2001); Simons (2005); Kratzer and Shimoyama (2002); Alonso-Ovalle (2006); Fox (2007); among many others). It has been claimed that there is a distribution requirement to derive the FC reading of a disjunction or indefinite with respect to a deontic necessity or possibility modal. For instance, according to the standard semantics, the meaning of (56) will be $\Diamond (p \vee q)$, which is that *there is a possible world in which John eats rice or bread*. And the sufficient conditions for this sentence to be true are at least one permitted world where John eats at least one of rice or bread. However, as it is obvious, (56) expresses more than what the standard semantics tells us of it. It gives rise to freedom of choice, which is known as free choice (FC) effect. In deriving this FC effect, the right semantics of (56) tells us that there has to be a permitted world for each of rice and bread, which is known as the ‘distribution requirement’ (DR) (Kratzer and Shimoyama, 2002; Alonso-Ovalle, 2006; Fox, 2007) as paraphrased in (56-b).¹²

- (56) a. John may eat rice or bread.
b. John may eat rice and he may eat bread: $\Diamond p \wedge \Diamond q$

In the literature, there are several proposals as to how this reading could be derived. According to Zimmermann (2001) and Simons (2005), this is built into truth conditions. According to Kratzer and Shimoyama (2002) and Alonso-Ovalle (2006), this requirement is derived as a conversational/quantity implicature. Alonso-Ovalle (2006), for example, argues that this requirement is derived in the pragmatics as a quantity implicature after the semantic composition is done. In contrast to that, Fox (2007) claims that this is derived as a grammaticalized implicature (as part of the semantic meaning of the sentence). In the following, I critically review a sample of accounts that are most crucial for us in accounting for the free/no choice implicatures of *-hari* and *-də* disjunctions and indefinites with respect to deontic necessity and possibility modals. I begin by discussing Zimmermann (2001).

3.3.3.1 Zimmermann (2001)

As we have seen in Section 2.6.1.1, Zimmermann (2001) proposes to analyze the disjunctions as being understood as conjunctions of epistemic possibilities in the following way.

¹²The FC effects are clearer with a possibility modal. For instance the DR, $\Diamond p \wedge \Diamond q$ for FC with a possibility modal has to be derived from $\Diamond (p \vee q)$. But, $\Diamond p \wedge \Diamond q$ for FC with a necessity modal has to be derived from $\Box (p \vee q)$. This will be discussed in more detail in Section 3.3.3.2.

First, he proposes to analyze all choice sentences (as in (57-a)) as wide disjunctions as in (57-b).

- (57) a. Mr. X might be in Victoria or in Brixton
 b. Mr. X might be in Victoria or he might be in Brixton

Second, he proposes to interpret the wide disjunction of the form “p might be the case or q might be the case” as conjoined epistemic possibilities. He notes that the final result is a conjunction of doubly modalized sentences, in the form of “it might be the case that p might be the case and it might be the case that q might be the case”. Crucially, he claims that the epistemic variant of the choice sentence in (58-a) can be represented as in (58-b) and (58-a) implies (59).

- (58) a. Mr. X might be in Regents Park or in Victoria.
 b. Mr. X might be in Regents Park or Mr. X might be in Victoria.

- (59) $\Diamond \Diamond N(X, rp)$ (Zimmermann 2001, p. 284).

What is most important in Zimmermann’s (2001) analysis of disjunctions with respect to overt modals is the idea that when it comes to epistemic aspect of the meaning, the sentences are doubly modalized. Inspired by Zimmermann (2001), I assume that an implicit epistemic modal in the form of a doxastic operator is inserted above the deontic necessity or the possibility modal of *-hari* or *-də* disjunction/indefinites with a deontic necessity or possibility modal. Thus, I assume that *-hari* or *-də* disjunctions/indefinites with overt modals are doubly modalized.

As we have seen Zimmermann proposes a truth-conditional account to derive the enriched meanings. Alonso-Ovalle (2006) argues against a truth conditional account and proposes to derive the enriched meanings as conversational implicatures. This is discussed next.

3.3.3.2 Alonso-Ovalle (2006)

Alonso-Ovalle (2006) starts out illustrating the FC effects with examples like in (60).

- (60) Sandy may have cake or ice cream.

The main argument that (Alonso-Ovalle, 2006) presents against truth conditional accounts as proposed in Zimmermann (2001) is that if this requirement is built into semantics, it should not disappear under downward entailing operators. For instance, Alonso-Ovalle

(2006) notes that a sentence like (61) in English gives rise to a free-choice effect, but, as shown in (62), this free-choice effect disappears under a downward entailing operators like negation. The semantics of the sentence in (62) claims that in none of the accessible worlds John can eat any of ice cream, cake or apple.

(61) Sandy may eat this ice cream, that cake, or that apple.

(62) Sandy may not eat this ice cream, that cake, or that apple.

His argument is that if FC distributivity were part of the semantics, it should not disappear under negation.

Alonso-Ovalle also shows that the ways of deriving distributivity of disjunctions embedded under *may* and *must* as in (63) are crucially different. He argues that for *must* as in (63-b), it can be derived in the semantics while for *may* as in (63-a), it can not derived in the semantics.

(63) a. Sandy may borrow Moby Dick, or Huckleberry Finn.

b. Sandy must borrow Moby Dick, or Huckleberry Finn.

Following Sauerland (Sauerland, 2004), he claims that the free choice effect of a disjunction under the deontic necessity modal *must* can be derived as secondary implicatures from primary implicatures. For example, the meaning of the assertion for (63-b), is as in (64).

(64) Assertion: $\Box (M \vee H)$

The distribution requirement (DR) for free-choice effect in (64) is as in (65).

(65) $\Diamond M \ \& \ \Diamond H$

The speaker's knowledge/belief that Sandy is under the obligation to borrow at least one of Moby Dick or Huckleberry Finn is represented in the following manner in Alonso-Ovalle (2006).

(66) $\kappa (\Box (M \vee H))$

As Alonso-Ovalle (2006) claims the primary implicatures for (63-b), are as in (67).

(67) a. $\neg \kappa (\Box (M \ \& \ H))$

b. $\neg \kappa (\Box (M))$

$$c. \quad \neg \kappa (\Box (H))^{13}$$

When these implicatures are strengthened, the secondary implicatures are derived as in (68). And, this set of secondary implicatures is also consistent with (63-b).

- (68) a. $\kappa \neg (\Box (M \& H))$
 b. $\kappa \neg (\Box (M))$
 c. $\kappa \neg (\Box (H))^{14}$

The derivation in (68) entails (69). What is conveyed in total is that Sandy is not under the obligation to borrow Moby Dick and that she is not under the obligation to borrow Huckleberry Finn or that Sandy is allowed to borrow Moby Dick and that she is allowed to borrow Huckleberry Finn. He claims that this derives the distribution requirement, which is presented as in (69) (without the knowledge/belief operator for simplicity).

$$(69) \quad \Diamond M \& \Diamond H$$

Alonso-Ovalle (2006) notes that the DR for free-choice in a sentence with a deontic possibility modal like *may* can not be derived in the way it was done with the deontic necessity modal *must*. He explains this with the following example.

(70) Sandy may borrow Moby Dick, or Huckleberry Finn.

(71) Assertion: $\Diamond (M \vee H)$

His argument is that the primary implicatures and secondary implicatures in (73) and (74) do not derive the desired distribution requirement for FC, which is that Sandy has the right to borrow Moby Dick and also has the right to borrow Huckleberry Finn, as represented in (72).¹⁵

$$(72) \quad \Diamond M \& \Diamond H.$$

- (73) $\neg \kappa (\Diamond (M \& H))$
 $\neg \kappa (\Diamond (M))$
 $\neg \kappa (\Diamond (H))$

¹³According to Sauerland (2004), $\kappa (p)$ means that the speaker believes that (p), and $\neg \kappa (p)$ means that the speaker does not believe that (p) or the speaker is not certain about the truth of (p).

¹⁴ $\kappa \neg (p)$ means that the speaker believes that $\neg (p)$ or the speaker is certain that (p) is false.

¹⁵Alonso-Ovalle (2006) presents derivation of this distribution requirement in terms of quality and quantity implicatures in a detailed manner. This is a modified and simplified presentation of derivations and reasoning in Alonso-Ovalle (2006). See Alonso-Ovalle 2006, p 138. for more details.

- (74) $\kappa \neg (\Diamond (M \& H))$
 $\kappa (\neg \Diamond (M))$
 $\kappa (\neg \Diamond (H))$

This is the problem in a nutshell. Strengthening of all the primary implicatures as in (74) is not consistent with the assertion. If one primary implicature is strengthened, as in (75), the strengthened implicature, together with the quality implicature entails that the speaker knows that Sandy is allowed to borrow Huckleberry Finn, as shown in (76) (and vice versa).

- (75) $\kappa (\neg \Diamond (M))$
- (76) a. Quality: $\kappa (\Diamond (M \vee H))$
b. Strengthening: $\kappa (\neg \Diamond (M))$
c. Entailment: $\kappa (\Diamond (H))$

However, (76-c) contradicts the primary implicature that the speaker does not know that Sandy is allowed to borrow Huckleberry Finn (the same reasoning applies to the other alternative).

Thus, Alonso-Ovalle (2006) notes this as problematic for deriving FC inferences of disjunction with respect to a possibility modal. He argues that the DR is a conversational/quantity implicature. The semantics of *or*, given in terms of alternative semantics (Hamblin, 1973), derives the DR as a domain widening implicature (cf. also Sections 1.7.2, 2.4.1 and 2.6.1.1). He claims that the distribution requirement is computed by way of domain widening after an exclusivity implicature has been generated by way of the mechanism of IE. He assumes that as in Heim (1982), the existential closure takes place below the modal. Even though under standard semantics the modal can not “see” the disjuncts buried under the existential quantifier, he argues that since the identity of the disjuncts is preserved under alternative semantics, that will make the alternatives visible to the modal in the pragmatics. He argues that the distribution requirement is derived by way of two steps in the process of strengthening; first by way of innocent exclusion, second by way of a ‘No Privilege’ implicature as introduced in Kratzer (2005). The instance of first strengthening is represented in (77), where $[[S]]$ represent the sentence and $[[S]]_{ALT, \cap}$ represents the relevant alternatives.

- (77) $[[S]]^+ = \lambda w. \exists p[p \in [[S]] \& p(w) \forall p[p \in \heartsuit ([[S]]_{ALT, \cap}) \rightarrow \neg p(w)]]$

With this first instance of strengthening $[[S]]^+$ with the innocent exclusion, a proposition that is true in a world w if and only if Sandy is allowed to eat only one of apple or pear

is derived. He argues that that does not give us the distribution requirement yet. The No Privilege implicature, the instance of the second strengthening ensures that either all the sub-domain competitors or none of them are true, as illustrated in (78).

(78)

$$[[S]]^{++} = \lambda w. [[S]]^+(w) \ \& \ \forall q \forall r \left[\begin{array}{c} \left(\begin{array}{c} q \in ([S]_{ALT,U} - [S]) \\ \& \\ r \in ([S]_{ALT,U} - [S]) \end{array} \right) \end{array} \rightarrow (q(w) \leftrightarrow r(w)) \right]$$

The second strengthened meaning (represented by $[[S]]^{++}$) conveys that Sandy is allowed to eat an apple and that she is allowed to eat a pear and that she is allowed to eat at most one of apple or pear, which signals that Sandy does not eat more than one of apple or pear in any permitted world.

In this way, Alonso-Ovalle (2006) proposes to derive the FC implicatures via a pragmatic strengthening mechanism. My account for derivation of FC, however, is a hybrid approach based on both the lexical properties of the particles *-hari* and *-də* and an *Exh* operator placed in the syntactic structure of a derivation at LF.¹⁶ Thus, based on the PP character of the particles *-hari* and *-də*, I utilize the exhaustivity based approach under the grammatical approach to derivation of implicatures. We also saw that in the account of Alonso-Ovalle (2006), two different strengthening mechanisms are applied to derive the free-choice effect of a disjunction under a possibility modal. However, in the derivation of free-choice effect of a *-hari* disjunction under a deontic possibility modal in Sinhala, I apply recursive exhaustification with respect to domain alternatives. As it was discussed in the previous section, I also argue that there is a distribution requirement for deriving free-choice. Crucially, I show that exhaustification with respect to domain and scalar alternatives derives the distribution requirement. At the same time, following Alonso-Ovalle (2006), a doxastic operator akin to the knowledge/belief operator as used in the examples in (67) and (68), is also adjoined at the matrix level at LF of a disjunction or indefinite with a deontic necessity or possibility modal. This serves to derive the epistemic inferences of *-hari* and *-də* disjunctions/indefinites with a deontic necessity or possibility modal.¹⁷

Application of an exhaustivity operator to derive implicatures was primarily inspired

¹⁶The hybrid approach to derivation of DRs/ implicatures followed in this thesis was discussed in detail in Sections 1.7.5, 2.5.2, and 2.6.1.1.

¹⁷For more details of a discussion of derivation of a distribution requirement for free-choice and no-choice, see Sections 2.6.1.1 and 2.6.1.2.

by Fox (2007). The implications of the account in Fox (2007) are discussed next.

3.3.3.3 Fox (2007)

Fox (2007) proposes that the conjunctive interpretation of disjunction (the FC effect) under a possibility modal operator may be derived by way of a covert exhaustivity operator (*Exh*) placed in the syntactic structure.¹⁸

Fox (2007) first attempts to derive the FC effect or the DR of (79-a) by way of the exhaustivity operator as follows. The parse for (79-a) would be as in (79-b). The set of alternatives for (79-a) are represented as in (79-c).

- (79) a. You may eat the cake or the ice-cream.
 b. $\text{Exh}(\text{C})(\text{You may eat the cake or the ice-cream})$.¹⁹
 c. $\text{Alt}(\Diamond(p \vee q)) = \{\Diamond p, \Diamond q, \Diamond(p \wedge q)\}$

According to the definition of IE, $\Diamond(p \wedge q)$ is the only proposition that can be innocently excluded. Thus, the meaning of (79-a) is equivalent to $\Diamond(p \vee q) \wedge \neg \Diamond(p \wedge q)$. Fox notes that this is consistent with free-choice possibility, but, as Fox (2007) shows it does not assert FC as it can also generate the ignorance inference that the speaker does not know what one is allowed to eat (only that the allowed things include the cake or the ice-cream but not both) (cf. Fox (2007)). He then proposes to apply *Exh* recursively, which will deliver the desired result: $\Diamond p \ \& \ \Diamond q$ as shown in (80).

- (80) $\text{Exc}(\text{C})(\text{Exh}(\text{C})(\Diamond(p \vee q))) = \Diamond(p \vee q) \wedge \neg \Diamond(p \wedge q)$ and
 $\neg(\Diamond p \wedge \neg \Diamond q)$ and
 $\neg(\Diamond q \wedge \neg \Diamond p)$
 $= \Diamond p \wedge \Diamond q$ and
 $\neg \Diamond(p \wedge q)$

Thus, by way of recursive application of exhaustivity, Fox (2007) derives the DR or the quasi-conjunctive interpretation of a disjunction embedded under an existential modal.

Building on Fox's (2007) proposal, I also propose to derive the no/free choice effects of *-hari* or *-də* disjunctions/indefinites with respect to necessity and possibility modals by way of application of an exhaustivity operator. Thus, as in the case of deriving ignorance inferences discussed in Chapter 2, I also follow the grammatical approach for deriving

¹⁸See Section 1.7.3.3 for more details of Fox's definition of the exhaustivity operator.

¹⁹Fox uses (A) and (C) interchangeably to refer to the set of alternatives.

free choice implicatures. Following Fox (2007), I also account for derivation of free choice implicatures of *-hari* disjunctions and indefinites under both deontic necessity and possibility modals by application of recursive exhaustivity. However, as in the case of a *-də* disjunction/indefinite with respect to a DP universal quantifier as discussed in Section 3.2, I show that application of the Exh operator as in Fox (2007) falls short of deriving the wide-scope/no-choice effects of a *-də* disjunction/indefinite. In the next section, I explore two alternative solutions for the problematic data. At the same time, Fox (2007) did not appeal to morphological ground/evidence to account for application of an exhaustivity operator. Spector (2014) links the PP character of an item like French disjunction *soit-soit* with exhaustivity by obligatorily associating it with an exhaustivity operator. As we discussed in Chapter 2, English disjunction *or* is not a PPI and application of an exhaustivity operator is quite arbitrary. I provide both empirical and theoretical evidence for application of exhaustivity in deriving the implicatures. Following Spector (2014) and based on the PP character of the particles *-hari* and *-də*, I claim that *-hari* and *-də* associate with an exhaustivity operator, as discussed in Section 1.7.4. In the next section, I account for derivation of free/no-choice effects of *-hari* and *-də* disjunctions with respect to deontic necessity and possibility modals.

3.3.4 Deriving free/no-choice effects of *-hari* and *-də* disjunctions

With all the theoretical background, assumptions and tools in hand now, this section is dedicated to formal derivation of free/no-choice implicatures of *-hari* and *-də* disjunctions under deontic necessity or possibility modals. I first account for the derivation of wide scope/no-choice effects and obligatory ignorance inferences of *-də* disjunctions under deontic necessity and possibility modals.

3.3.4.1 No-choice effects of *-də* with necessity modals

We observed in Section 3.3.1 that *-də* disjunctions and indefinites under deontic necessity modals give rise to a wide scope/no-choice effect and strong ignorance inferences. The example in Section 3.3.1 is repeated here in (81).

- (81) John-tə dən bath-də paan-də kannə wenəw-a, mamə danne næ məkak-də
 John-DAT now rice-də bread-də eat has-to I know not what-də
 kiyəla.
 COMP
 “John has to eat either rice or bread now, I don’t know which one.” (only one of
 them unknown to the speaker)
 CONTEXT 1: NO-CHOICE READING: John has just had a surgery and the doctor
 had advised him not to eat anything for two hours. A short while ago, the doctor

mentioned one thing that John has to eat (i.e. rice, in a context where rice and bread are available). The speaker has either forgotten or does not know which one.

SCOPE EFFECT: $\neg d\partial$ (or) $> \Box_{De}$

EPISTEMIC IMPLICATURE: The speaker does not know what/which.

CONTEXT 2: FREE-CHOICE READING: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John has to eat rice or bread now and he is permitted to eat any of rice or bread.²⁰

SCOPE EFFECT: $\Box_{De} > \neg d\partial$ (or)

EPISTEMIC IMPLICATURE: The speaker knows what John is permitted to eat.

Thus, the components of meaning that we want to derive for a $\neg d\partial$ disjunction under a deontic necessity modal as in (48) are: [1] the speaker believes/ is sure/knows that John is obliged to eat rice or bread [2] the speaker is not sure that John is obliged to eat rice and the speaker is not sure that John is obliged to eat bread [3] the speaker is sure that there is exactly one thing (either rice or bread) that John has to eat.

As illustrated in (82), I claim that exhaustification with respect to domain alternatives serves to derive the ignorance inferences. Here, crucially exhaustification with respect to the epistemic alternatives (epistemically modalized alternative/s) is responsible for deriving the ignorance implicatures. I, however, show that local exhaustification of the scalar alternative as in (82-d) does not derive the desired wide scope/no-choice inferences.²¹

- (82) a. $\Box_{Ep}$ [John-tə dən bath-də paan-də kannə wenəw-a.]
 “John has to eat either rice or bread now.”
- b. Assertion: $\Box_{Ep} \Box_{De} [R \vee B]$
- c. Domain Implicatures: $Alt_D(\Box_{Ep} \Box_{De} [R \vee B]) = \{\Box_{Ep} \Box_{De} R, \Box_{Ep} \Box_{De} B\}$
 $Exh_D [\Box_{Ep} \Box_{De} [R \vee B]] = \Box_{Ep} \Box_{De} [R \vee B] \wedge \neg \Box_{Ep} \Box_{De} R \wedge \neg \Box_{Ep} \Box_{De} B$
- d. Scalar Implicatures: $Alt_S(R \vee B) = \{R \wedge B\}$
 $Exh_S(R \vee B) = (R \vee B) \wedge \neg (R \wedge B)$
- e. Total meaning: $\Box_{Ep} \Box_{De} [R \vee B] \wedge \neg \Box_{Ep} \Box_{De} R \wedge \neg \Box_{Ep} \Box_{De} B \wedge \Box_{Ep} \Box_{De} \neg [R \wedge B]$

²⁰I use # to mean that the sentence above is not felicitous in this context.

²¹In the derivations hereafter, epistemic necessity/possibility modals are represented with $\Box_{Ep} / \Diamond_{Ep}$ while deontic necessity/possibility modals are represented with $\Box_{De} / \Diamond_{De}$

In (82-a), we have the *-da* disjunction sentence with the deontic necessity modal and with the covert doxastic operator adjoined at the matrix level at LF. Assertion of (82-a) is represented in (82-b). The domain implicatures drawn by exhaustification of epistemic domain alternatives results in the uncertainty implicatures as represented in (82-c). This serves to generate the ignorance component of meaning as uncertainty implicatures, that the speaker does not believe that John is obliged to eat rice and the speaker does not believe that John is obliged to eat bread. Crucially, given the [+local] morpho-syntactic requirement of the particle *-da*, the scalar exhaustification is limited to occur below the doxastic operator, thus locally. At the same time, given the universal force of the deontic necessity modal, the scalar exhaustification also happens below the deontic necessity modal, as shown in (82-d), otherwise exclusivity implicatures will not be drawn.²² In (82-e), derived by the union of the domain and scalar implicatures, we have the total meaning that the speaker believes that John is obliged to eat rice or bread and that the speaker does not believe that John is obliged to eat rice and that the speaker does not believe that John is obliged to eat bread and that the speaker believes that John is obliged not to eat both rice and bread.

The LF as derived in (82-e) is identical to (83).

$$(83) \quad \Box_{Ep} \Box_{De} [R \vee B] \wedge \Diamond_{Ep} \neg [\Box_{De} B] \wedge \Diamond_{Ep} \neg [\Box_{De} R] \wedge \Box_{Ep} \Box_{De} \neg [R \wedge B]$$

In other words,

- (84) In all of the speaker's doxastically accessible worlds John is obliged to eat rice or bread and there is at least one world epistemically accessible to the speaker where it is false that John is obliged to eat rice and there is at least one world epistemically accessible to the speaker where it is false that John is obliged to eat bread (which gives rise to the ignorance aspect of the meaning) and in all of the speaker's doxastically accessible worlds John is obliged not to eat rice and bread (which gives rise to the "exactly one" effect of the meaning)

As I argued in Section 2.5.2, there is a distribution requirement for deriving ignorance inferences as re-stated in (85).

²²The quantificational force of the necessity modal is different from that of the possibility modal. So, given the very strong exclusivity character of the particle *-da*, to derive the strongest meaning possible, we need to exhaustify below the deontic necessity modal. In the case of a deontic possibility modal, to derive the strongest meaning possible, we will exhaustify above the deontic possibility modal, as we will see in the next section.

- (85) $\Diamond \neg p \wedge \Diamond \neg q$ (given the assertion of a disjunction with two alternatives p, q)
 = Given the assertion of a disjunction with two alternatives p, q , there is at least one world w' epistemically accessible to the speaker from w^0 , where p is false and there is at least one world w' epistemically accessible to the speaker from w^0 , where q is false.

Note that the derivation in (82-c) as represented in (86) derives the distribution requirement for ignorance.

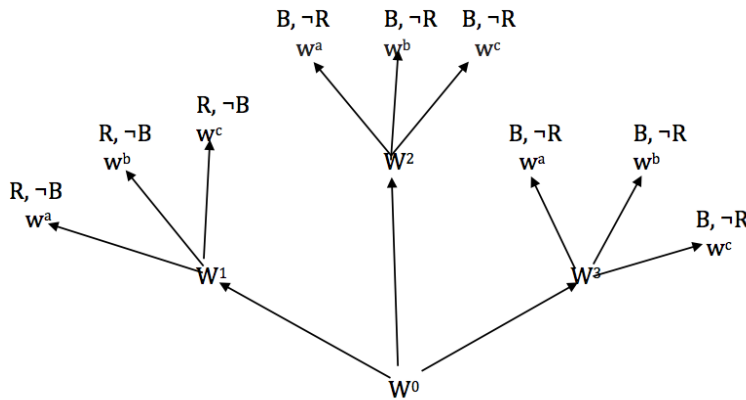
$$(86) \quad \Box_{Ep} \Box_{De} [R \vee B] \wedge \Diamond_{Ep} \neg [\Box_{De} B] \wedge \Diamond_{Ep} \neg [\Box_{De} R]$$

Note also that, crucially, the scalar implicature derived by exhaustification of the scalar alternative below the deontic necessity modal as in (82-d) (and as represented in (87) with the epistemic and deontic necessity modals scoping over them) prevents the deontic conjunctive alternative from being true in any of the deontically accessible worlds. This, I claim, serves to derive the exactly one effect of the meaning.

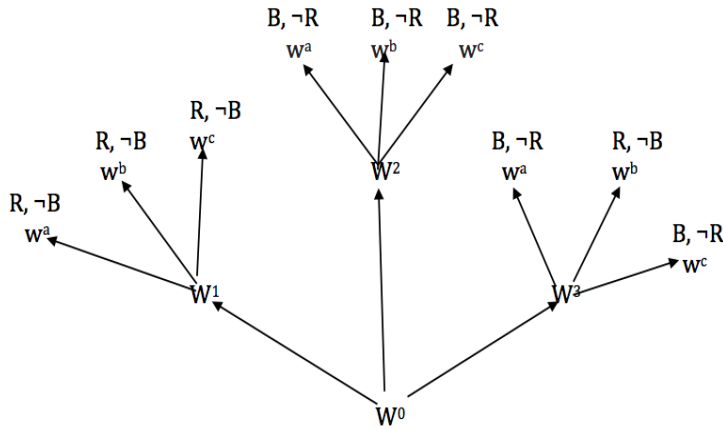
$$(87) \quad \Box_{Ep} \Box_{De} [R \vee B] \wedge \Box_{Ep} \Box_{De} \neg [R \wedge B]$$

However, the LF as derived in (82-e) could be true in both the situations as depicted in (88) and (89). In (88) and (89), W_1 , W_2 , and W_3 represent worlds epistemically accessible to the speaker from W_0 . Deontically accessible worlds are represented by w_a , w_b , and w_c .

(88)



(89)



In the the situation depicted in (88), in all the deontic worlds w^a , w^b , and w^c , accessible from $W1$, the alternative: John eats rice is true and the alternative: John eats bread is false. In all the worlds w^a , w^b , and w^c , accessible from $W2$, the alternative: John eats bread is true and the alternative: John eats rice is false. We can observe the same (as in $W2$) in all the worlds w^a , w^b , and w^c , accessible from $W3$. Thus, the situation depicted in (88) is one where John is obliged to eat exactly one (and the same) of rice or bread (with a no-choice effect). In the the situation depicted in (89), in all the worlds w^a , w^b , and w^c , accessible from $W1$, the alternative: John eats rice is true and the alternative: John eats bread is false. In all the deontic worlds w^a , w^b , and w^c , accessible from $W2$, the alternative: John eats bread is true and the alternative: John eats rice is false. But, in some of the deontic worlds accessible from $W3$, the alternative: John eats rice is true and in some of them the alternative: John eats bread is true. Thus, the the situation depicted in (89) is one where John is obliged to eat exactly one of rice or bread, with a choice effect. What this shows is that the LF as derived in (82-e) is compatible with a wide scope and no-choice reading of disjunction, but does not derive it. Thus, a Fox-inspired meaning for Exh applied here fails to derive the wide scope/no-choice effect of disjunction with respect to a deontic necessity modal.

With the same strategy as for the case of the universal quantifier already discussed, in the following, I explore two alternative proposals to account for the wide scope/no-choice effects of a *-də* disjunction with respect to a deontic necessity modal. These proposals are presented speculatively with the understanding that further research/investigation is needed.

ALTERNATIVE PROPOSAL 1: The set of deontic alternatives that we considered for the

derivation in (82) are: $\{\Box_{De} (R \vee B), \Box_{De} R, \Box_{De} B, \Box_{De} (R \wedge B)\}$. We saw that the result of the Fox's exhaustivity operator operating on this set of alternatives was compatible with a distributivity/choice effect. However, if we have an exhaustivity operator operating on a set of alternatives closed under conjunction (i.e. $\{\Box_{De} R \wedge \Box_{De} B\}$: cf. Spector 2016)), we can account for the wide scope/no choice effects of a *-də* disjunction under the deontic necessity modal.²³ The desired effect for wide scope/no-choice reading of a disjunction is as in (90).

$$(90) \quad \Box_{De} (R \vee B) \wedge \neg (\Diamond_{De} R \wedge \Diamond_{De} B)$$

As noted in Section 3.2.3.2 for the case of the universal quantifier, the full set of alternatives could include the existential case:

$$(91) \quad \begin{aligned} \Box_{De} R &\rightarrow \Diamond_{De} R \\ \Box_{De} B &\rightarrow \Diamond_{De} B \\ \Box_{De} (R \wedge B) &\rightarrow \Diamond_{De} (R \wedge B) \\ \Box_{De} R \wedge \Box_{De} B &\rightarrow \Diamond_{De} R \wedge \Diamond_{De} B \end{aligned}$$

Once we assume that the alternatives are closed under conjunction, the set of alternatives for $\Box_{De} (R \vee B)$ will include (92).

$$(92) \quad (\Diamond_{De} R \wedge \Diamond_{De} B)$$

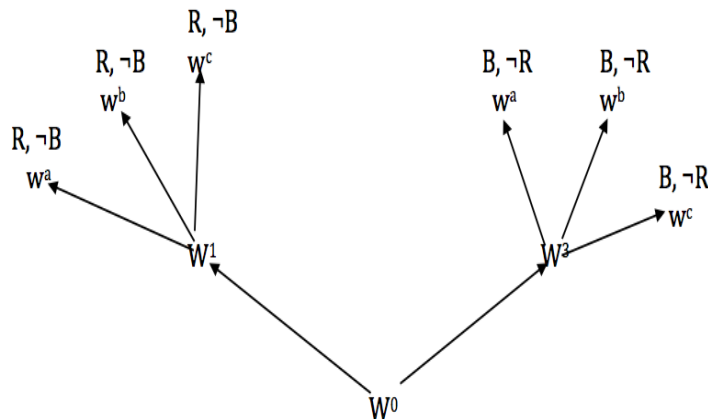
Now, the derivation of implicatures associated with scalar alternatives can proceed as in (93). In (93-a), we have the *-də* disjunction sentence with the deontic necessity modal and with the covert doxastic operator adjoined at the matrix level at LF. Assertion of (93-a) is represented in (93-b). The targeted scalar implicature is represented in (93-c). The total meaning with the doxastic operator appended at the matrix level is presented in (93-d).

$$(93) \quad \begin{aligned} \text{a. } &\Box_{Ep} [\text{John-tə dən bath-də paan-də kannə wenəw-a.}] \\ &\text{“John has to eat either rice or bread now.”} \\ \text{b. } &\text{Assertion: } \Box_{Ep} \Box_{De} [R \vee B] \\ \text{c. } &\text{Scalar Implicatures: } Alt_S(\Box_{De} (R \vee B)) = \{\Diamond_{De} R \wedge \Diamond_{De} B\} \\ &Exh_S(\Box_{De} (R \vee B)) = \Box_{De} (R \vee B) \wedge \neg (\Diamond_{De} R \wedge \Diamond_{De} B) \\ \text{d. } &\text{Total Meaning: } \Box_{Ep} \Box_{De} (R \vee B) \wedge \Box_{Ep} \neg (\Diamond_{De} R \wedge \Diamond_{De} B) \end{aligned}$$

²³Spector (2016) discusses formulations of Exh and notes that closing the set of alternatives under conjunction results in the interpretation of Exh corresponding to Groenendijk and Stokhof (1984)'s original formulation. This is not compatible with free-choice (and this seems appropriate for this case). The implications require future research.

So, the result of applying the Exh with a set of alternatives closed under conjunction is that it returns an exclusivity implicature which is stronger than that in (87). The LF as derived (93-d) accounts for the wide scope/no-choice effect of disjunction added to the ignorance inferences requiring situations as in (94).

(94)



As discussed by Spector (2016), closing the set of alternatives under conjunction does not allow free-choice effects. The decision to allow an Exh with a set of alternatives closed under conjunction thus adds complexity to possibilities associated with Exh, and requires further research.

In the next section, I present the second alternative proposal.

ALTERNATIVE PROPOSAL 2: We discussed in the previous section that a disjunction or an indefinite with particle *-də* places a pragmatic constraint on the alternatives in the domain. This is in the sense that a speaker must have a specific kind of epistemic access to the context and the individuals associated with the disjunction/indefinite. As it will be discussed in Section 3.4, in such a context, some property/background of the individuals associated with the disjunction/indefinite can be evaluated with respect to the speaker (relative to the actual world) giving rise to wide scope effects (i.e quite similar to the manner of a non-specific *de-re* reading as discussed in Section 3.4). For instance, for the *-də* disjunction as in (48) expressing a wide-scope/no-choice effect with respect to a deontic necessity modal, the speaker has “privileged” epistemic access to the context to know that John is obliged to eat exactly one (and the same) of the two types of food: Rice and Bread (see the context in (81)). This epistemic access will serve to evaluate the disjunction/indefinite with respect to the speaker’s doxastic worlds in the actual world,

thus giving rise to a wide-scope/no-choice effect of disjunction over the deontic necessity modal. At the same time, we can account for the ignorance inferences by distributing the individuals among the belief worlds of the speaker by way of exhaustification with respect to epistemically modalized domain alternatives as in (82-c). The implementation of this process/procedure is similar to the process of deriving non-specific *de-re* reading of a disjunction/indefinite of a *-də* disjunction/indefinite with respect to an attitude verb as I discuss and present in Section 3.4. I will follow up on this in that section.

Thus, I have explored two alternative proposals to account for the derivation of both the obligatory wide scope/no-choice and obligatory ignorance effects of a *-də* disjunction under a deontic necessity modal. In the next section, I account for the derivation of both the obligatory wide scope/no-choice and obligatory ignorance effects of a *-də* disjunction under a deontic possibility modal. We will face similar issues as with deontic necessity, and explore similar solutions.

3.3.4.2 No-choice effects of *-də* with possibility modals

We observed in Section 3.3.1 that *-də* disjunctions and indefinites under deontic possibility modals also give rise to a wide scope/no-choice effect and strong ignorance inferences. The example in (50) is repeated here in (95).

- (95) John-tə dæn bath-də paan-də kannə puluwan, mamə danne nə mokak-də
 John-DAT now rice-də bread-də eat can I know not what-də
 kiyəla.
 COMP

“John can eat either rice or bread now, I don’t know which one.” (only one of them unknown to the speaker)

CONTEXT 1: NO-CHOICE READING: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned something that John could eat (i.e. rice in a context where rice and bread are available). The speaker has either forgotten or does not know which one.

SCOPE EFFECT: $-də$ (or) $> \Diamond_{De}$

EPISTEMIC IMPLICATURE: The speaker does not know what/which.

CONTEXT 2: FREE-CHOICE READING: John has just had a surgery and the doctor had advised him not to eat anything for two hours. A short while ago, the doctor mentioned that John could eat rice or bread now and he is permitted to eat any of rice or bread.

SCOPE EFFECT: $\Diamond_{De} > -də$ (or)

EPISTEMIC IMPLICATURE: The speaker knows what John is allowed to eat.

Thus, the components of meaning that we want to derive for a *-də* disjunction under a deontic possibility modal as in (95) are: [1] the speaker believes/ is sure/knows that John is allowed to eat rice or bread [2] the speaker is not sure that John is allowed to eat rice and the speaker is not sure that John is allowed to eat bread [3] the speaker is sure that either John is allowed to rice or he is allowed to eat bread.

As illustrated in (96), I claim that exhaustification with respect to domain alternatives derives the desired ignorance inferences. As before, matrix exhaustification with respect to the epistemic alternatives (epistemically modalized alternative/s) is responsible for deriving the ignorance implicatures. However, as we discussed in the previous section, Fox inspired Exh operator fails to derive wide scope/ no-choice effects. This is explained in the following.

- (96) a. $\Box_{Ep}$ [John-tə bath-də paan-də kannə puluwan.]
 “John can eat either rice or bread now.”
- b. Assertion: $\Box_{Ep} \Diamond_{De} [B \vee R]$
- c. Domain Implicatures: $Alt_D (\Box_{Ep} \Diamond_{De} [[B \vee R]]) = \{\Box_{Ep} \Diamond_{De} B, \Box_{Ep} \Diamond_{De} R\}$
 $Exh_D [\Box_{Ep} \Diamond_{De} [R \vee B]] = \Box_{Ep} \Diamond_{De} [B \vee R] \wedge \neg \Box_{Ep} \Diamond_{De} B \wedge \neg \Box_{Ep} \Diamond_{De} R$
- d. Scalar Implicature: $Alt_S (\Diamond_{De} [B \vee R]) = \{\Diamond_{De} [B \wedge R]\}$
 $Exh_S [\Diamond_{De} [B \vee R]] = \Diamond_{De} [B \vee R] \wedge \neg \Diamond_{De} [B \wedge R]$
- e. Total meaning: $\Box_{Ep} \Diamond_{De} [B \vee R] \wedge \neg \Box_{Ep} \Diamond_{De} B \wedge \neg \Box_{Ep} \Diamond_{De} R \wedge \Box_{Ep} \neg \Diamond_{De} [B \wedge R]$

In (96-a), we have the *-də* disjunction sentence with the deontic necessity modal and with the covert doxastic operator adjoined at the matrix level at LF. Assertion of (96-a) is represented in (96-b). The domain implicatures drawn by matrix exhaustification of epistemic domain alternatives results in the uncertainty implicature as represented in (96-c). This serves to generate the ignorance component of meaning as uncertainty implicatures, that the speaker is not sure that John is allowed to eat rice and the speaker is not sure that John is allowed to eat bread. Crucially, given the [+local] morpho-syntactic constraint of the particle *-də*, the scalar exhaustification occurs below the doxastic operator, thus locally. At the same time, as we discussed in the previous section, *-də* is a very strong PPI with a very strong exclusivity implicature. Given the existential force of the deontic possibility modal, the scalar exhaustification has to happen above the deontic possibility

modal, (the deontic alternative is exhaustified) as shown in (96-d). This is to account for the strong exclusivity implicatures of *-da* disjunction. In (96-e), derived by the union of the domain and scalar implicatures, we have the total meaning that the speaker believes/ is sure/knows that John is allowed to eat rice or bread and that the speaker is not sure that John is allowed to eat rice and the speaker is not sure that John is allowed to eat bread and the speaker is sure that John is not allowed to eat both rice and bread.

The derived meaning in (96-e) is equivalent to (97).

$$(97) \quad \Box_{Ep} \Diamond_{De} [B \vee R] \wedge \Diamond_{Ep} \neg [\Diamond_{De} R] \wedge \Diamond_{Ep} \neg [\Diamond_{De} B] \wedge \Box_{Ep} \neg [\Diamond_{De} [B \wedge R]]$$

In other words,

- (98) In all of the speaker's doxastically accessible worlds John is allowed to eat rice or bread and there is at least one world epistemically accessible to the speaker where it is false that John is allowed to eat rice and there is at least one world epistemically accessible to the speaker where it is false that John is allowed to eat bread (which gives rise to the ignorance aspect of the meaning) and in all of the speaker's doxastically accessible worlds it is false that John allowed to eat rice and bread (which gives rise to the "exactly one" effect of the meaning)

Note that the derivation in (96-d) as represented in (99) derives the distribution requirement for ignorance inferences that I argued for in the previous section.

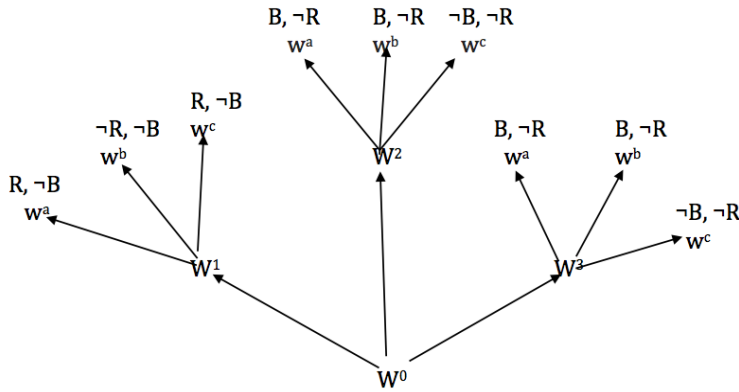
$$(99) \quad \Box_{Ep} \Diamond_{De} [B \vee R] \wedge \Diamond_{Ep} \neg [\Diamond_{De} R] \wedge \Diamond_{Ep} \neg [\Diamond_{De} B]$$

Note also that, crucially, the scalar implicature derived by exhaustification of the scalar alternative above the deontic possibility modal as in (96-d) (and as represented in (100) with the epistemic and deontic possibility modals scoping over them) prevents the deontic conjunctive alternative from being true in any of the deontically accessible worlds. This, I claim serves to derive the exactly one effect of the meaning.

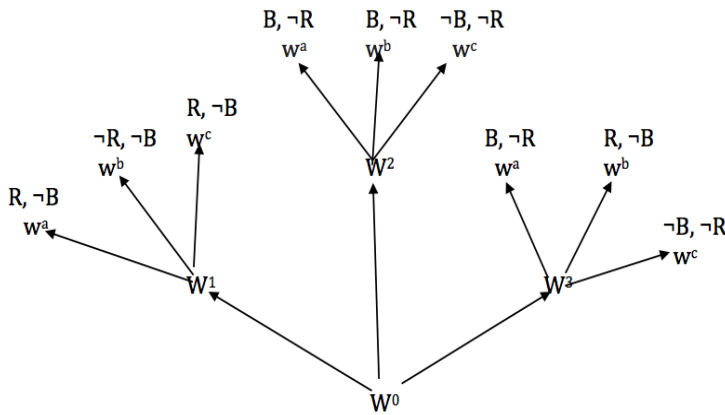
$$(100) \quad \Box_{Ep} \Diamond_{De} [B \vee R] \wedge \Box_{Ep} \neg \Diamond_{De} [B \wedge R]$$

However, the LF as derived in (96-e) and as represented in (97) could be true in both the situations as depicted in (101) and (102).

(101)



(102)



In some of the deontic worlds accessible from W^3 in (102), the alternative: John eats rice is true and in some of them the alternative: John eats bread is true. Thus, the situation depicted in (102) is one where John is allowed to eat exactly one of rice or bread, with a choice effect. What this shows is that the LF as derived in (96-e) is compatible with a wide scope and no-choice reading of disjunction, but does not derive it.

In the following, I will examine the two alternatives discussed in the previous section for the case of deontic necessity in relation to deontic possibility here.

ALTERNATIVE PROPOSAL 1: As before, if we have an exhaustivity operator with a set of alternatives closed under conjunction (i.e. $\{\Diamond_{De}R \wedge \Diamond_{De}B\}$: cf. Spector 2016)), we can account for both the wide scope/no choice and ignorance effects of a $-d\partial$ disjunction under the deontic possibility modal.

Once we assume that the alternatives are closed under conjunction, the set of alternatives for $\Diamond_{De} (R \vee B)$ will include (103).

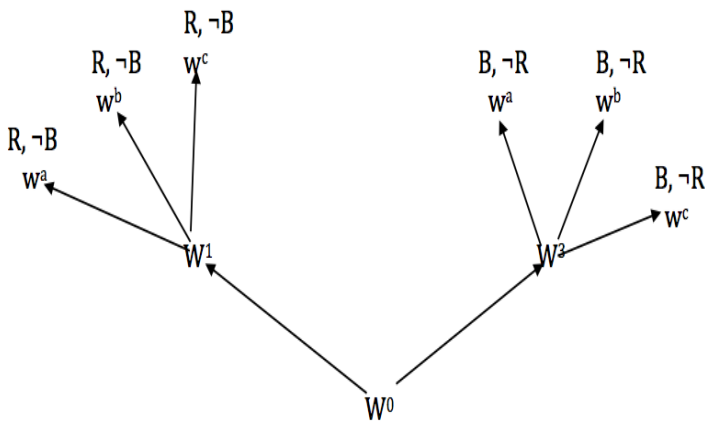
$$(103) \quad \Diamond_{De} R \wedge \Diamond_{De} B$$

Now, the derivation of the scope effects can proceed as in (104). In (104-a), we have the *-də* disjunction sentence with the deontic possibility modal and the covert doxastic operator adjoined at the matrix level at LF. Assertion of (104-a) is represented in (104-b). The targeted scalar implicatures is represented in (104-c). The total meaning with the doxastic operator appended at the matrix level is presented in (104-d).

- (104) a. $\Box_{Ep} [\text{John-tə dæn bath-də paan-də kannə puluwan.}]$
 “John can eat either rice or bread now.”
 b. Assertion: $\Box_{Ep} \Diamond_{De} [R \vee B]$
 c. Scalar Implicatures: $Alt_S(\Diamond_{De} (R \vee B)) = \{\Diamond_{De} R \wedge \Diamond_{De} B\}$
 $Exh_S(\Diamond_{De} (R \vee B)) = \Diamond_{De} (R \vee B) \wedge \neg (\Diamond_{De} R \wedge \Diamond_{De} B)$
 d. Total Meaning: $\Box_{Ep} \Diamond_{De} (R \vee B) \wedge \Box_{Ep} \neg (\Diamond_{De} R \wedge \Diamond_{De} B)$

The implicatures as derived (104-d) account for the wide scope/no-choice effect as depicted in the situation in (105).

(105)



While this variant of the Exh operator offers interesting possibilities, the concerns noted earlier still remain.

ALTERNATIVE PROPOSAL 2: As it was discussed in the previous section in the case of

deontic necessity modals, the specific epistemic access required by the particle *-də* could play the same role in accounting for the wide scope/no-choice effects of a *-də* disjunction with respect to a deontic possibility modal. I will also follow up on this in Section 3.4.

In the next section, I account for the derivation of narrow scope effects and generation of ignorance and free-choice effects of a *-hari* disjunction under a deontic necessity modal.

3.3.4.3 Ignorance effects of *-hari* with necessity modals

We observed in Section 3.3.2 that *-hari* disjunctions and indefinites under deontic necessity modals in their narrow scope reading may give rise to ignorance inferences or free-choice inferences. In a context where ignorance inferences are present, the components of meaning that we want to derive for a *-hari* disjunction under a deontic necessity modal as in (52) are: [1] the speaker believes/ is sure/knows that John is obliged to eat rice or bread [2] the speaker is not sure that John is obliged to eat rice and the speaker is not sure that John is obliged to eat bread [3] the speaker is not sure that John is obliged to eat both rice and bread. I claim that global exhaustification with respect to both domain and scalar alternatives of a *-hari* disjunction under a deontic necessity modal derives the desired narrow scope effect and ignorance inferences. These components of meaning are derived as illustrated in (106).

- (106) a. $\Box_{Ep} [\text{John-tə dæn bath-hari paan-hari kannə wenəw-a.}]$
 “John has to eat rice or bread now.”
 b. Assertion: $\Box_{Ep} \Box_{De} [R \vee B]$
 c. Domain Implicatures: $Alt_D (\Box_{Ep} \Box_{De} [R \vee B]) = \{\Box_{Ep} \Box_{De} R, \Box_{Ep} \Box_{De} B\}$
 $Exh_D [\Box_{Ep} \Box_{De} [R \vee B]] = \Box_{Ep} \Box_{De} [R \vee B] \wedge \neg \Box_{Ep} \Box_{De} R \wedge \neg \Box_{Ep} \Box_{De} B$
 d. Scalar Implicatures: $Alt_S (\Box_{Ep} \Box_{De} R \vee B) = \{\Box_{Ep} \Box_{De} [R \wedge B]\}$
 $Exh_S (\Box_{Ep} \Box_{De} R \vee B) = \Box_{Ep} \Box_{De} R \vee B \wedge \neg \Box_{Ep} \Box_{De} [R \wedge B]$
 e. Total meaning: $\Box_{Ep} \Box_{De} [R \vee B] \wedge \neg \Box_{Ep} \Box_{De} R \wedge \neg \Box_{Ep} \Box_{De} B \wedge \neg \Box_{Ep} \Box_{De} [R \wedge B]$

In (106-a), we have the *-hari* disjunction sentence with the deontic necessity modal and with the covert doxastic operator adjoined at the matrix level at LF. Assertion of (106-a) is represented in (106-b). The domain implicatures drawn by exhaustification of epistemic domain alternatives result in the uncertainty implicatures as represented in (106-c). This serves to generate the ignorance component of meaning as uncertainty im-

plicatures: the speaker does not believe that John is obliged to eat rice and the speaker does not believe that John is obliged to eat bread. Crucially, the scalar exhaustification occurs above the doxastic operator, thus globally as in (106-d). This is a weak scalar implicature entailed by domain implicatures.²⁴ In (106-e), derived by the union of the domain and scalar implicatures, we have the total meaning that the speaker believes that John is obliged to eat rice or bread and that the speaker does not believe that John is obliged to eat rice and that the speaker does not believe that John is obliged to eat bread and that the speaker does not believe that John is obliged to eat both rice and bread.

The LF as derived in (106-e) is identical to (107).

$$(107) \quad \Box_{Ep} \Box_{De} [R \vee B] \wedge \Diamond_{Ep} \neg [\Box_{De} B] \wedge \Diamond_{Ep} \neg [\Box_{De} R] \wedge \Diamond_{Ep} \neg [\Box_{De} [R \wedge B]]$$

In other words,

- (108) In all of the speaker's doxastically accessible worlds John is obliged to eat rice or bread and there is at least one world epistemically accessible to the speaker where it is false that John is obliged to eat rice and there is at least one world epistemically accessible to the speaker where it is false that John is obliged to eat bread and there is at least one world epistemically accessible to the speaker where it is false that John is obliged to eat both rice and bread.

As I argued in Section 2.5.2, there is a distribution requirement for deriving ignorance inferences as re-stated in (109).

- (109) $\Diamond \neg p \wedge \Diamond \neg q$ (given the assertion of a disjunction with two alternatives p, q)
 = Given the assertion of a disjunction with two alternatives p, q, there is at least one world w' epistemically accessible to the speaker from w^0 where p is false, and there is at least one world w' epistemically accessible to the speaker from w^0 where q is false.

Note that the derivation in (106-c) as represented in (110) derives the distribution requirement for ignorance.

$$(110) \quad \Box_{Ep} \Box_{De} [R \vee B] \wedge \Diamond_{Ep} \neg [\Box_{De} B] \wedge \Diamond_{Ep} \neg [\Box_{De} R]$$

Note also that, crucially, the scalar implicature derived by exhaustification of the scalar alternative above the deontic necessity modal as in (106-d) (and as represented in (111)) serves to convey that the speaker is ignorant about whether John is obliged to eat both rice

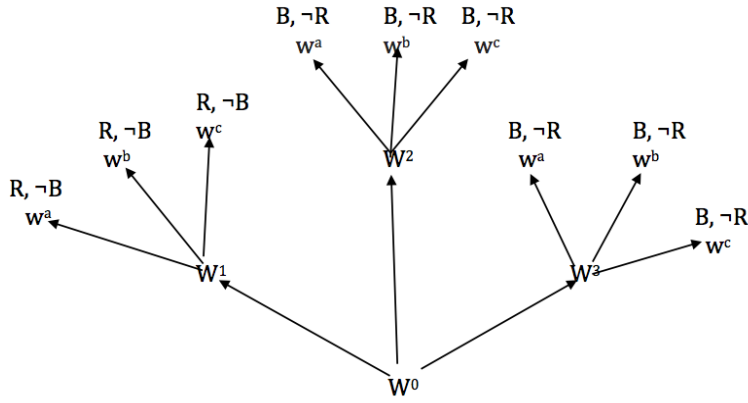
²⁴See Section 2.6.3 for concerns related to global exhaustification of the scalar alternative and economy.

and bread.

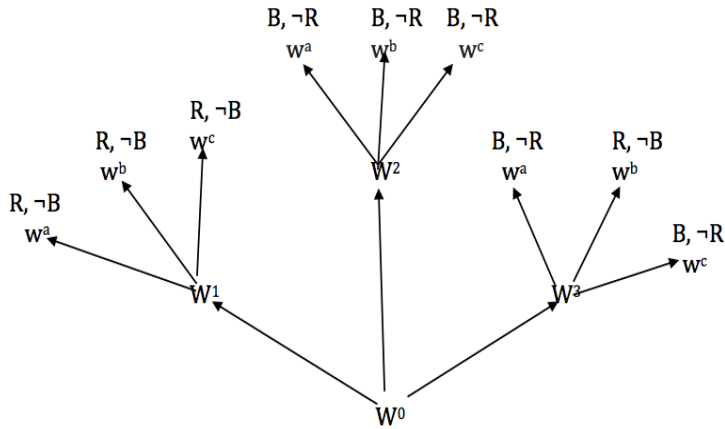
$$(111) \quad \Box_{Ep} \Box_{De} [R \vee B] \wedge \Diamond_{Ep} \neg [\Box [R \wedge B]]$$

Thus, the LF derived in (106-e) and represented in (107) is compatible with any of the situations depicted in the following.

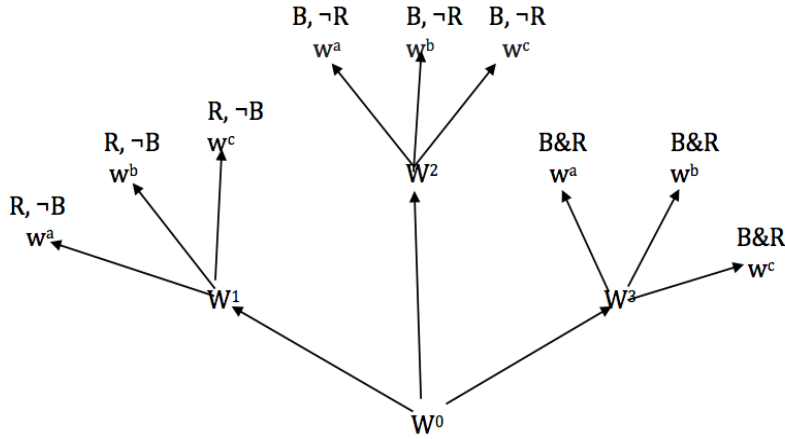
(112)



(113)



(114)



In all the situations depicted here, no alternative can be true in all the worlds epistemically accessible to the speaker, which gives rise to ignorance inferences. This way, I account for the derivation of both the narrow scope and ignorance effects of *-hari* disjunction under a deontic necessity modal based on a distribution requirement derived by way of exhaustification with respect to domain alternative/s and the weak scalar implicature. Crucially, *-hari* differs from *-də* in allowing situations with worlds like W3 in (113) and W3 in (114).

In the next section, I account for the derivation of narrow scope and ignorance effects of a *-hari* disjunction under a deontic possibility modal.

3.3.4.4 Ignorance effects of *-hari* with possibility modals

We observed in Section 3.3.2 that *-hari* disjunctions and indefinites under deontic possibility modals may also give rise to ignorance inferences or free-choice effects. Thus, when an ignorance inference is present, the components of meaning that we want to derive for a *-hari* disjunction under a deontic possibility modal as in (54) are: [1] the speaker believes/ is sure/knows that John is allowed to eat rice or bread [2] the speaker is not sure that John is allowed to eat rice and the speaker is not sure that John is allowed to eat bread and the speaker is not sure that John is allowed to eat both rice and bread. As before, I claim that global exhaustification with respect to both domain and scalar alternatives associated with a *-hari* disjunction under a deontic possibility modal derives the desired narrow scope effect and ignorance inferences. These components of meaning are derived as illustrated in (115). Here, crucially, global exhaustification of the scalar alternative/s with respect to the doxastic operator is responsible for deriving the narrow scope effect, as illustrated and discussed as follows.

- (115) a. $\Box_{Ep} [\text{John-tə bath-hari paan-hari kannə puluwan.}]$
 “John can eat rice or bread now.”
- b. Assertion: $\Box_{Ep} \Diamond_{De} [B \vee R]$
- c. Domain Implicatures: $Alt_D (\Box_{Ep} \Diamond_{De} [[B \vee R]]) = \{\Box_{Ep} \Diamond_{De} B, \Box_{Ep} \Diamond_{De} R\}$
 $Exh_D [\Box_{Ep} \Diamond_{De} [R \vee B]] = \Box_{Ep} \Diamond_{De} [B \vee R] \wedge \neg \Box_{Ep} \Diamond_{De} B \wedge \neg \Box_{Ep} \Diamond_{De} R$
- d. Scalar Implicature: $Alt_S (\Box_{Ep} \Diamond_{De} [B \vee R]) = \{\Box_{Ep} \Diamond_{De} [B \wedge R]\}$
 $Exh_S [\Box_{Ep} \Diamond_{De} [B \vee R]] = \Box_{Ep} \Diamond_{De} [B \vee R] \wedge \neg \Box_{Ep} \Diamond_{De} [B \wedge R]$
- e. Total meaning: $\Box_{Ep} \Diamond_{De} [B \vee R] \wedge \neg \Box_{Ep} \Diamond_{De} B \wedge \neg \Box_{Ep} \Diamond_{De} R \wedge \neg \Box_{Ep} \Diamond_{De} [B \wedge R]$

The interpretation is derived as we have seen for the deontic necessity case. In (115-a), we have the *-hari* disjunction sentence with the deontic possibility modal and with the covert doxastic operator adjoined at the matrix level at LF. Assertion of (115-a) is represented in (115-b). The domain implicatures drawn by matrix exhaustification of epistemic domain alternatives result in the uncertainty implicature as represented in (115-c). This serves to generate the ignorance component of meaning as uncertainty implicatures, that the speaker is not sure that John is allowed to eat rice and the speaker is not sure that John is allowed to eat bread. Crucially, the scalar exhaustification occurs above the doxastic operator, thus globally. In (115-e), derived by the union of the domain and scalar implicatures, we have the total meaning that the speaker believes/ is sure/knows that John is allowed to eat rice or bread and that the speaker is not sure that John is allowed to eat rice and the speaker is not sure that John is allowed to eat bread and the speaker is not sure that John is allowed to eat both rice and bread.

The derived meaning in (115-e) is equivalent to (116).

$$(116) \quad \Box_{Ep} \Diamond_{De} [B \vee R] \wedge \Diamond_{Ep} \neg [\Diamond_{De} R] \wedge \Diamond_{Ep} \neg [\Diamond_{De} B] \wedge \Diamond_{Ep} \neg [\Diamond_{De} [B \wedge R]]$$

In other words,

- (117) In all of the speaker's doxastically accessible worlds John is allowed to eat rice or bread and there is at least one world epistemically accessible to the speaker where it is false that John is allowed to eat rice and there is at least one world epistemically accessible to the speaker where it is false that John is allowed to eat bread and there is at least one world epistemically accessible to the speaker where it is false that John is allowed to eat rice and bread.

As we have seen earlier, the derivation in (115-d) accounts for the distribution requirement for ignorance inferences that I argued for in the previous section.

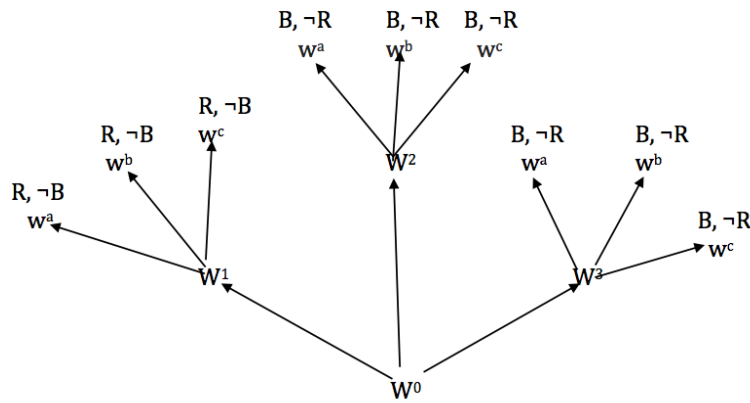
$$(118) \quad \Box_{Ep} \Diamond_{De} [B \vee R] \wedge \Diamond_{Ep} \neg [\Diamond_{De} R] \wedge \Diamond_{Ep} \neg [\Diamond_{De} B]$$

Note also that, crucially, the scalar implicature derived by exhaustification of the scalar alternative above the doxastic operator as in (115-d) (and as represented in (119)) conveys that the speaker is ignorant about whether John is allowed to eat both rice and bread.

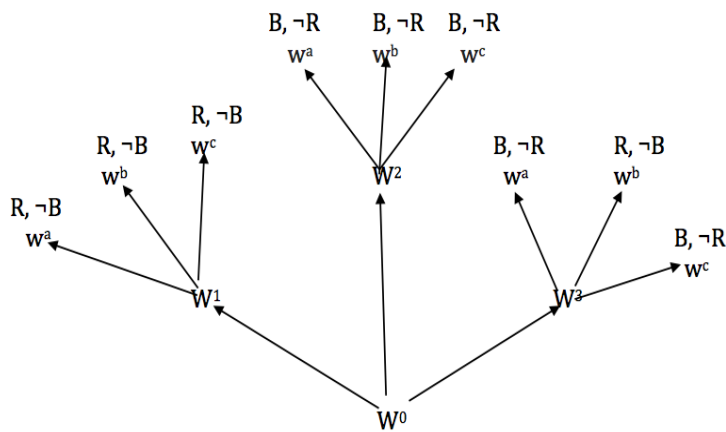
$$(119) \quad \Box_{Ep} \Diamond_{De} [B \vee R] \wedge \Diamond_{Ep} \neg [\Diamond_{De} [B \wedge R]]$$

Thus, the LF derived in (115-e) and represented in (116) is compatible with any of the situations depicted in the following.

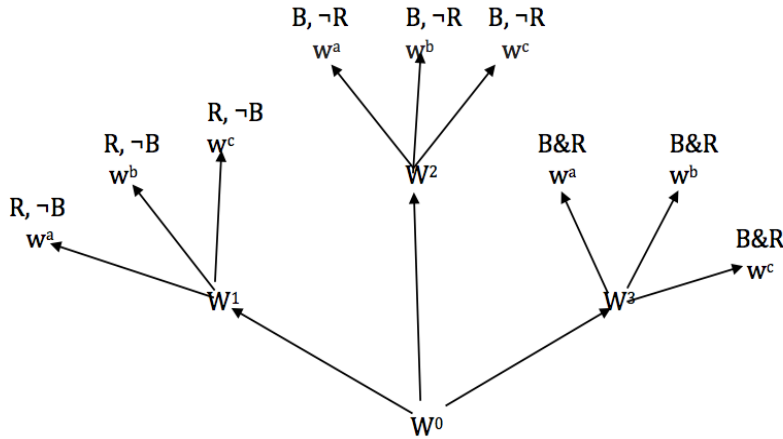
(120)



(121)



(122)



In all the situations depicted here, no alternative can be true in all the worlds epistemically accessible to the speaker, which give rise to ignorance inferences. This way, I account for the derivation of both the narrow scope and ignorance effects of *-hari* disjunction under a deontic possibility modal based on a distribution requirement derived by way of exhaustification with respect to domain alternative/s and the weak scalar implicature. In the next section, I account for the derivation of narrow scope and free choice effects of a *-hari* disjunction under a deontic necessity modal.

3.3.4.5 Free-choice effects of *-hari* with necessity modals

We observed in Section 3.3.2 that *-hari* disjunctions and indefinites under necessity modals may give rise to a free-choice effect. When free choice is implicated, the components of meaning that we want to derive for a *-hari* disjunction under a deontic necessity modal as in (52) are: [1] the speaker believes/ is sure/knows that John is obliged to eat rice or bread [2] the speaker knows that John is allowed to eat rice and the speaker knows that John is allowed to eat bread.

As illustrated in (123), I claim that recursive exhaustification (cf. Fox (2007)) with respect to domain alternatives of a *-hari* disjunction under a deontic necessity modal derives the desired free-choice implicatures. Here, crucially recursive exhaustification (embedded and matrix) with respect to the deontic alternatives (deontically modalized alternative/s) is responsible for deriving the free choice implicatures. The epistemic effect that the speaker knows what John is allowed to eat (i.e. that John is allowed to eat any of rice or bread) is accounted for by way of the epistemic necessity modal adjoined at the matrix level.

- (123) a. $\Box_{Ep}$ [John-tə dən bath-hari paan-hari kannə wenəw-a.]
 “John has to eat rice or bread now.”
- b. Assertion: $\Box_{Ep} \Box_{De} [R \vee B]$
- c. Domain Implicatures: $Alt_D(\Box_{De} Exh_D[R \vee B]) = \{\Box_{De} Exh_D R, \Box_{De} Exh_D B\}$
 $= \{\Box_{De} (R \wedge \neg B), \Box_{De} (R \wedge \neg B)\}$
 $Exh_D(\Box_{De} Exh_D [R \vee B]) = \Box_{De} (R \vee B) \wedge \neg \Box_{De} (R \wedge \neg B) \wedge \neg \Box_{De} (B \wedge \neg R)$
- d. Total Meaning: $\Box_{Ep} \Box_{De} [R \vee B] \wedge \Box_{Ep} \neg \Box_{De} (R \wedge \neg B) \wedge \Box_{Ep} \neg \Box_{De} (B \wedge \neg R)$ ²⁵

In (123-a), we have the *-hari* disjunction sentence with the deontic necessity modal and with the covert doxastic operator adjoined at the matrix level at LF. Assertion of (123-a) is represented in (123-b). The domain implicatures drawn by recursive exhaustification with respect to deontic domain alternatives results in the implicature as represented in (123-c). The total meaning with the doxastic operator adjoined at the matrix level is represented in (123-d). This serves to generate free-choice component of meaning as implicatures: the speaker is sure that John is allowed to eat rice and the speaker is sure that John is allowed to eat bread. This follows because if the speaker is sure that John must eat rice or bread and is also sure that it is false that he has to eat rice and not bread, then the speaker is sure that John is allowed to eat bread (and vice-versa for rice). In other words John has the freedom to choose.

The total meaning conveyed of (123-d) is represented in (124).

$$(124) \quad \Box_{Ep} \Box_{De} [R \vee B] \wedge \Box_{Ep} \Diamond_{De} B \wedge \Box_{Ep} \Diamond_{De} R$$

In other words,

- (125) In all of the speaker’s doxastically accessible worlds John is obliged to eat rice or bread and in all of the speaker’s doxastically accessible worlds John is allowed to eat rice and in all of the speaker’s doxastically accessible worlds John is allowed to eat bread.

As I argued in Section 3.3.3, there is a distribution requirement for deriving free-choice inferences as re-stated in (126).

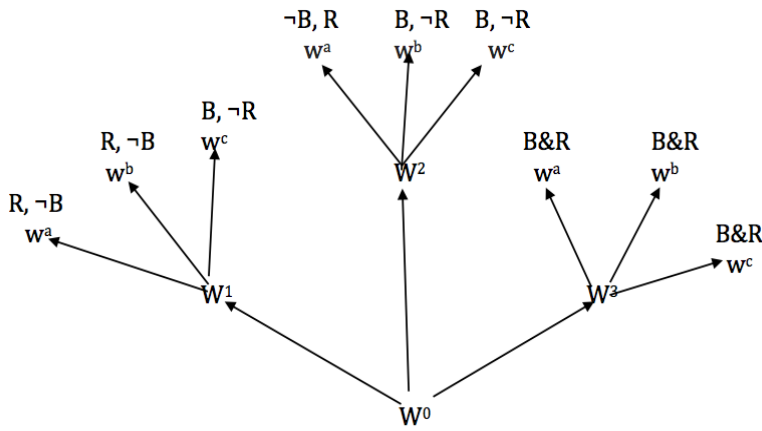
$$(126) \quad \Diamond p \wedge \Diamond q \text{ (given the assertion of a disjunction with two alternatives } p, q)$$

²⁵Nicolae (2017) uses a derivation quite similar to this with the doxastic operator (in place of the deontic modal) to derive the meaning of French simple disjunction *ou*. See Section 2.8.2 for more details.

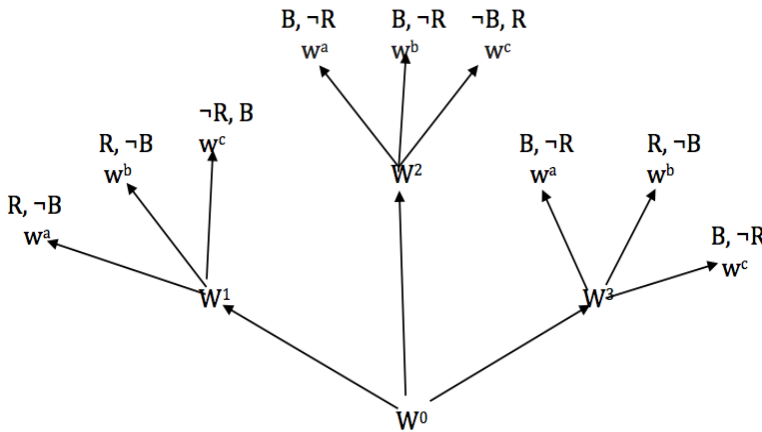
= Given the assertion of a disjunction with two alternatives p, q, there is at least one world w' deontically accessible from w^0 where p is true and there is at least one world w' deontically accessible from w^0 where q is true.

Note that the derivation in (123-d) as represented in (124) derives the distribution requirement for free-choice. This is compatible with a situation where the speaker knows that John has the permission to choose freely. Thus, the LF derived in (123-d) and represented in (124) is compatible with any of the situations depicted in the following.

(127)



(128)



We see here that we have not taken the scalar alternative into account when exhaustifying the alternatives. Note that if the scalar alternative is exhaustified as presented in (129), it will be true only in the situation in (128).

$$(129) \quad \Box_{Ep} \Box_{De} [R \vee B] \wedge \Box_{Ep} \Diamond_{De} B \wedge \Box_{Ep} \Diamond_{De} R \wedge \Box_{Ep} \Box_{De} \neg [B \wedge R]$$

As it was discussed in Section 2.7.1 with respect to cancelation of ignorance inferences of *-hari* disjunctions, I assume that when recursive exhaustification is involved, the process continues without the scalar alternative. However, there is a debate as to whether the scalar alternative should be included in the set of alternatives in accounting for free-choice effects of a disjunction/indefinite under a deontic modal. For instance Simons (2005) argues and presents evidence that sentence like that in (130) can produce a free-choice effect without an anti-conjunctive inference. This is in the sense that (130) can be read as Jane may sing and Jane may dance and she also has permission to do both.²⁶

(130) Jane may sing or dance. (Simons, 2005, p. 272)

A free-choice effect without an anti-conjunctive inference can be represented with a situation as depicted in (127) above.

On the other hand, the proposal in Fox (2007) predicts that free-choice involves an anti-conjunctive inference. A free-choice effect with an anti-conjunctive inference can be represented with a situation as depicted in (128) above.

However, we have derived the free-choice effects without taking the conjunctive alternative into account. This leaves us with freedom to interpret free-choice with or without an anti-conjunctive inference as in (127) or (128).

This way, I account for the derivation of free-choice effects of a *-hari* disjunction under a deontic necessity modal based on a distribution requirement derived by way of recursive exhaustification with respect to deontic domain alternatives. In the next section, I account for the derivation of free-choice effects of a *-hari* disjunction under a deontic possibility modal.

3.3.4.6 Free-choice effects of *-hari* with possibility modals

We observed in Section 3.3.2 that *-hari* disjunctions and indefinites under deontic possibility modals also may give rise to a free-choice effect. When free choice is implicated of a *-hari* disjunction under a deontic possibility modal as in (52), the components of meaning that we want to derive are: [1] the speaker believes/ is sure/knows that John is allowed to eat rice or bread [2] the speaker knows that John is allowed to eat rice and the speaker knows that John is allowed to eat bread.

²⁶The examples of free-choice under discussion here involve deontic necessity modals. Simons also presents examples with deontic necessity modals. I am however taking an example with a possibility modal to compare it with Fox (2007) who derives free-choice with a deontic possibility modal

As illustrated in (131), I claim that recursive exhaustification (cf. Fox (2007)) with respect to domain alternatives of a *-hari* disjunction under a deontic possibility modal derives the desired free-choice implicatures. Here, crucially recursive exhaustification with respect to the deontic alternatives (deontically modalized alternative/s) over the deontic possibility modal is responsible for deriving the free choice implicatures. The epistemic effect that the speaker knows what John is allowed to eat (i.e. that John is allowed to eat any of rice or bread) is accounted for by way of the epistemic necessity modal adjoined at the matrix level.

- (131) a. $\Box_{Ep}$ [John-tə bath-hari paan-hari kannə puluwan.]
 “John can eat rice or bread now.”
 b. Assertion: $\Box_{Ep} \Diamond_{De} [B \vee R]$
 c. Domain Implicatures: $Alt_D (\Diamond_{De} [[B \vee R]]) = \{\Diamond_{De} B, \Diamond_{De} R\}$
 $Exh_D (\Diamond_{De} [B \vee R]) = \{[\Diamond_{De} B \wedge \neg \Diamond_{De} R], [\Diamond_{De} R \wedge \neg \Diamond_{De} B]\}$
 $Exh_D (Exh_D (\Diamond_{De} [B \vee R])) = \Diamond_{De} [B \vee R] \wedge \neg (\Diamond_{De} B \wedge \neg \Diamond_{De} R) \wedge \neg (\Diamond_{De} R \wedge \neg \Diamond_{De} B)$
 d. Total meaning: $\Box_{Ep} \Diamond_{De} [B \vee R] \wedge \Box_{Ep} \neg (\Diamond_{De} B \wedge \neg \Diamond_{De} R) \wedge \Box_{Ep} \neg (\Diamond_{De} R \wedge \neg \Diamond_{De} B)$

In (131-a), we have the *-hari* disjunction sentence with the deontic possibility modal and with the covert doxastic operator adjoined at the matrix level at LF. Assertion of (131-a) is represented in (131-b). The domain implicatures drawn by recursive exhaustification with respect to deontic domain alternatives results in the implicature as represented in (131-c). The total meaning with the doxastic operator adjoined at the matrix level is represented in (131-d). This serves to generate free-choice component of meaning as implicatures, that the speaker is sure that John is allowed to eat rice and the speaker is sure that John is allowed to eat bread. In other words John has the freedom to chose.

The total meaning conveyed in (131-d) is equivalent to the LF in (132).

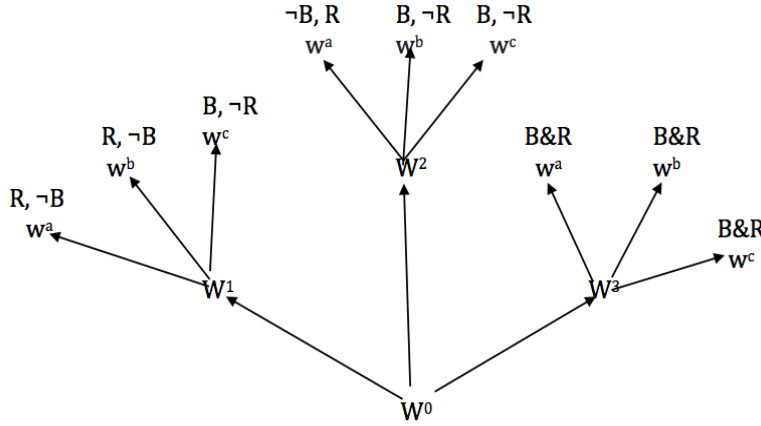
- (132) $\Box_{Ep} \Diamond_{De} [R \vee B] \wedge \Box_{Ep} \Diamond_{De} B \wedge \Box_{Ep} \Diamond_{De} R$

In other words,

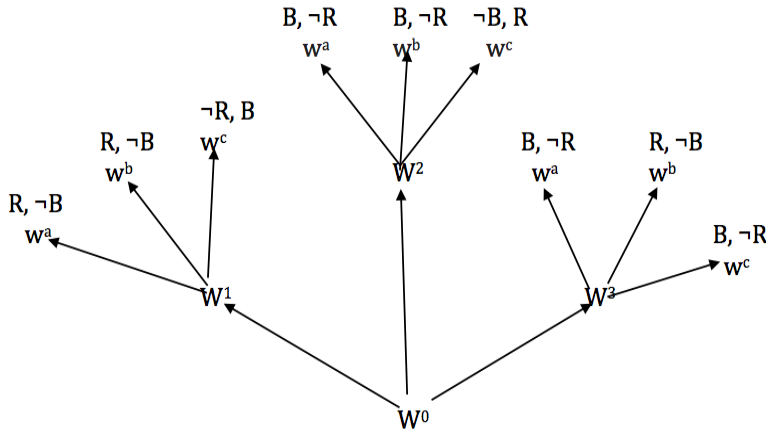
- (133) In all of the speaker’s doxastically accessible worlds John is allowed to eat rice or bread and in all of the speaker’s doxastically accessible worlds John is allowed to eat rice and in all of the speaker’s doxastically accessible worlds John is allowed to eat bread.

As I argued in Section 3.3.3 and in the previous section, the LF in (132) satisfies the distribution requirement: $\Diamond p \wedge \Diamond q$ for deriving free-choice implicatures. This is compatible with a situation where the speaker knows what John may or may not eat and John has the permission to chose freely. Thus, the LF derived in (131-d) and represented in (132) is compatible with any of the situations depicted in the following.

(134)



(135)



As before, we see here that we have not taken the scalar alternative into account when exhaustifying the alternatives. Note that if the scalar alternative is exhaustified as presented in (136), it will be true only in the situation in (135).

$$(136) \quad \Box_{Ep} \Diamond_{De} [R \vee B] \wedge \Box_{Ep} \Diamond_{De} B \wedge \Box_{Ep} \Diamond_{De} R \wedge \Box_{Ep} \neg \Diamond_{De} [B \wedge R]$$

This way, I account for the derivation of free-choice effects of a *-hari* disjunction under a deontic possibility modal based on a distribution requirement derived by way of

recursive exhaustification with respect to deontic domain alternatives.

In the next section, I propose to account for the derivation of free/no-choice effects and related ignorance inferences of *-hari* and *-də* indefinites under deontic necessity and possibility modals in the same manner that we did for *-hari* and *-də* disjunctions under modals.

3.3.5 Deontic modals and *-hari* and *-də* indefinites

We observed in Section 3.3.2 at the beginning of this chapter that like disjunctions with the particles *-hari* and *-də*, indefinites with the particles *-hari* and *-də* also give rise to free/no choice implicatures with respect to deontic necessity and possibility modals. Crucially, I assume that we can account for these facts of *-hari* and *-də* indefinites based on the analysis of the derivation of free-choice/no choice/ignorance implicatures of *-hari* and *-də* disjunctions. This comes out straightforwardly when we assume that the general function of indefinites is to introduce alternatives (cf. Kratzer and Shimoyama, 2002) and the particles *-hari* and *-də* impose the same kind of syntactic/semantic requirements on the structure and alternatives in the domain.

3.4 Attitude verbs and *-hari* and *-də* disjunctions/indefinites

This section deals with the implications associated with the background, data and derivation of different types of *de-re* and *de-dicto* readings of *-hari* and *-də* disjunctions and indefinites under attitude verbs such as *wiswaasə kərənəwa* in Sinhala identical to *believe* in English.

At least since Fodor (1970), it is believed that an indefinite embedded under an attitude verb like *believe* as explained in (137) gives rise to at least three readings: specific *de re*; non-specific *de dicto*; non-specific *de re*. As explained in the example in (138), the same three readings are available for a plain indefinite under an attitude verb like *believe* in Sinhala. However, crucially, for plain indefinites combined with the particles *-hari* and *-də* in Sinhala, the specific *de re* reading is unavailable under an attitude verb like *wiswaasə kərənəwa*. It is observed that for a plain indefinite combined with the particle *-də* only the non-specific *de re* reading is available. On the other hand, a plain indefinite combined with the particle *-hari* is compatible with a non-specific *de dicto* or non-specific *de re* reading. Thus, it is seen that a *-də* indefinite is marked for a non-specific *de re* reading while a *-hari* indefinite is compatible with any of non-specific *de re* or non-specific *de*

dicto readings.

As discussed in Section 3.4.3, the existing scope or pronoun-variable binding theories are faced with problems associated with scope paradoxes or over/under generation issues in accounting for the non-specific *de re* reading. The main goal of this section is to account for the non-specific *de re* reading of a *-də* indefinite without having to face a scope paradox or over/under generation issues. At the same time, it accounts for the non-specific *de dicto* reading of a *-hari* indefinite and its compatibility with a non-specific *de re* reading. It proposes to account for the *de re* reading of a *-də* indefinite by way of a pragmatic condition that the particle *-də* places on alternatives in its domain and an exclusivity implicature derived by way of local exhaustification with respect to scalar alternative/s. Even though a *-hari* indefinite is not marked for a *de re* reading, its compatibility with a *de re* reading is accounted for based on its compatibility with the pragmatic constraint and its compatibility with an exclusivity implicature derived by way of global exhaustification with respect to scalar alternative/s. It also proposes that the non-specific aspect of the meaning of both *-hari* and *-də* indefinites is derived by way of exhaustification with respect to domain alternatives associated with the indefinite.

The section is organized as follows. Section 1 presents an overview of the background to the investigation. Section 2 presents data to propose a new account to derive the non-specific *de re* reading (third reading). Section 3 critically reviews some of the existing accounts and shows their limitations to account for (particularly) the third reading. Section 4 presents the proposal to account for the non-specific *de re* and *de dicto* readings associated with *-hari* and *-də* indefinites based on the semantic and pragmatic constraints that the two particles place on the domain of alternatives of an indefinite.

3.4.1 Background

A plain indefinite as in (137) embedded under an attitude verb like *believe* in English is ambiguous between three readings: specific *de re*; non-specific *de dicto*; non-specific *de re* (cf. Fodor (1970); Von Stechow (2011); Keshet (2011)) as illustrated in (137-a), (137-b) and (137-c).

(137) Mary believes that John met a teacher.

- a. Specific *de re*: There is a particular person *x* (i.e. Sue) of whom Mary believes that John met *x*. She is a teacher in the actual world. Mary may or may not know this.
- b. Non-specific *de dicto*: Mary believes that there is some teacher *x* and John

met x .

- c. Non-specific *de re*: Mary believes that John met either Sue or Jane. But she does not know which one. Sue and Jane are teachers in the actual world. Mary may or may not know this.

The same is true for a plain indefinite embedded under an attitude verb in Sinhala.

- (138) Mary wiswaasə-kəɾənəwa John guruwəriy-ak hamu-una kiyəla.
 Mary believe John teacher-INDF met COMP
 “Mary believes that John met a teacher.”

- a. ✓ Specific *de re* b. ✓ Non-specific *de dicto* c. : ✓ Non-specific *de re*

Since Quine (1956), the specific *de re* and non-specific *de dicto* readings are accounted for based on the relative scope of the intensional operator and the existential quantifier (cf. Russell (1905); Montague (1970); Ladusaw (1977); Von Fintel and Heim (2011)).

- (139) a. Specific *de re*: $\exists x. x$ is a teacher in w_0 & $\forall w' \in \text{Beliefs}(\text{Mary}, w_0)$: John met x in w' .
There is an (actual) teacher x such that in all of Marys belief worlds, John met x .
 b. Non-specific *de dicto*: $\forall w' \in \text{Beliefs}(\text{Mary}, w_0)$: $\exists x. x$ is a teacher in w' & John met x in w' .
For every world w' in the belief-worlds of Mary, there is some teacher in w' and John met x in w' . (cf. based on Seth Cable’s intensional semantics class notes).

However, the non-specific *de re* reading causes a scope paradox (cf. Keshet (2011); Von Fintel and Heim (2011)). On the one hand the DP’s quantificational force has to scope below the intensional operator. On the other, its restrictor has to scope above the intensional operator. Thus, a scope based analysis falls short of handling the derivation of the third reading (cf. Von Fintel and Heim (2011); Keshet (2011)). The meaning of the third reading can be roughly characterized as in (140).

- (140) $\forall w' \in \text{Beliefs}(\text{Mary}, w_0)$: $\exists x. x$ is a teacher in w_0 & John met x in w' .
In all of Marys belief worlds w' , there is some x such that x is a teacher in the actual world, and John met x in w' . (cf. based on Seth Cable’s intensional semantics class notes).

Thus, due to the scope paradox, a scope based analysis is not able to handle the derivation of the third reading (Von Fintel and Heim (2011); Keshet (2011)).

As discussed in Section 3.4.3, different types of proposals such as scope based accounts, pronoun-variable binding accounts, etc have been made in the literature to derive the *de re* and *de dicto* readings of indefinites under attitude verbs (Russell (1905); Montague (1970); Ladusaw (1977); Kamp (1971); Cresswell (1990); Percus (2000); Von Stechow (2006); Heim (2011); Keshet (2011)). However, these accounts fall short of rightly accounting for the third reading as these theories either under generate or over generate. In this context, indefinites marked with the particles *-hari* and *-də* in Sinhala offer a very interesting paradigm and crucial insights for deriving the non-specific *De re* and *De dicto* readings. This is discussed next.

3.4.2 Insights from *-hari* and *-də* indefinites under attitude verbs

Indefinites with *-hari* and *-də* exhibit behaviors different from a plain indefinite with respect to attitude verbs. A plain indefinite marked with *-hari* embedded under an attitude verb like *believe* as in (141) is compatible with two readings: non-specific *de dicto* and non-specific *de re* (i.e. (141) will be true in the contexts in (137-b) and (137-c)).

- (141) Mary wiswaasə-kəṛənəwa John kaawə-hari guruwəriy-ak hamu-una kiyəla.
 Mary believe John who-hari teacher-INDF met COMP
 “Mary believes that John met some teacher.”
- a. #Specific *de re* b. ✓Non-specific *de dicto* c. ✓Non-specific *de re*

On the other hand, for a plain indefinite marked with the particle *-də* in Sinhala, only the third reading is available as shown in (142) (i.e. (142) will be true only in the context in (137-c)).

- (142) Mary wiswaasə-kəṛənəwa John kaawə-də guruwəriy-ak hamu-una kiyəla.
 Mary believe John who-də teacher-INDF met COMP
 “Mary believes that John met some teacher.”
- a. #Specific *de re* b. # Non-specific *de dicto* c. : ✓ Non-specific *de re*

As it was discussed in Section 1.6.2, the particles *-hari* and *-də* are positive polarity items in Sinhala that associate with an exhaustivity operator to generate exhaustivity implicatures. Moreover, as it was discussed in Section 2.4.2 and as it will be discussed in Section 3.4.4.2, the pragmatic or felicity conditions for the use of *-hari* and *-də* indefinites are different from those of each other as well as plain indefinites.

I claim that we can account for the third reading of a *-də* indefinite based on the PP behavior (associated with exhaustivity) and pragmatic constraints (domain restrictions)

imposed by the particle *-də* without having to face a scope paradox or over/under generation issues. I claim that the non-specific aspect of the meaning of both *-hari* and *-də* indefinites is derived by way of exhaustification with respect to domain alternatives associated with the indefinite. I also show that the non-specific *de dicto* reading of a *-hari* indefinite can be accounted for based on exhaustification with respect to domain alternatives.

As it was discussed in Section 2.4.2 and as it was noted in the introduction, felicity conditions for *-hari* and *-də* indefinites are different. This is discussed next.

3.4.2.1 Pragmatic conditions for indefinites with *-hari* and *-də*

It is observed that *-hari* and *-də* indefinites exhibit different pragmatic or felicity conditions regarding their context or method of identification. For instance, *-hari* indefinites do not make discriminations regarding the context or method of identification. As shown in (143) and (144), *-hari* indefinites are compatible both in contexts in which the speaker has direct perceptual access to the individual associated with the indefinite and in contexts in which the speaker does not. *-də* indefinites, on the other hand, are only felicitous in contexts in which the speaker has direct (clear) perceptual access to the individual associated with the indefinite as illustrated in (144).²⁷

- (143) a. Mary sees John kissing a teacher far away (blurry vision), and she does not know (has no idea of) the teacher.
 b. balannə, John kauru-hari/#-də guruwəriy-ak imbinawa.
 see, John who-hari/-də teacher-ak kiss
 “See, John is kissing some teacher.”
- (144) a. Mary sees John kissing a teacher close by (clear vision), but she does not know (i.e. the name of) the girl.
 b. balannə, John kauru-də/-hari guruwəriy-ak imbinawa.
 see, John who-də/-hari teacher-ak kiss
 “See, John is kissing some teacher.”

Thus, *-də* indefinites are only felicitous in contexts where the speaker has epistemic access to some facts/property of the individual/domain of the existential claim in the actual world. On the other hand, *-hari* indefinites are felicitous in contexts where the speaker has epistemic access to some facts/property of the individual/domain of the existential claim in the actual world as well as in contexts where the speaker does not have epistemic ac-

²⁷It is also observed that if there is no clear vision context, a speaker will have to have some kind of contextual background for a *-də* indefinite to be used felicitously.

cess to some facts/property of the individual/domain of the existential claim in the actual world.

This way, *-hari* and *-də* indefinites are sensitive to different pragmatic conditions. As it was discussed in Section 2.4.2, *-də* indefinites are also sensitive to different methods of identification: ostension (place); description; naming (cf. Aloni and Port (2001); Aloni and Port (2015)). A speaker using a *-də* indefinite signals that s/he identifies a property of the indefinite in some contextually relevant way, but is ignorant about the witness of the existential claim in some other way. This is crucial in the analysis of the *de-re* aspect of the meaning of a *-də* indefinite with respect to an attitude verb. This is discussed in Section 3.4.4. Before presenting my proposal, I critically review some of the existing accounts.

3.4.3 Existing approaches

Since Russel (1905) or Quine (1956) the concept of intensionality has been discussed mainly from at least three theoretical approaches: the scope based approaches (Russel (1905); Montague (1973); Ladusaw (1977); Stowell (1993)) and the world/situation pronoun or variable binding account (Percus (2000); von Stechow & Heim (2011)) and split intensionality account (Keshet (2008, 2010)).

It is observed that the existing scope or null pronoun based accounts either under-generate or over-generate. I argue that without some constraints, they do not have the capacity to account for the third reading. Following is a critical review of the existing accounts.

3.4.3.1 Scope based theories

The scope accounts (Russel (1905); Montague (1973); Ladusaw (1977)) propose that *de re/de dicto* ambiguity arises as a result of ambiguity in scope configurations with respect to the intensional operator and the DP. For the *de re* reading, the DP has to be evaluated in the actual world and this is satisfied by assuming that the whole DP covertly moves outside of the intensional operator. On the other hand, for the *de dicto* reading, the DP is interpreted within the scope of the intensional operator.

However, Fodor (1970) observed that in addition to the *de re* and *de dicto* readings previously observed for DPs with attitude verbs, there is a third reading. Fodor referred to this reading as the non-specific *de re* reading.

As it was discussed in Section 4.1, this non-specific *de re* reading causes a scope paradox: on the one hand the DP's quantificational force scopes below the intensional operator, but on the other, its restrictor scopes above the intensional operator. Thus, a scope based analysis is not able to handle the derivation of the third reading. In other words, the scope based theories undergenerate.

The accounts of syntactically represented variables for world, time, situation pronouns or operators were proposed to handle the undergeneration issues related to scope based accounts. This is discussed next.

3.4.3.2 Null possible world/situation pronoun theories

This line of approaches (Kamp (1971); Cresswell (1990); Percus (2000); Kratzer (2007); von Stechow & Heim (2011)) assumes that predicates contain a null but syntactically represented possible world/situation pronoun or operator which saturates the world/situation/variable argument of the predicate.

These approaches assume that the ambiguity can be resolved by assuming that different binders for variables occupy different positions in the syntactic structure of a sentence. This is responsible for triggering different interpretations.

However, the concern with this approach (cf. Keshet (2008; 2010)) is that it allows for limitless application of variable operator/pronoun binding. In other words, this can be implemented for the variable operators/pronouns of the right kind or the ad hoc kind. Thus, the world/pronoun/operator variable accounts overgenerate (cf. also Cresswell (1990)).

Noting these issues, Keshet (2008; 2010) proposed his split intensionality theory. This is discussed next.

3.4.3.3 Split intensionality theory

The split intensionality theory (Keshet (2008), Keshet (2010)) is a modified version of scope based theories and improves on the scope based theories by attempting to solve the problem of undergeneration of the scope based theories and the problem of overgeneration of variable binder theories. It relies on an intensional abstraction operator that serves to generate an intension denoting expression from an extension denoting expression. Thus, intensionality is split between an intensionality operator like *believe* and an intensional abstraction operator which is represented as $\wedge$. The relative positions of DPs relative to

the operator $\wedge$, which denotes “up” determine whether a reading is *de dicto* or *de re*. This means that, for a DP to obtain a *de re* interpretation, the DP has to move to a position above the operator. When the DP remains in situ, it is interpreted *de dicto*.

Again, as Keshet (2010) himself admits, in his account, there remains a question about the syntactic status of the operator $\wedge$. There is only an interpretational motivation for the application of the $\wedge$ operator. There is no morphological or any sort of independent empirical motivation (such as agreement) for the insertion of the operator. The operator $\wedge$ is ‘freely insertable’. This proposal makes better predictions overall than the scope based theories. However, even though it improves on pronoun-variable accounts, and it does not overgenerate as much as pronouns, it leaves room for overgeneration mainly because it views the operator $\wedge$ as freely insertable (cf. Keshet (2010)).

In this background, I offer a novel account to derive (particularly) the non-specific *de re* reading of *-də* indefinite based on exhaustification of alternatives and a pragmatic constraint that the particle *-də* places on the alternatives in the domain. This is discussed next.

3.4.4 Deriving the non-specific *de re* and *de dicto* readings

I argue that given its PP character, *-hari* or *-də* induces obligatory exhaustification of alternatives. Exhaustification of alternatives will serve to derive the non-specificity aspect of the meaning by distributing individuals among different belief worlds of the subject, thus the seeming effect of the quantifier scoping below the intensional operator. This, I argue, accounts for the *non-specificity* aspect of the meaning.

I show that obligatory exhaustivity of a *-də* indefinite is linked with a uniqueness presupposition, i.e. that there exists a unique individual satisfying the description for the witness of the existential claim. The uniqueness presupposition is facilitated by one or more stable identificational property/ies (i.e. descriptive content) of the indefinite in the actual world or in all of the speaker’s epistemically accessible worlds (crucially not the subject’s belief worlds). This, I argue, accounts for the *de re* aspect of the meaning.

I first discuss deriving the non-specific *de re* reading of a *-də* indefinite in the next section.

3.4.4.1 Non-specific aspect of the meaning of a *-də* indefinite

As we saw in Section 3.4.2, a *-də* indefinite interacting with an attitude verb gives rise to non-specific or ignorance inferences. I claim that the non specificity aspect of the meaning is derived by way of exhaustification with respect to domain alternatives (inspired by the grammatical approach to derivation of implicatures (cf. Fox (2006); Chierchia et al. (2012); Nicolae (2017)). This is illustrated with the example and derivation in (145) and (146) and the explanation that follows it. The relevant context is (137-c), repeated below.

- (145) Mary wiswaasə kərənəwa John kaawə-də (guruwəriy-ak) hamu-una kiyəla.
 Mary believe do John who-də (teacher) meet-PAST COMP
 “Mary believes that John met someone (teacher).”

CONTEXT: Non-specific *de re*: Mary believes that John met either Sue or Jane.
 But she does not know which one. Sue and Jane are teachers in the actual world.
 Mary may or may not know this.

- (146) a. Mary wiswaasə kərənəwa John kaawə-hari (guruwəriy-ak) hamu-una kiyəla.
 b. $\Box_{\text{Mary}} [G \vee M]$
 c. Domain Implicatures: $\text{Alt}_D (\Box_{\text{Mary}} [G \vee M]) = \{ \Box_{\text{Mary}} G, \Box_{\text{Mary}} M \}$
 $\text{Exh}_D [\Box_{\text{Mary}} [G \vee M]] = \Box_{\text{Mary}} [G \vee M] \wedge \neg \Box_{\text{Mary}} G \wedge \neg \Box_{\text{Mary}} M$
 d. Scalar Implicatures: $\text{Alt}_S (G \vee M) = \{G \wedge M\}$
 $\text{Exh}_S [G \vee M] = [G \vee M] \wedge \neg [G \wedge M]$
 e. Total Meaning: $\Box_{\text{Mary}} [G \vee M] \wedge \Box_{\text{Mary}} \neg [G \wedge M] \wedge \neg \Box_{\text{Mary}} G \wedge \neg \Box_{\text{Mary}} M$

Suppose, Giita and Maala are the individuals/alternatives associated with the indefinite in (145). (Assuming that the general function of indefinites is to introduce alternatives (cf. Kratzer and Shimoyama, 2002).²⁸ In (146-b), we have the LF form of (146-a) without any kind of strengthening or inference drawn. The domain implicatures drawn by exhaustification with respect to domain alternatives: $\{ \Box_{\text{Mary}} G, \Box_{\text{Mary}} M \}$ as in (146-c) result in the uncertainty implicatures: $\Box_{\text{Mary}} [G \vee M] \wedge \neg \Box_{\text{Mary}} G \wedge \neg \Box_{\text{Mary}} M$. This amounts to the meaning that Mary does not believe that the proposition that John met Giita is true and Mary does not believe that the proposition that John met Maala is true. This derives the non-specificity/ignorance aspect of the meaning. The implicature drawn by exhaustification with respect to the scalar alternative/s: $\{G \wedge M\}$ as in (146-d) results in the scalar implicature/s. This amounts to the meaning that Mary believes that the proposition that

²⁸Note that I am following the grammatical approach to derivation of implicatures (cf. Fox, 2006; Chierchia et al., 2012; Nicolae, 2017) rather than the conversational implicatures approach in Kratzer and Shimoyama (2002). However, the idea that the general function of indefinites is to introduce alternatives was first proposed in Kratzer and Shimoyama (2002).

John met both Giita and Maala is false. This gives us the strengthened meaning that Mary believes that John met exactly one of the two individuals.

It is also observed that a *de re* reading associates with a ‘singularity’ intuition. The scalar implicature serves to account for this via uniqueness. The domain implicatures derived by way of exhaustification with respect to domain alternatives give rise to a distributive reading that there are different individuals in different belief worlds of Mary. This accounts for the derivation of the non-specificity aspect of the meaning. Thus, The scalar implicature together with the domain implicature and the assertion gives us the total meaning that there is one particular individual John met and the Mary does not know who/which one. This derives us the ‘uniqueness’ aspect of the meaning as well as the ‘ignorance’ aspect of the meaning of a *-də* indefinite under an attitude verb.

3.4.4.2 Epistemic access: the *de re* aspect of the meaning:

In this section I show that the pragmatic constraints (felicity conditions) of *-də* indefinites (i.e. their acceptability only in contexts with some kind of epistemic access for the speaker) serve to evaluate the restrictor in the actual world relative to the speaker and derive the *de re* aspect of the meaning.

As it was already discussed in Chapter 2, *-hari* and *-də* indefinites in Sinhala fall under a specific class of indefinites called epistemic indefinites (cf: Aloni and Port 2015); Alonso-Ovalle and Menéndez-Benito (2013); Alonso-Ovalle and Menéndez-Benito (2017); Weerasooriya (2017); Weerasooriya (2018)). There has been much interest in the recent literature about epistemic indefinites that place different pragmatic constraints with respect to felicitous use of an indefinite. In the following, I review the earlier discussion and present examples from a sample of existing accounts on the felicity conditions associated with epistemic indefinites in languages. I begin by discussing Alonso-Ovalle and Menéndez-Benito (2017).

As we have already seen, Alonso-Ovalle and Menéndez-Benito (2017) claim that Spanish *algún* is only acceptable in blurry vision contexts. They support their claim with the following example which shows that *algún* indefinites are infelicitous in contexts where the speaker has direct perceptual access to the witness of the existential claim.

- (147) a. L and P are visiting the Math department. They don’t know anything about the people working there, and they haven’t seen any of them before. They

suddenly see an individual, who can be inferred to be a professor, frantically dancing lambada on his desk.

- b. #Mira! algún profesor está bailando encima de la mesa!
 Look! ALGUN professor is dancing on of the table
 Look! Some professor is dancing on the table! (Alonso-Ovalle and Menéndez-Benito, 2017)

This contrast is also observed in Sinhala. For example, Slade (2015) argues that *-hari* indefinites in Sinhala are most felicitous in a context where the speaker sees a person dancing on the table and the person is not fully visible to the speaker.

- (148) kauru-hari mese uda natanawa.
 wh-hari table on dance-PRES
 “Somebody dances on the table.” (Slade 2015)

Analysing the felicity conditions associated with Japanese *nani – ka* and *dore – ka* indefinites, Alonso-Ovalle and Shimoyama (2017) claim that in the context in (149-a), only a *nani – ka* “what-ka” indefinite (as opposed to a *dore – ka* “which-ka” indefinite) is felicitous, as shown in the following examples.

- (149) a. The Troop of Mushrooms
 J and L are hiking in the woods. As they go down a steep hill, they see a troop of mushrooms. J’s hand inadvertently touches one. She clearly sees the mushroom that she touched.
- b. J:#Dore-ka kinoko-ni sawat-ta!
 which.one-KA mushroom-DAT touch-PAST
 “(I) touched which one-ka mushroom!”
- c. J:Nani-ka kinoko-ni sawat-ta!
 what-KA mushroom-DAT touch-PAST
 “(I) touched what-ka mushroom!” (Alonso-Ovalle and Shimoyama, 2017)

This property of epistemic indefinites is characterized in several ways (cf. Aloni (2001); Aloni and Port (2015); Alonso-Ovalle and Menéndez-Benito (2013); Alonso-Ovalle and Menéndez-Benito (2017)). The restrictions placed by some epistemic indefinites on epistemic access is crucial for our analysis. This is discussed next.

Building on Aloni and Port (2001) and Aloni and Port (2015), Alonso-Ovalle and Menéndez-Benito (2017) proposes an account based on what they call “identificational properties”.²⁹ As we have seen, they characterize the identificational properties (for an

²⁹The notions of Conceptual Covers/Identification Methods as in Aloni and Port (2001) and Aloni and

individual, in a world w) as in (150).

- (150) A property P is identificational for an individual d in w iff
- a. In all the worlds w' compatible with d 's beliefs in w , $|\{x : f(w')(x)\}| = 1$,
and
 - b. d believes in w that f is a stable property

They illustrate this as follows. They claim that the sentence in (151) will express a proposition that is defined for w_0 only if (152-a) is true. When this condition obtains, (151) is true only if the truth conditions in (152-b) are satisfied.

- (151) María está besando a algún estudiante!
 María is kissing A ALGÚN student
 María is kissing some student.
- (152) a. $f(\text{STUDENT})$ is not identificational for the speaker of c in w' .
 b. $\exists x[f(\text{STUDENT})(w_0)(x) \ \& \ \text{KISS}_{w_0}(x)(\text{MARIA})]$ (Alonso-Ovalle and Menéndez-Benito, 2017)

They claim that the extension of a proposition expressed based on an identificational property in the world of evaluation is a singleton as derived in (153). They argue that a plausible value for f that pointing will make salient would be the function that combines with a property P and returns the property in (153-a). Then, the restriction of *algún* for (151) would be (153-b). They argue that the sentence in (151) would express the proposition in (154).

- (153) a. $\lambda w. \lambda x. P(x)$ and x is in front of the speaker in w .
 b. $\lambda w. \lambda x. x$ is a student that is in front of the speaker in w .
- (154) $\lambda w. \exists x [\text{STUDENT}_w(x) \ \& \ \text{IN-FRONT-OF-SP}_w(x) \ \& \ \text{KISS}_w(x)(M)]$

They claim that as in (147), an *algún* indefinite is not felicitous in clear vision contexts. They argue that by using *algún*, a speaker signals that she is NOT using a restriction that (i) she believes picks out exactly one individual, and (ii) is a stable property.³⁰

When it comes to domain restriction, a *-dø* indefinite is the opposite of *algún*. Contra *algún*, a speaker using a *-dø* indefinite signals that s/he IS using a restriction that (i) she

Port (2015) were discussed in detail in Section 2.4.2. See Section 2.4.2 or Aloni and Port (2001) and Aloni and Port (2015) for more details.

³⁰According to Alonso-Ovalle and Menéndez-Benito (2017) a stable property holds across times, and having access to a stable singleton property would allow the speaker to pick out the witness.

believes picks out exactly one individual, and (ii) is a stable property. A *-də* indefinite facilitates this restriction by way of its pragmatic constraint of being felicitous in contexts such as the clear vision context (or a context with some epistemic background/access). In this way, a *-də* indefinite provides epistemic access to some kind of identificational property of the witness of the existential claim of the indefinite. This, I argue, serves to evaluate the restrictor in the actual world in relation to the speaker's belief worlds. Thus, anchoring the restrictor to the speaker's belief worlds is responsible for deriving the *de re* aspect of the meaning of a *-də* indefinite. Suppose, a speaker utters (156) in the context of (155).

- (155) CONTEXT: John, Mary and I are at a party thrown by our mother. Mother had also invited two women to the party. I see John talking to one of the women close by. From the white saari she is wearing, I recognize her as some teacher from the local university. Mary hears from someone that John met with one of the two women. Mary also hears that the names of the women are Giita and Maala. She does not know anything else.

Then I report this as in (156).

- (156) Mary *wiswaasə-kərənəwa* John *kaawə-də* *guruwəriy-ak* *hamu-una* *kiyəla*.
 Mary believe John who-də teacher-ak met COMP
 "Mary believes that John met some teacher."

Now, we can import the insights from Alonso-Ovalle and Menéndez-Benito (2017) to derive the *de re* meaning of (156) in the context of (155) as illustrated in (157) based on the contextual information. In (157), we have the function that that combines with a property P and returns the property in (157-a), which is made salient by the epistemic access as depicted in (155). Then, the restriction of the *-də* indefinite in (156) would be (157-b). And, the sentence in (156) would express the proposition in (157-c). As seen in (157-c), the restrictor *guruwəriy-ak* "a teacher" is evaluated in the actual world w_0 with respect to the speaker's belief worlds w' , while the variable x is evaluated in w' with respect to Mary's belief worlds w'' .

- (157) a. $\lambda w. \lambda x. P(x)$ and x wears a white saari in w .
 b. $\lambda w. \lambda x. x$ is a teacher in a white saari seen by the speaker in w .
 c. $\forall w'$: w' is compatible with the speaker's beliefs in w_0 , $\forall w''$: w'' is compatible with Mary's beliefs in w' , $\exists x. x \in \{y: y \text{ is a teacher in } w' \text{ and } y \text{ is in front of the speaker in } w' \text{ and } y \text{ is wearing a white saari in } w' \}$ and John met x in w'' .

Thus, it is seen that the felicity conditions of a *-də* indefinite allow for a speaker to have epistemic access to some kind of identifiable property of the the witness of the existential claim. This serves to evaluate the restrictor of the indefinite in the actual world and derive the *de re* aspect of the meaning. Here, the problem of over-generation associated with pronoun-variable binding accounts is not available as it is constrained by pragmatic conditions of a *-də* indefinite.

At the same time, I speculate that we can apply the same process of deriving the specific *de re* reading of a *-də* indefinite as an alternative to account for deriving the wide scope and ignorance effects of a *-də* disjunction/indefinite with respect to the universal quantifier and the wide scope/no-choice and ignorance effects of a *-də* disjunction/indefinite with respect to a deontic modal (See alternative 2 in Sections 3.2.3.2, 3.3.4.1 and 3.3.4.2). For instance, we accounted for the wide scope reading of a *-də* indefinite with an attitude verb above based on a pragmatic constraint that the particle *-də* places on alternatives in the domain. And, we derived the ignorance inferences of a *-də* indefinite with an attitude verb above based on exhaustification of alternatives. As an alternative, I propose to derive the wide scope and ignorance effects of a *-də* disjunction/indefinite with respect to the universal quantifier and the wide scope/no-choice and ignorance effects of a *-də* disjunction/indefinite with respect to a deontic modal based on the pragmatic constraint and exhaustification of alternatives.

In the next section, I account for the non-specific *de re* and *de dicto* readings of a *-hari* indefinite.

3.4.4.3 Non-specific *de re* reading of a *-hari* indefinite

As we saw in Section 3.4.2, a *-hari* indefinite interacting with an attitude verb gives rise to non-specific or ignorance inferences. I claim that the non specificity aspect of the meaning a *-hari* indefinite with respect to an attitude verb is derived by way of global exhaustification with respect to domain and scalar alternatives. This is illustrated with the example and derivation in (158) and (159) and the explanation that follows it.

(158) Mary wiswaasə kərənəwa John kaawə-hari (guruwəriy-ak) hamu-una kiyəla.
 Mary believe do John who-hari (teacher) meet-PAST COMP
 “Mary believes that John met someone (teacher).”

(159) a. Mary wiswaasə kərənəwa John kaawə-hari (guruwəriy-ak) hamu-una kiyəla.
 b. $\Box_{\text{Mary}} [G \vee M]$
 c. Domain Implicatures: $\text{Alt}_D (\Box_{\text{Mary}} [G \vee M]) = \{ \Box_{\text{Mary}} G, \Box_{\text{Mary}} M \}$

- $$Exh_D [\Box_{Mary} [G \vee M]] = \Box_{Mary} [G \vee M] \wedge \neg \Box_{Mary} G \wedge \neg \Box_{Mary} M$$
- d. Scalar Implicatures: $Alt_S (\Box_{Mary} [G \vee M]) = \{\Box_{Mary} [G \wedge M]\}$
 $Exh_S (\Box_{Mary} [G \vee M]) = \Box_{Mary} [G \vee M] \wedge \neg \Box_{Mary} [G \wedge M]$
- e. Total Meaning: $\Box_{Mary} [G \vee M] \wedge \neg \Box_{Mary} G \wedge \neg \Box_{Mary} M \wedge \neg \Box_{Mary} [G \wedge M]$

Suppose, Giita and Maala are the individuals/alternatives associated with the indefinite in (158). In (159-b), we have the LF form of (159-a) without any kind of strengthening or inference drawn. The domain implicatures drawn by exhaustification with respect to domain alternatives: $\{\Box_{Mary} G, \Box_{Mary} M\}$ as in (159-c) result in the uncertainty implicatures: $\Box_{Mary} [G \vee M] \wedge \neg \Box_{Mary} G \wedge \neg \Box_{Mary} M$. This amounts to the meaning that Mary does not believe that the proposition that John met Giita is true and Mary does not believe that the proposition that John met Maala is true. This derives the non-specificity/ignorance aspect of the meaning. The implicature drawn by global exhaustification with respect to the scalar alternative/s: $\{\Box_{Mary} [G \wedge M]\}$ as in (159-d) results in the weak scalar implicature/s. This amounts to the meaning that Mary does not believe that the proposition that John met both Giita and Maala is true, which expresses ignorance with respect to the conjunctive alternative.

We discussed in the previous section that a *de re* reading associates with a ‘uniqueness’ aspect of the meaning. The weak scalar implicature of a *-hari* indefinite as derived in (159-d) is compatible with the uniqueness aspect of the meaning. In other words, the LF as derived in (159-e) is compatible with a context where John met exactly one of the two individuals. We observed in Section 1.6.3, that a *-hari* indefinite is also compatible with a clear vision context. This shows that a *-hari* indefinite is compatible with context with some kind of epistemic access to the witness of the existential claim. This accounts for the compatibility of a *-hari* indefinite with a *de re* reading with respect to an attitude verb. The domain implicatures derived by way of exhaustification with respect to domain alternatives give rise to a distributive reading that there are different individuals in different belief worlds of Mary. This accounts for the derivation of the non-specificity aspect of the meaning.

This way, I account for the compatibility of a non-specific *de-re* meaning of a *-hari* indefinite with respect to an attitude verb in Sinhala. In the next section, I discuss accounting for the non-specific *de dicto* meaning of a *-hari* indefinite.

3.4.4.4 Non-specific *de dicto* reading of a *-hari* indefinite

We observed that a *-hari* indefinite is also compatible in a context where there is no epistemic access (i.e. a blurry vision context) to the witness of the existential claim. I claim that a non-specific *de dicto* reading of a *-hari* indefinite is available in such a context where there is no way to evaluate the restrictor in the actual world by way of an identificational property or something as such, but the alternatives associated with the indefinite are evaluated with respect to Mary's belief worlds. Note that the LF as derived in (159-e) is logically equivalent to (160).

$$(160) \quad \Box_{Mary} [G \vee M] \wedge \Diamond_{Mary} \neg G \wedge \Diamond_{Mary} \neg M \wedge \Diamond_{Mary} \neg [G \wedge M]$$

The LF in (160) is compatible with a nonspecific reading of the alternatives associated with the indefinite. Thus, I claim that in the absence of epistemic access to an identificational property, a *-hari* indefinite with respect to an attitude verb will be compatible with a non-specific *de – dicto* reading.

3.5 Conclusions

In this chapter we discussed the different semantic effects pertaining to *-hari* and *-də* disjunctions and indefinites in contexts of the universal quantifier, modals and attitude verbs. We saw that *-hari* and *-də* disjunctions/ indefinites give rise to different scope and epistemic effects with respect to the universal quantifier, deontic modals and attitude verbs.

I showed that a *-hari* disjunction/indefinite gives rise to a narrow scope reading of the disjunction/indefinite in contexts of the universal quantifier, deontic modals or attitude verbs. The narrow scope effects of a *-hari* disjunction/indefinite were derived by way of matrix exhaustification with respect to domain and scalar alternatives. The narrow scope reading of a *-hari* disjunction/indefinite was shown to be ambiguous between one with an ignorance inference and one without (with respect to the universal quantifier); and between one with an ignorance inference and one with free-choice (with respect to a deontic modal). Ignorance inferences of *-hari* disjunctions/indefinites in contexts of the universal quantifier, modals and attitude verbs (i.e. the non-specificity aspect) were derived by way of exhaustification with respect to epistamically modalized domain and scalar alternatives. We accounted for obviation of ignorance inferences of a *-hari* disjunction/indefinite with respect to the universal quantifier by way of exhaustification with respect to non-modalized domain and scalar alternatives. We derived free-choice effects of a *-hari* disjunction/indefinite with respect to a deontic modal by way of recursive exhaustification of deontically modalized domain alternatives.

I showed that a *-də* disjunction/indefinite gives rise to a wide scope reading of the disjunction/indefinite and obligatory ignorance inferences in the context of the universal quantifier, a deontic modal or attitude verb. As in the case of *-hari* disjunctions/indefinites, we accounted for the ignorance inferences of *-də* disjunctions/indefinites in contexts of the universal quantifier, modals and attitude verbs (i.e. the non-specificity aspect) by way of exhaustification with respect to epistemically modalized domain and scalar alternatives. We saw that the Exh operator as defined in Fox (2007) appears to fall short of deriving the wide-scope effects of a *-də* disjunction/indefinite with respect to the universal quantifier, deontic modal and an attitude verb. We explored two alternative solutions. The first one was to use the Fox defined Exh operator and assume that the alternatives are closed under conjunction (following an insight from Spector (2016)). This was shown to derive a stronger meaning to account for the wide scope effects. The second one was to account for the wide scope effect by way of a felicity condition on epistemic access (pragmatic constraint) that the particle *-də* places on the alternatives in the domain of a *-də* disjunction/indefinite.

Chapter 4

Summary and Conclusions

4.1 Introduction

In this study, we examined the grammar of the particles *-hari* and *-də*, that systematically appear across disjunction and indefinite constructions in Sinhala from a new perspective. We saw that the syntax/semantics (especially of the particle *-də*) have mostly been analyzed in terms of either Q(-uestion) Operators (i.e. Kishimoto (2005)) or Choice Functions (i.e. Hagstrom (1998); Cable (2010); Slade (2011); among many others). Then, with a very naive intuition that the morpho-syntax/semantics of the two particles may be different, we observed data with respect to disjunctions and indefinites formed with the two particles in new contexts such as negation, the universal quantifier, modals and attitude verbs. We came out with new insights to propose a novel analysis of the particles *-hari* and *-də* based on their positive polarity behavior. In the following sections, I offer a summary of the main data points, theoretical arguments and claims made in this thesis. I also present predictions for cross-linguistics applications/generalizations and implications and directions for future research.

4.2 The two particles *-hari* and *-də* as PPIs and consequences

We observed that the two particles *-hari* and *-də* appear attached to individual alternatives in disjunctions or wh-words (IDPs) in indefinites and questions. We proposed that these are contexts that involve alternatives. Accordingly, we claimed in this study that the two particles *-hari* and *-də* are alternative sensitive particles (cf. also Slade (2011)). We also observed that the two particles *-hari* and *-də* are not semantically licensed under immediate scope of negation. Based on this observation, it was claimed that the two particles are positive polarity items (PPIs) in Sinhala. Following Spector's (2014) analysis of the French disjunctions *soit-soit* and *ou*, it was also claimed that as PPIs the two particles

-hari and *-də* associate with an exhaustivity operator. This was crucially the central point of this study. The main arguments of the study were centered on the finding that the particles *-hari* and *-də* are PPIs associated with exhaustivity. The thesis studied the effects of the application of exhaustivity associated with the particles *-hari* and *-də* on the alternatives under their scope when they are placed in the contexts of modals, the universal quantifier and attitude verbs.

4.3 Morpho-syntax of the particles *-hari* and *-də* and exhaustivity

We saw that the exhaustivity inferences and their implications associated with PPIs such as French disjunction *soit-soit* and *ou* had already been discussed in the literature (cf. Spector (2014); Nicolae (2016; 2017)). However, these proposals did not establish links between morpho-syntactic properties/requirement of these items and exhaustivity (i.e. the operator). In this thesis, we have proposed that there is a link between the morpho-syntactic requirements/properties of the particles *-hari* and *-də* and exhaustivity (i.e. the operator). Crucially, we analyzed the morpho-syntax of the particles *-hari* and *-də* as carrying an uninterpretable exhaustivity [*unExh*] feature. We also argued that an implicit exhaustivity operator carrying an interpretable exhaustivity [*inExh*] feature appears at the matrix level of the syntactic structure of a *-hari* or *-də* disjunction or indefinite construction at LF. Thus, we claimed that exhaustivity implicatures were generated by way of the uninterpretable exhaustivity [*unExh*] feature of the particles *-hari* and *-də* being checked with the interpretable exhaustivity [*inExh*] feature of the exhaustivity operator. We also observed that the PP behavior of the two particles *-hari* and *-də* is different (i.e. *-hari* is a mild PPI and *-də* is a strong PPI) and the differences in their PP behavior have consequences on the derivation and non/cancelability of inferences such as ignorance inferences. In order to account for the differences in the PP behavior of the two particles *-hari* and *-də*, we claimed that the particle *-də* comes with a [+] morpho-syntactic locality requirement with respect to the exhaustification of the scalar alternative/s. This was presented as a domain condition on feature checking: that the [*unExh*] feature of *-də* must be checked in the local domain (within the CP that contains it) with respect to an operator/quantifier with the universal/existential quantification force. This was shown to result in the scalar alternative/s associated with *-də* being negated locally (within the CP that contains it). We also argued that the particle *-hari* is not marked for a domain condition.

4.4 Deriving ignorance

We observed that disjunctions and indefinites formed with the two particles *-hari* and *-də* give rise to ignorance inferences. We argued for two ingredients each of which is neces-

sary, but not sufficient to generate ignorance inferences of a *-hari* or *-də* disjunction or indefinite expression. These conditions were: [1] the domain must have more than one alternative (i.e. an anti-singleton domain); [2] the disjunction/indefinite has to be a positive polarity item (PPI) associated with exhaustification of alternatives. It was claimed that exhaustification (based on PP behavior of the two particles) with respect to an anti-singleton domain of alternatives serves for generation of ignorance inferences. We argued for a distribution requirement (DR) with respect to possible worlds epistemically accessible to the speaker to derive the right truth conditions for ignorance inferences. The DR was presented as: given the assertion of a disjunction that involves two alternatives *p*, *q*, there is at least one world epistemically accessible to the speaker where *p* is false and there is at least one world epistemically accessible to the speaker where *q* is false. This distribution requirement for both *-hari* and *-də* disjunctions and indefinites was shown to be derived from a common source: by way of exhaustification with respect to epistemically modalized domain alternatives. Thus, ignorance inferences of *-də* disjunctions and indefinites were derived by way of matrix (global) exhaustification of domain alternatives. Exclusivity implicatures of alternatives associated with *-də* disjunctions and indefinites were derived by way of local exhaustification of scalar alternative/s with respect to the doxastic operator. The [+locality] morpho-syntactic requirement of the particle *-də* served for the associated scalar alternative/s to be exhaustified locally. We also argued that a *-hari* disjunction or indefinite gives rise to ignorance with respect to both individual (i.e. domain) and conjunctive (i.e. scalar) alternatives. Thus, ignorance inferences of *-hari* disjunctions and indefinites were derived by way of matrix (global) exhaustification with respect to scalar as well as domain alternatives associated with *-hari* disjunctions or indefinites.

4.5 Canceling ignorance

We also observed that the ignorance inferences of a *-hari* disjunction or indefinite can be canceled while those of a *-də* disjunction or indefinite can not be canceled. Accounting for the non/cancelability of the ignorance inferences of a *-hari* or *-də* disjunction or indefinite, it was claimed that there is a correlation between non/cancelability of ignorance implicatures and the strength of a PPI. We argued that cancelability of the ignorance inferences of a *-hari* disjunction or indefinite is related to the weak PP behavior of *-hari*, while non-cancelability of the ignorance inferences of a *-də* disjunction is related to the strong PP behavior of *-də*. It was claimed that when the scalar alternative/s of a *-də* disjunction/indefinite are exhaustified under the doxastic operator, it gives rise to a strong scalar implicature. We argued that the strong scalar implicature of *-də* prevents the conjunctive alternative from being true in any of the worlds epistemically accessible

to the speaker. We showed that this plus the distribution requirement for ignorance inferences prevents any alternative from being true in all the worlds epistemically accessible to the speaker. This accounted for the non-cancelability of ignorance inferences of a *-də* disjunction/indefinite. It was claimed that when ignorance inferences of a *-hari* disjunction/indefinite are canceled, a reanalysis of domain implicatures are made to cancel the uncertainty implicatures drawn by exhaustification with respect to domain alternative/s. The reanalysis was shown to be done via recursive exhaustification with respect to domain alternatives which allows for at least one alternative to be true in all the worlds epistemically accessible to the speaker, which is compatible with knowledge.

4.6 Scope and ignorance

We saw that *-hari* and *-də* disjunctions and indefinites with respect to the universal quantifier, modals and attitude verbs give rise to different scope effects and different epistemic inferences.

We observed that a *-də* disjunction/indefinite gives rise to wide scope effects of the disjunction/indefinite and obligatory ignorance inferences in the contexts of the universal quantifier, deontic modals or attitude verbs. We claimed that ignorance inferences are derived by way of exhaustification with respect to epistemic domain alternatives of a *-də* disjunction/indefinite. We argued that the Exh operator as defined in Fox (2007) operating on a set of alternatives in Sauerland's (2004) procedure falls short of deriving the wide-scope effects of a *-də* disjunction/indefinite with respect to the universal quantifier, deontic modals and attitude verbs. We speculated that a Fox defined Exh operator with a set of alternatives closed under conjunction (cf. Spector (2016)) can derive a stronger meaning to account for the wide scope effects. As an alternative, we also explored the possibility to account for the wide scope effect by way of a felicity condition on epistemic access (pragmatic constraint) that the particle *-də* places on the alternatives in the domain of a *-də* disjunction/indefinite.

We observed that a *-hari* disjunction/indefinite generates narrow scope effects in the contexts of the universal quantifier, deontic modals or attitude verbs. We also saw that the narrow scope reading of a *-hari* disjunction/indefinite is ambiguous between one with an ignorance inference and one without. We claimed that ignorance inferences are derived by way of exhaustification with respect to epistemic alternatives of a *-hari* disjunction/indefinite. Obviation of ignorance inferences were accounted for by way of exhaustification with respect to domain and scalar alternatives below the doxastic operator.

4.7 Free/no-choice and ignorance

It was observed that *-hari* and *-də* disjunctions and indefinites give rise to free choice and no-choice effects and different epistemic inferences relative to the differences with respect to deontic possibility and necessity modals. We offered a semantic analysis and derivations to account for the free-choice and no-choice effects and associated epistemic inferences based on the PP character and exhaustivity implicatures of *-hari* and *-də* disjunctions and indefinites in the contexts of deontic necessity and possibility modals.

The wide scope/no-choice effects of *-də* disjunction/indefinite with respect to deontic modals were proposed to derive by way of a Fox defined Exh operator with a set of alternatives closed under conjunction. As it was explained above, this was a result of a Fox (2007) defined Exh operator not being able to account for the wide scope/no-choice reading. As in the case of the DP universal quantifier, as another option, we also showed that we can account for the wide scope effect by way of a felicity condition on epistemic access (pragmatic constraint) that the particle *-də* places on the alternatives in the domain of a *-də* disjunction/indefinite.

In the narrow scope reading of a *-hari* disjunction/indefinite, ignorance inferences were derived by way of exhaustification with respect to epistemic domain alternatives. Free choice effects were derived by way of recursive exhaustification with respect to deontic domain alternatives.

4.8 De re and ignorance

We saw that disjunctions and indefinites with the particles *-hari* and *-də* trigger non-specific *de re* and *de dicto* readings of indefinites with respect to attitude verbs (crucially, a specific *de re* reading is missing for these indefinites). We accounted for the non-specific *de re* and *de dicto* readings by way of exhaustification with respect to domain and scalar alternatives and by way of pragmatic conditions that the two particles *-hari* or *-də* place on alternatives in a domain. We claimed that the descriptive content of a *-hari* or *-də* indefinite can be evaluated separately from its quantificational force/content relative to the actual world and the speaker. Given their PP character, the non-specificity aspect of the meaning was derived by way of distributing individuals among the belief worlds of the subject by exhaustification with respect to domain alternatives introduced by an indefinite.

The *de re* aspect of the meaning was accounted for based on the pragmatic conditions imposed by a *-hari* or *-də* indefinite for the speaker to have access to some property/

descriptive content of the indefinite in the actual world. We showed a link between exhaustification with respect to the scalar alternative/s of a *-də* indefinite and a uniqueness presupposition, i.e. that there exists a unique individual satisfying description for the witness of the existential claim. The uniqueness presupposition was shown to be facilitated by one stable identificational property (i.e. descriptive content) of the indefinite in the actual world or in all of the speaker's epistemic worlds (crucially not the subject's belief worlds). A *-hari* indefinite in its narrow scope reading with respect to an attitude verb was shown to be compatible with both non-specific *de re* and non-specific *de dicto* readings.

4.9 Predictions for cross-linguistics applications/generalizations

We observed that the particles *-hari* and *-də* systematically appear across constructions such as disjunctions, indefinites and questions in Sinhala. We find many languages in the world that make use of the same particle/s in disjunctions, indefinites and questions in a fashion similar to *-hari* or *-də* in Sinhala. For instance, as we discussed in Section 1.5, Japanese makes use of the particle *-ka* in a fashion similar to *-hari* and *-də* in Sinhala (cf. also Weerasooriya (2018)). Tlingit makes use of the particle *-sa* in fashion similar to *-də* in Sinhala (cf. Cable (2010)). Malayalam makes use of the particle *-oo* in a fashion similar to *-də* in Sinhala (cf. Slade (2011)). However, in all these accounts, these particles have been analyzed in the contexts of indefinites and questions and treated as a Q-quantifier or Q-question operator. At the same time, the grammars of these particles (even in the one that included disjunctions as in Slade (2011)) have been analyzed in matrix contexts. After examining the multitude of effects that the particles *-hari* or *-də* generate when they are placed in the contexts of negation, the universal quantifier, modals and attitude verbs, it seems advisable to observe the grammar of similar particles in other languages in new contexts as we did for the particles *-hari* or *-də* in Sinhala. We saw that an analysis of the particles *-hari* and *-də* as PPIs equipped us with new insights to better account for the grammar of these particles. The insights drawn from the analysis of the particles *-hari* and *-də* as PPIs in new contexts may also be applied cross-linguistically to analyze the grammar of similar particles in other languages from new perspectives. For instance, Weerasooriya (2018) extended the analysis of the particle *-də* as a PPI to an analysis of the particle *-ka* in Japanese as a PPI. Weerasooriya (2018) accounted for the derivation and non/cancelability of ignorance inferences associated with disjunctions and indefinites formed with these particles based on the positive polarity status (strength) of two particles. Thus, new cross-linguistic generalizations may be drawn with respect to the grammar of similar particles in other languages based on new analyses and the conclusions drawn.

Following Spector (2014), we have proposed an analysis of disjunction in terms of a

PPI. We have derived exclusivity and inclusivity implicatures based on PP behavior of disjunction (i.e. based on the strength of a PPI). However, we are not sure yet how productive or how powerful this system to be applied cross-linguistically is. For instance, we know the English disjunction *or* is not a positive polarity item, but French disjunction *soit-soit* and Hungarian disjunction *vagy* are PPIs. We have seen that the exclusivity component of French disjunction *soit-soit* is derived as a PPI in Spector (2014). But, when exhaustivity is applied to an item like English disjunction, it is considered to be optional (cf. Nicolae (2017); Fox (2007); Chierchia (2012), among many others). Then, it is interesting to explore whether exhaustivity can be used to explain cross-linguistics variability with respect to disjunction. It is still not clear whether it is a language specific fact that disjunctions or indefinites in some languages are PPIs? For instance, we have extensively discussed that the behavior of Spanish *algún* indefinites are epistemic indefinites. In Section 2.4.5, we saw that English *some* is a PPI and in certain contexts English *some* indefinites are epistemic indefinites. But, we have not explored whether Spanish *algún* is a PPI or not. Then, it is interesting to explore what kind of predictions made in this thesis can be applicable to similar items in other languages.

We argued that the particles *-hari* and *-də* impose different morpho-syntactic requirements for their domain of grammatical operations such as feature checking. For instance, we argued that the [*unExh*] feature of *-də* (for the scalar alternative) must be checked in the local domain (i.e. within the CP that contains it) with respect to an operator/quantifier with the universal/existential quantification force. This was shown to result in the scalar alternative/s associated with *-də* being negated locally. This was based on the fact that the conjunctive interpretation of disjunction for *-də* can never be recovered or rescued for the particle *-də*. It is worthwhile to study whether similar kind of constraints work across languages. For instance, we saw that the French disjunction *soit-soit* is identical Sinhala *-də* in many respects. However, we also saw that its conjunctive interpretation can be rescued with an even number of DE operators. Thus, it will be important to examine whether a similar locality constraint is available for French disjunction *soit-soit* and more broadly for PPI disjunctions in other languages that give rise to exclusivity implicatures.

4.10 Questions with the particle *-də*

In Section 1.4, we observed that the particle *-də* is also used in all Yes/No, alternative and constituent questions in Sinhala. Particle *-də* in questions is actually the one that has been analyzed most in the previous accounts (cf. Kishimoto (2005); Hagstrom (1998); Cable (2010); Slade (2011); among many others). We treated the particle *-də* as a positive polarity item associated with obligatory exhaustivity. Then, as the particle *-də* is also

used in questions, we could explore the possibility of extending the exhaustivity based approach to an analysis of questions in Sinhala from a new perspective. However, an exhaustivity based analysis of questions has been outside the scope of this thesis. There have been influential proposals in the literature to analyze questions and answers by way of exhaustivity based approaches (cf. Groenendijk and Stokhof (1984); Lahiri (1991); Heim (1994); Rullmann (1995)). More recently, Xiang (2016) has discussed interpreting questions with non-exhaustive answers. Thus, it is important to explore whether the same treatment of the particle *-də* as an exhaustivity particle can be extended to the analysis of questions in Sinhala. However, this requires thorough investigation, which is outside the scope of this thesis. In the future work, I plan to take this up for investigation.

4.11 Implications and directions for future research

In this section, I point to three domains for future research. It was observed in Section 1.6.2 that even though the Sinhala positive polarity item *-də* patterns with French *soit-soit* in many ways such as their exclusivity implicatures and strength of positive polarity, the positive polarity behavior of the two items in Sinhala and French is different. For instance, we saw that the narrow scope interpretation of *soit-soit* can be rescued with an even number of DE operators. We also saw that the narrow scope interpretation of *-də* can not be rescued even with an even number of DE operators. This could be due to the fact that, as we observed in Section 1.4, a disjunction expression with *-də* in Sinhala is odd without a clause similar to *I do not know who/what/which* following it (even though, this is not observed for indefinite constructions formed with the particle *-də*). At this point, we are not sure what the underlying processes are. A study of the implications associated with a comparison between Sinhala *-də* and French *soit-soit* is left for future research.

We cast the derivations with respect to *-hari* and *-də* disjunctions and indefinites based on the grammatical approach to calculation of implicatures (cf. Fox (2007); Chierchia et al. (2012); Meyer (2013); Nicolae (2017), among many others). We saw that the semantics of these particles have, for the most part, been analyzed in terms choice functions (cf. Hagstrom (1998); Cable (2010)). Especially, Slade (2011) derived the semantics of disjunctions and indefinites formed with both the particles *-hari* and *-də* with choice functions. We, however, observed that the existing accounts were limited to the analysis of the particles to matrix contexts. When we analyze the particles in the contexts of negation, we found evidence that they are PPIs and studied their grammar in terms of exhaustivity. Thus, we saw that an exhaustivity based analysis is an interesting, convincing and effective approach to the analysis of these particles. I have not attempted to show that a reformulated version of choice-functions does not work for an analysis of the grammar

of these particles with the new insights drawn. One may as well take it up to study the grammar of these particles with a reformulated version of choice-functions.

We discussed that derivation of implicatures such as ignorance and scalar implicatures has for a long time been a topic entertained in the domain of pragmatics. We offered an account of deriving such implicatures as grammaticalized implicatures. We have an account of derivation of scalar implicatures based on syntactic notion of locality requirement (i.e. that the [*unExh*] feature of *-də* with respect to scalar alternative/s must be checked in the local domain (within the CP that contains it)). Thus, for both syntactic position and operations for the particle *-də* with respect to scalar alternative/s are clearly marked. We have just argued that the [*unExh*] feature of *-hari* with respect to scalar alternative/s must be checked globally (outside the CP that contains it) when deriving ignorance inferences. However, we still do not have a clear picture of the syntactic position of the exhaustivity operator for global exhaustification of alternatives. This requires further investigation.

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