On deriving and canceling ignorance

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Abstract. The goals of this paper are two. First, it argues for a distribution requirement (DR: ◇ ¬ p ∧ ◇ ¬ q, derived with respect to the worlds epistemiclly accessible to a speaker) to account for the ignorance implicatures (IIs) of ***-hari*** and ***-də*** marked disjunctions and indefinites in Sinhala (Indo Aryan, Sri Lanka). Second, it claims that the choice of non/cancelation of these IIs does not depend on whether they are conversational or not, but rather on the differences in the positive polarity (PP) behavior (weak vs. strong: cf. Spector, 2014) of the two particles. It casts its proposal in the grammatical approach to derivation of implicatures (cf. Fox, 2007; Chierchia et al., 2012; Meyer, 2013; Nicolae, 2017; a.m.o.).

Keywords: disjunction, indefinites, positive polarity, exhaustivity, ignorance.

1. Introduction

Disjunctions and indefinites formed with the particles ***-hari*** and ***-də*** in Sinhala (Indo Aryan, Sri Lanka) give rise to ignorance implicatures (IIs) as shown in (1) and (2). However, the IIs of ***-hari*** disjunctions and indefinites can be canceled as shown in (1) while those of ***-də*** disjunctions and indefinites can not be canceled as also shown in (2).

(1) a. John Gita-**-hari** Mala-**-hari** hamuuna. æthtətə, man dannəwa kawə-də kiyəla.
John Gita-hari Mala-hari met. in fact I know who-də COMP
"John met Gita or Mala (⇝The speaker does not know who). In fact, I know who."
EPISTEMIC IMPLICATURE: The speaker does not know who.
IMPLICATURE CANCELATION: The speaker knows who.

b. John kawə**-hari** hamuuna. æthtətə, man dannəwa kawə-də kiyəla.
John wh-hari met. in fact I know who-də COMP
"John met somebody (⇝The speaker does not know who). In fact, I know who. "
EPISTEMIC IMPLICATURE: The speaker does not know who.
IMPLICATURE CANCELATION: The speaker knows who.

(2) a. John Gita**-də** Mala**-də** hamuuna. #æthtətə, man dannəwa kawə-də kiyəla.
John Gita-də Mala-də met. in fact I know who-də COMP
"John met Gita or Mala (⇝The speaker does not know who). In fact, I know who."
EPISTEMIC IMPLICATURE: The speaker does not know who.
IMPLICATURE CANCELATION: #The speaker knows who.

b. John kawə**-də** hamuuna. #æthtətə, man dannəwa kawə-də kiyəla.
John wh-də met. in fact I know who-də COMP
"John met somebody (⇝The speaker does not know who). In fact, I know who. "
EPISTEMIC IMPLICATURE: The speaker does not know who.
IMPLICATURE CANCELATION: #The speaker knows who.

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At the same time, the particles ***-hari*** and ***-də*** are positive polarity items (PPIs) (i.e. they are anti-licensed in the (immediate) scope of negation) as shown in (3a). However, a conjunctive (inclusive) interpretation of ***-hari*** disjunctions can be rescued (or recovered) with another down ward entailing (DE) operator as shown in (3b) while that of ***-də*** disjunctions can not be rescued (or recovered) as seen in (3c).[2]

(3) a. John Gita**-hari/-də** Mala**-hari/-də** dækk-e næ.
John Gita-hari/-də Mala-hari/-də saw-E not
"John did not see Gita or he did not see Mala. $\surd$ -hari/-də (OR) > NEG / *NEG > -hari/-də (OR)

b. 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." *-hari/-də (OR) > NEG > NEG / $\surd$ NEG > NEG > -hari/-də (OR)

c. John Gita**-də** Mala**-də** dækk-e næ kiyala penennə næ.
John Gita-də Mala-də saw-E neg COMP appear neg
"It is unlikely that John did not see Gita or Mala." $\surd$ -hari/-də (OR) > NEG > NEG / *NEG > NEG > -hari/-də (OR)

Thus, *-hari* is a mild PPI (i.e. *-hari* carries a weak exclusivity implicature) while *-də* is a strong PPI (i.e. *-də* carries a very strong exclusivity implicature: cf. Spector (2014) for the analysis of *ou* vs. *soit-soit* in French). The PP character and the differences in the PP behavior of the two particles bear on significant consequences in accounting for the non/cancelability of the IIs as well as deriving the DR responsible for the IIs of the disjunctions and indefinites.

Deriving the ignorance inferences of *-hari* and *-də* disjunctions and indefinites as in (1) and (2), I show that speaker ignorance requires every alternative in the domain to be false in at least one world epistemically accessible to the speaker. Accordingly, I present this as a requirement with respect to the truth conditions associated with the epistemic alternatives available to the speaker and represent it as a distribution requirement (DR) of the worlds epistemically accessible to the speaker. In deriving the DR, given their PP character, I assume that *-hari* and *-də* associate with an implicit exhaustivity operator (*Exh*) placed in the syntactic structure of a disjunction/indefinite construction (inspired by Spector (2014) for the analysis of *soit-soit* in French associating with an *Exh* operator as discussed in Section 2.1). Following Alonso-Ovalle (2006) and Kratzer and Shimoyama (2002), I assume that disjunctions/indefinites introduce (contextually relevant) alternatives that can expand up to be propositions and the particles such as *-hari* and *-də* are alternative sensitive particles that impose conditions on them (as discussed in Section 3.2.1). I also mark a difference between domain and scalar/maximal alternatives associated with disjunctions and indefinites for the distinctive effects that they generate (cf also. Sauerland (2004) for disjunctions as discussed in Section 3.2.5). I also speculate that a covert assertoric/doxastic operator akin to an epistemic necessity modal ($\Box$) scopes above a disjunctions/indefinite construction at LF (cf. Alonso Ovalle and Menénde Benito (2010) and Nicolae (2017) as discussed in Section 3.2.2). Accordingly, the DR responsible for the IIs of both *-hari* and *-də* disjunctions/indefinites is uniformly derived by way of exhaustification of a disjunction/indefinite with respect to the epistemically modalized domain alternatives (inspired

[2]The same PP character and behavior are observed in *-hari* and *-də* indefinites. I am using the disjunction examples here as the conjunctive/inclusive interpretation of alternatives is more transparent in disjunctions.

by Sauerland, 2004; Alonso Ovalle and Menénde Benito, 2010; Meyer, 2013 and Nicolae, 2017).

Accounting for the cancelability of IIs of *-hari* disjunctions and indefinites, I show a co-relation between the WPP behavior and the weak/optional scalar implicatures (WSIs) of *-hari* disjunctions/indefinites. I argue that the implicatures of *-hari* disjunctions/indefinites can be re-analyzed/re-calibrated due to its WPP behavior to derive an inclusive interpretation of the alterrnatives associated with the disjunction/indefinite. Accounting for the non-cancelability of IIs of *-də* disjunctions and indefinites, I argue that, given its strong PP behavior giving rise to an obligatory SI, *-də* prevents itself from being re-analyzed/re-calibrated or licensed under a second *Exh* or DE operator which will give rise to a weaker meaning (inspired by Spector's account of SPP behavior of French *soit – soit* disjunction as discussed in Section 2.1). Thus, I show that the SSIs of *-də* disjunctions/indefinites have consequences for strengthening the IIs already derived of them as domain implicatures leading to non-cancelability.

The paper is organized as follows. Section 2 presents the empirical and theoretical background pertaining to the choice of the grammatical approach for the derivations of implicatures in this paper. Section 3 formally accounts for the derivation of the IIs of both *-hari* and *-də* disjunctions and indefinites in a uniform manner by way of the DR due to their PP character. Section 4 accounts for the non/cancelability of IIs of *-hari* and *-də* disjunctions and indefinites due to the differences in the PP behavior of the two particles. Section 5 presents the summary and conclusions.

2. Background on grammatical approach to implicature calculation

The grammatical approach to implicature calculation (Fox, 2007; Chierchia et al., 2012; Meyer, 2013; Nicolae, 2017; 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. 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 (4a) with the speaker's intention to convey (4c) is represented in (4b) with the insertion of the operator O_{Exh}:

(4) 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.

At the same time, Fox (2007) and Chierchia et al. (2012) note that *Exh* for derivation of implicatures for *or* in English is optional. However, recently Spector (2014) argues that disjunctions such as French *soit-soit* obligatorily associate with an *Exh* operator due to its PP character. Implications of Spector's account for the analysis of the particles *-hari* and *-də* are discussed next.

2.1. Positive polarity items and obligatory exhaustivity

Spector (2014) claims that *soit-soit* disjunction as a PPI tends to give rise to more robust exclusivity inferences or exhaustivity effects than those of *ou* as illustrated in the following examples.

(5) 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."

(6) 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 notes that the exclusivity inference for *ou* disjunction is optional based on its compatibility with the continuation "Absolutely! She will even go both days " as seen in (5). However, as seen in (6), he notes that the exclusivity inference of *soit-soit* is obligatory, 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 SIs while SIs are generally optional for *ou* disjunctions. Due to its obligatory scalar inferences, Spector argues that the distribution of PPIs such as *soit-soit* is related to the distribution requirement of an exhaustivity operator as shown in (7).

(7) *soit-soit* must occur in the scope of an exhaustivity operator. (Spector (2014))

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

In light of Spector (2014), the particles *-hari* and *-də* exhibit behavior similar to those of *ou* and *soit-soit* respectively with respect to non/optionality of implicatures. For instance, the disjunction sentence with *-hari* as in (1a) will be true in a situation where John met one of Gita or Mala or even both. As shown in (8), the fact that it can be continued with "even both" shows that the SI is optional for a *-hari* disjunction sentence.

(8) John Gita-hari Mala-hari hamuuna. æththətə, eyaa ee dennawə-mə hamuuna
John Gita-hari Mala-hari met in fact he those two-EMPH met
"John met Gita or Mala. In fact, he even met both."

On the other hand, the disjunction expression with *-də* as in (2a) will be true only in a situation where John met exactly one of Giita or Maala. As shown in (9), the fact that it can not be continued with "even both" shows that only an exclusive reading is true of the *-də* disjunction and thus the SI is obligatory for it.

(9) John Gita-də Mala-də hamuuna. #æththətə, eyaa ee dennawə-mə hamuuna
John Gita-də Mala-də met in fact he those two-EMPH met
"John met Gita or Mala. In fact, he even met both."

Following the evidence that exclusivity implicatures for *ou* disjunction are optional, Spector notes that exhaustivity operator for *ou* disjunction is optional as opposed its counterpart disjunction *soit-soit*. Inspired by Spector (2014), I assume that *-də* in Sinhala associates with an obligatory implicit *Exh* operator. However, different from Spector, building on Nicolae

(2017), I argue that the particle *-hari* also associates with the exhaustivity operator, given its PP character responsible for generation of IIs. Nicolae (2017) argues that even though the SI of *ou* disjunction is optional, in unembedded contexts *ou* gives rise to IIs. As discussed in the previous section, Nicoale argues that exhaustification with respect to epistemically modalized domain alternative is responsible for the IIs of *ou* disjunction. Hence, Nicolae claims that *ou* obligatorily associates with an *Exh* operator for domain exhaustification. As discussed in Section 1, *-hari* disjunctions and indefinites in a manner similar to *ou* disjunctions generate IIs. Accordingly, I assume that both the particles *-hari* and *-də* associate with an implicit *Exh* operator.

Thus, given their PP character and obligatory exhaustivity, I argue that the particles *-hari* and *-də* associate with an *Exh* operator placed in the syntactic structure of a *-hari* and *-də* disjunction/indefinite construction as discussed in Section 3.2.5. So, for the alternatives introduced by *-hari* and *-də* disjunctions/indefinites, I argue that the exhaustification is factored into the grammatical structure by way of this *Exh* operator.

Thus, I offer an account based on the PP character and differences in 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 IIs. The background and implications associated with the DR to account for the IIs of the two types of disjunctions and indefinites are discussed next.

3. On Deriving IIs of *-hari* and *-də* disjunctions and indefinites

My goal in the following sections is to formally account for the derivation of the ignorance component of both *-hari* and *-də* disjunctions and indefinites. Despite the differences in the PP behavior of the two particles, I make a proposal that can uniformly account for the derivation of the ignorance component of both *-hari* and *-də* disjunctions and indefinites by way of a distribution requirement (DR) with respect to the worlds epistemicaly accessible to a speaker. This is discussed in the next section.

3.1. A DR to account for IIs of *-hari* and *-də* disjunctions and indefinites

The requirement for the distribution of alternatives among accessible worlds has been much discussed for deriving free-choice (FC) effects of disjunction or indefinites under deontic necessity or possibility modals. (cf: Zimmermann, 2001; Kratzer and Shimoyama, 2002; Alonso OvaIIe, 2006; Fox, 2007; Menéndez-Benito, 2010; among many others). I argue that, like for FC, there is a DR for IIs (as in the examples in (1) and (2)) with respect to the worlds epistemically accessible to a speaker. Note that speaker knowledge (i.e. the speaker *knowing who/what, etc*) minimally requires at least one alternative in a domain of quantification to be true in all the worlds epistemically accessible to a speaker. So, the requirement for speaker ignorance (i.e. the speaker *not knowing who/what, etc* is to prevent any alternative from being true in all the worlds epistemically accessible to a speaker. This requirement is satisfied when every alternative is false in at least one world epistemically accessible to the speaker. I present this as a distribution requirement with respect to the worlds epistemically accessible to a speaker as in the following. ,

(10) $\Box (p \vee q) \wedge \Diamond \neg p \wedge \Diamond \neg q$
(Given the epistemic assertion of two alternatives p and q in the domain of an indefi-

nite, 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 propose to derive this DR by exhaustification with respect to epistemically modalized domain alternatives of *-hari* and *-də* disjunctions and indefinites. In the next section, I present the theoretical tools and assumptions used in the derivation of the DR.

3.2. Theoretical tools and assumptions on deriving the DR for IIs

In Section 1, we observed that disjunctions and indefinites with both *-hari* and *-də* express ignorance in an identical way. Accordingly, I propose to derive the ignorance component of both *-hari* and *-də* disjunctions and indefinites in a uniform manner: by exhaustifying with respect to epistemic domain alternatives.

First, we need to charactrize the alternatives. Given the fact that *-hari* and *-də* are alternative sensitive particles and following Kratzer and Shimoyama (2002) and Alonso-Ovalle (2006), I assume that the general function of disjunctions and indefinites is to introduce contextually relevant alternatives and the particles *-hari* and *-də* impose conditions on them. This is discussed next.

3.2.1. Disjunctions and indefinites as introducing alternatives

Kratzer and Shimoyama (2002) analyzing Japanese indeterminate and German *irgendein* phrases argue that, like focus (cf. Rooth, 1985), indefinites too introduce sets of alternatives that can develop upto be propositions, by way of Hamblin Functional Application.[3] Following Kratzer and Shimoyama (2002), Alonso-Ovalle (2006) proposes to analyze disjunction in terms of alternative semantics. Thus, building on Kratzer and Shimoyama (2002) and Alonso-Ovalle (2006), I assume that both *-hari* and *-də* disjunctions and indefinites introduce contextually relevant alternatives that expand upto be propositions. The existential operator is assumed to scope over the propositional alternatives.

In the characterization of epistemic alternatives, I assume that assertions are implicitly modalized. Accordingly, I assume that a covert assertoric/doxastic operator akin to an epistemic necessity modal scopes above a disjunction/indefinite construction at LF. This is discussed in the next section.

3.2.2. The 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; Gazdar, 1979; among many others). At the same time, Kratzer and Shimoyama (2002), Alonso-Ovalle and Menéndez-Benito (2003), Sauerland (2004), Chierchia (2004), 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 and indefinites.

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

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 argue that assertions are implicitly modalized, which serves to derive the epistemic effects of an indefinite construction without a modal. They define the assertoric operator as in (11).

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

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′.

Given the modal effects of *-hari* and *-də* disjunctions and indefinites, 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/indefinite sentence. I employ an assertoric operator defined as in (11) by Alonso-Ovalle and Menéndez-Benito (2010) for the derivation of the epstemic effects of the two types of disjunction and indefinite sentences. I present this assertoric/doxastic operator as a necessity epistemic modal represented with □ in the derivations.

As discussed in Section 2.1, given their positive polarity behavior and inspired by Spector (2014) I assume that the two particles *-hari* and *-də* as PPIs also associate with an exhaustivity operator. We discussed the notion of exhaustivity in Section 2 as serving to derive implicatures as grammaticalized implicatures. Now, the definition of the exhaustivity operator to be used in the derivations is discussed in the next section.

3.2.3. The exhaustivity operator for derivations

The exhautivity operator as in Fox (2007) with the notion of innocent exclusion (IE) incorporated into the definition of *Exh* has been quite influential in recent proposals deriving implicatures. I opt to use an *Exh* operator with innocent exclusion incorporated in it for the derivations in this paper. I discuss the motivation for this option as in the following with examples.

Consider the sentence in (12a). The alternatives for the sentence in (12a) can be preliminarily identified as the ones given in (12b).

(12) a. 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}.

All the alternatives in (12b) asymmetrically entail the disjunction in (12a). As a result, if an *Exh* (without innocent exclusion) as in (13) applies to the sentence in (12a), it generates the inconsistent propositions as illustrated in (14).

(13) $\text{Exh}\ (A_{<st,t>})\ (p_{st})\ (w) \Leftrightarrow p\ (w) \wedge \forall\ q \in A\ (q \neq p \rightarrow \neg q\ )$
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.

(14) 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 (15). In other words, the strengthened implicature together with the assertion as in (15) entails that the speaker knows that Sue talked to Fred, which is incorrect.

(15) a. *Exh* [Sue talked to John or Fred]=
b. Sue talked to John or Fred & Sue did not talk to John ⇒ 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 (16).

(16) $[[\text{Exh}]]\ (A_{<st,t>})\ (p_{st})\ (w) \Leftrightarrow p\ (w) \wedge \forall\ q \in \text{I.E}\ (p,A) \rightarrow \neg q\ (w)$

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 (17).

(17) $\text{I.E}\ (p,A) = \cap \{A' \subseteq A: A' \text{ is a maximal sub set of A s.t. } A'\neg \cup \{p\} \text{ is consistent } \}$
$A\neg = \{\neg p: p \in A\}$

Given a proposition p and a set of alternatives A, innocent exclusion I.E (p,A) excludes a maximal set of propositions in A such that its exclusion is consistent with the prejacent. Only the propositions that are in the intersection (i.e. in every one of the sets) can be excluded innocently (non-arbitrarily).

Now, *Exh* with I.E applied to a disjunction sentence as in (12a) 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 (18).

(18) 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. I.E = {Sue talked to John and Fred}
d. Sue talked to John or Fred & Sue did not talk to John and Fred.

We will see that in both deriving and canceling IIs, employing an *Exh* operator as defined in (16) will not result in an inconsistent set of propositions.

Due to their PP character, the particles *-hari* and *-də* appear to carry some intrinsic lexical properties, I argue that exhaustification is partially determined by the lexical requirements of the particles *-hari* and *-də* as also noted in Section 2.1. The implications associated this move are discussed next.

3.2.4. The particle-operator concord

Building on much of the accounts discussed below, I argue for an agreement relation account between lexical items and grammatical operators such as the *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 [∃], [∀], [Neg], [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. 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 [*un*Exh] feature. Thus, obligatory exhaustivity is treated as a morphological requirement/ lexical property of the particles *-hari* and *-də* represented by an uninterpretable exhaustivity [*un*Exh] feature. Then, this lexical property is factored into the grammar by way of the *Exh* operator carrying an equivalent interpretable exhaustivity [*in*Exh] 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 (cf. also Chierchia, 2013). I argue for a syntactic agreement/feature checking relation between the particles *-hari* and *-də* carrying an uninterpretable exhaustivity [*un*Exh] feature and *Exh* operator carrying an interpretable exhaustivity [*in*Exh] feature in the generation of implicatures.

Given the distinctive roles and effects of domain and scalar alternatives on derivation and non/cancelability of IIs, I implement a system that *Exh* targets domain and scalar alternatives separately on an individual basis in a single structure/derivation. This is discussed next.

3.2.5. Characterizing domain and scalar implicatures

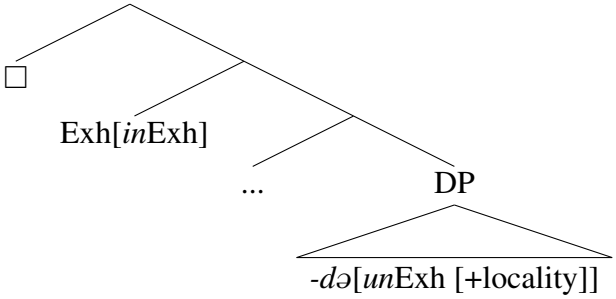
I show that domain implicatures are responsible for IIs while scalar implicatures have consequences for non/cancelability of IIs. Due to these distinctive effects and inspired by Sauerland (2004), I present the derivations in a two layered approach with exhaustification applied to domain and scalar alternatives separately on an individual basis in the same structure/derivation. Following Gazdar (1979), Sauerland (2004) in his Neo-Gricean approach to implicature calculation employs the κ-operator (epistemic certainty operator) to derive ignorance (”epistemic uncertainty”) expressed in a disjunction as in (19) in terms of primary and secondary implicatures. Thus, for a disjunction statement in the form A or B, the primary implicatures are as in (19a) and the primary implicature of the scalar alternative is strengthened into a secondary implicature as in (19b).

(19) a. Primary implicatures of A or B
$\neg\ \kappa$ A
$\neg\ \kappa$ B
$\neg\ \kappa$ (A and B)

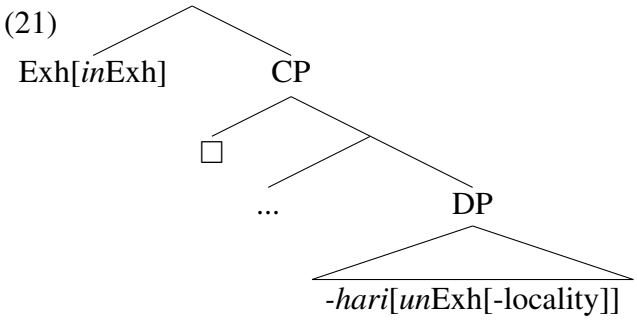
b. Secondary implicatures of A or B
$\kappa \neg$ (A and B)

Thus, inspired by Sauerland (2004), I implement a system that targets domain and scalar alternatives separately in a single derivation. When the *Exh* operator targets domain alternatives, I mark it as Exh_D, and when the *Exh* operator targets scalar alternatives, I mark it as Exh_S . The agreement system and the two layered approach as implemented here also allows us to derive the differences between *-hari* and *-də* disjunction sentences. Essentially, I argue that the two particles *-hari* and *-də* come with a [+] or [-] morpho-syntactic locality requirement with respect to exhaustification of the scalar alternative/s: [+locality] for *-də* and [-locality] for *-hari*. I show that these requirements are domain conditions on feature checking: the [*un*Exh] 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 (20). This is responsible for the strong SIs of *-də* disjunctions and indefinites. On the other hand, the [*un*Exh] feature of *-hari* must be checked globally with respect to the doxastic operator (i.e. above the doxastic operator and outside the CP that contains it), as illustrated in (21). This results in the scalar alternative/s associated with *-hari* being negated globally (i.e. outside the CP domain that contains it) which is responsible for the weak SIs of *-hari* disjunctions and indefinites.

(20)



(21)



These non/locality requirements have consequences for strong and weak interpretations of *-də* and *-hari* disjunctions as discussed in Section 4.

With all these assumptions and tools in hand, the DR responsible for the IIs of *-hari* and *-də* disjunctions is derived as in the next section.

3.3. Deriving the DR for IIs of ***-hari*** and ***-də*** disjunctions and indefinites

As seen in (22), the alternatives for a disjunction expression with the particles *-hari* and *-də* in (1a) and (2a) (repeated here in (22)) are Gita and Mala. I propose to derive the DR by way of matrix exhaustification of disjunction with respect to epistemically modalized domain alternatives as in (23), and the explanation that follows it.

(22) John Gita-hari/-də Mala-hari/-də hamuuna.
John Gita-hari/-də Mala-hari/-də met
"John met Gita or Mala: $\rightsquigarrow$The speaker does not know who."

(23) a. [[$O_{[inExhD]}$] [CP [ModP [M □] [∃ [TP [DP John] [VP [V hamuun-a] [DP Gita-hari/-də DP Mala-hari/-də$_{[unExh]}$]]]]
b. Assertion: □ [G ∨ M]
c. Domain Implicatures: Alt_D (□ [G ∨ M]) = {□ G, □ M}
Exh_D [□ [G ∨ M]] = □ [G ∨ M] ∧ ¬ □ G ∧ ¬ □ M

In (23a), we have the disjunction construction with the two alternatives and particles carrying an uninterpretable *Exh* feature (i.e. [*un*Exh]). The covert assertoric operator/emistemic modal (i.e. □) scopes above the disjunction expression with the two alternatives that are existentially closed before it. The covert exhahustivity operator (O_{Exh}) with its interpretable *Exh* feature (i.e. [*in*Exh]) scopes over the assertion outside the CP domain that contains it. Assertion of the disjunction with the two alternatives is represented in (23b). The domain implicatures drawn by matrix exhaustification of disjunction with respect to domain alternatives result in the ignorance implicatures as seen (23c).

Crucially, the implicatures derived in (23c) serve to destribute the negated domain alternatives among the worlds epistemically accessible to the speaker. The LF as derived in (23c) is equivalent to: □ [G ∨ M] ∧ ◇ ¬ G ∧ ◇ ¬ M. This prevents at least one alternative from being true in all the worlds epistemically accessible to the speaker and satisfies the DR responsible for IIs.

At the same time, I account for the IIs of *-hari* and *-də* indefinites based on the analysis of the derivation of the IIs 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 as discussed in Section 3.2.5. Assume that we have three alternatives {Gita, Mala, Sita} in the contextual domain of the indefinites with the two particles as in (1b) and (2b) (repeated here in (24)).

(24) John kawə-hari/-də hamuuna.
John wh-hari/-də met.
"John met somebody: ⇝The speaker does not know who. "

(25) a. [[$O_{[inExhD]}$ [CP [ModP [M □] [∃ [TP [DP John] [VP [V hamuuna] [DP kawə-hari/-də$_{[unExh]}$]]]]
b. Assertion: □ [G ∨ M ∨ S]
c. Domain Implicatures: Alt_D (□ [G ∨ M ∨ S]) = {□ G, □ M, □ S}
Exh_D [□ [G ∨ M ∨ S]] = □ [G ∨ M ∨ S] ∧ ¬ □ G ∧ ¬ □ M ∧ ¬ □ S

In (25a), we have the indefinite construction with the two particles carrying an uninterpretable *Exh* feature (i.e. [*un*Exh]). The covert emistemic modal (i.e. □) scopes above the indefinite expression existentially closed before it. The covert exhahustivity operator (O_{Exh}) with its interpretable *Exh* feature (i.e. [*in*Exh]) scopes over the assertion. Assertion of the indefinite with the three alternatives at LF is represented in (25b). Exhaustification with respect to domain alternatives result in the ignorance implicatures as seen (25c).

Crucially, the implicatures derived in (25c) serve to destribute the negated domain alternatives among the worlds epistemically accessible to the speaker. The LF as derived in (25c) is equivalent to: □ [G ∨ M ∨ S] ∧ ◇ ¬ G ∧ ◇ ¬ M ∧ ◇ ¬ S. This prevents at least one alternative from being true in all the worlds epistemically accessible to the speaker and satisfies the DR

responsible for IIs.

Thus, this account proposes a grammatical account to derive the IIs of both disjunctions and indefinites formed with the two particles. The grammatical account is motivated by the lexico-syntactic properties of the two particles *-hari* and *-də* as discussed in Section 3.2.4.

At the same time, as we observed in Section 1, the nature of ignorance expressed by disjunctions and indefinites with the two particles is different with respect to their non/cancelability conditions. In the next section, I also propose to account for the non/cancelability of IIs of the two types of disjunctions and indefinites based on the grammatical properties of the two particles.

4. On non/cancelability of IIs of *-hari* and *-də* disjunctions and indefinites

In this section, I account for the non/cancelability of IIs of *-hari* and *-də* disjunctions and indefinites due to the differences in the PP behavior of the two particles. Thus, it is claimed that even the non/cancelability of the IIs of these disjunctions and indefinites is predicted in the grammar of these particles. There has been a long tradition in linguistics to treat cancelable implictures as conversational implicatures and non-cancelable implicatures as conventional implicatures. The background and implications of these approaches are discussed next.

4.1. Approaches to implicature non/cancelation

Implicatures have traditionally been categorized as "conventional implicatures" and "conversational implicatures". One difference traditionally established between conversational and conventional implicatures is that conversational implictures 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 argue that the choice between cancelability and non-cancelability of IIs of *-hari* disjunctions/indefinites does not depend on whether they are conversational or not, but rather on the morpho-syntactic properties of the two particles. We will see that properties associated with non/cancelability of implicatures are incorporated and predicted in the grammar of these particles.

4.2. Canceling IIs of *-hari* disjunctions and indefinites

As I argued in Section 3.3, exhaustification of disjunction with respect to domain alternatives derives the DR responsible for IIs. Suppose, a speaker utters the disjunction sentence with *-hari* in (1a) as in (26) (without cancellation of ignorance). The implicatures as derived as in (23c) serve for the DR responsible for IIs.

(26) John Gita-hari Mala-hari hamuuna.
John Gita-hari Mala-hari met
"John met Gita or Mala: ⇝The speaker does not know who."

However, the *-hari* disjunction expression in (26), is compatible with any of the continuations in (27) (claiming ignorance) or (28) (canceling ignorance).

(27) John Gita-hari Mala-hari hamuuna. man dann-e næ kaawə-də kiyəla.
John Gita-hari Mala-hari met I know not who/which COMP
"John met Gita or Mala. I don't know who."

(28) John Gita-hari Mala-hari hamuuna. man dannəwa kaawə-də kiyəla.
John Gita-hari Mala-hari met I know who/which COMP
"John met Gita or Mala. I know who."

Accounting for these facts, I show that there is a correlation between a *-hari* disjunction being a WPPI and the cancelable behavior of the IIs of a *-hari* disjunction. I argue that this is correlated with the weak claim with respect to the conjunctive alternative of a *-hari* disjunction. For instance, the IIs of a *-hari* disjunction expression derived for (26) prior to any kind of continuation as in (27) or (28) (i.e. as in the implicatures in (23c)) entails a weak implicature with respect to the scalar alternative as shown in (29).

(29) $\Box [G \vee M] \wedge \neg \Box G \wedge \neg \Box M \Rightarrow \neg \Box [G \wedge M]$

Thus, as opposed to what happens with *-də* as seen in the next section, there is no obligatory strengthening of the expression with a scalar implicature for *-hari*. This way, $\neg \Box (G \wedge M)$ only implies that the speaker does not know/believe that $G \wedge M$ is true. Accordingly, $\neg \Box [G \wedge M]$ is compatible with two states of affairs. On 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 (30a). On the other, it is also compatible with $\Box \neg (G \wedge M)$ (i.e. the speaker believes that $G \wedge M$ is false) as represented in (30b).

(30) a. $\Box [G \vee M] \wedge \neg \Box \neg [G \wedge M] = \Box [G \vee M] \wedge \Diamond [G \wedge M]$
b. $\Box [G \vee M] \wedge \Box \neg [G \wedge M] = \Box [G \vee M] \wedge \neg \Diamond [G \wedge M]$

Now the task at hand is to account for the WPP semantics of (29) and its role in canceling IIs. As we discussed before, the character of a WPPI is that the narrow/in-situ interpretation of the item in question can be recovered or rescued with extraclausal negation or by an even number of DE operators. Note that the implicatures in (23c) has asymmetrically entailed implicatures as shown in (31).

(31) $\Box [G \vee M] \wedge \neg \Box G \wedge \neg \Box M \Rightarrow \Box [G \vee M] \wedge \Diamond G \wedge \Diamond M.$

Like the two sides of the same coin, their truth conditions are different. For instance, if derived independently, the implicatures $\Box [G \vee M] \wedge \Diamond G \wedge \Diamond M$ are compatible with both a conjunctive interpretation of disjunction and the speaker knowing who. This is only possible due to the weak claim of *-hari* with respect to the scalar alternative which is compatible with an inclusive interpretation.

Thus, due to its lack of obligatory strengthening of IIs generated by *-hari* disjunctions/indefinites, I argue that the domain implicatures derived as in (25c) can be re-calibrated (re-parsed/re-analyzed) to derive implicatures compatible with an inclusivity implicature. The domain implicatures of the *-hari* disjunction as in (25c) can be re-analyzed/re-calibrated by way of recursive exhaustification as in (32) (See also Nicolae (2017) for the disjunction *ou* in French.).

(32) a. $Exh_D [\Box [Exh_D [G \vee M]]]$
b. $Alt_D (G \vee M) = \{G, M\}$
c. $Exh_D [G \vee M] = [G \vee M]$
d. $Alt_D(\Box Exh_D [G \vee M]) = \{\Box Exh_D G, \Box Exh_D M\}$
$= \{ \Box [G \wedge \neg M], \Box [M \wedge \neg G] \}$
e. $Exh_D \Box Exh_D [G \vee M] = \Box [G \vee M] \wedge \neg \Box [G \wedge \neg M] \wedge \neg \Box [M \wedge \neg G]$

The implicatures as derived in (33e) are equivalent to: □ [G ∨ M] ∧ ◇ G ∧ ◇ M. This does not prevent at least one alternative from being true in all the worlds epistemically accessible to the speaker and is compatible with a situation where the speaker knows who John met.

In accounting for the cancelability of IIs of *-hari* indefinites, I fallow the same account as for the cancelation of the IIs of *-hari* disjunctions. This is tenable 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 as discussed in Section 3.2.4.

(33) a. Exh_D [□ [Exh_D [G ∨ M ∨ S]]]
b. Alt_D (G ∨ M ∨ S) = {G, M, S }
c. Exh_D (G ∨ M ∨ S) = [G ∨ M ∨ S]
d. Alt_D(□ Exh_D (G ∨ M ∨ S)) = {□ Exh_D G, □ Exh_D M, □ Exh_D S}
= { □ (G ∧ ¬ M), □ (M ∧ ¬ G), □ (G ∧ ¬ S), □ (M ∧ ¬ S) }
e. Exh_D □ Exh_D (G ∨ M ∨ S) = □ [G ∨ M ∨ S] ∧ ¬ □ [G ∧ ¬ M] ∧ ¬ □ [M ∧ ¬ G] ∧ ¬ □ [G ∧ ¬ S] ∧ ¬ □ [M ∧ ¬ S]

The implicatures as derived in (33e) are equivalent to: □ [G ∨ M ∨ S] ∧ ◇ G ∧ ◇ M ∧ ◇ S. Like for the disjunctiojn, this does not prevent at least one alternative from being true in all the worlds epistemically accessible to the speaker and is compatible with a situation where the speaker knows who John met.

4.3. Non-cancelability of IIs of *-də* disjunctions and indefinites

As we discussed above, the SI of a *-də* disjunction is strong and obligatory. I account for the strong scalar implicature of a *-də* disjunction by way of *Exh* operator applied locally (i.e. below the doxastic operator as discussed in Section 3.2.5) with respect to the scalar alternative as derived in (34).

(34) Alt_S (G ∨ M) = { G ∧ M}
□ Exh_S (G ∨ M) = □ G∨ M ∧ □ ¬ [G ∧ M]

By the union of the domain and scalar implicatures (cf. (23c) and (34)), the total meaning of a *-də* disjunction as in (2a) repeated here in (35) is computed as in (36).

(35) John Gita-də Mala-də hamuuna. #æthtə, man dannəwa kawə-də kiyəla.
John Gita-də Mala-də met. in fact I know who-də COMP
"John met Gita or Mala: ⇝The speaker does not know who. In fact, I know who. "

(36) a. [[$O_{[inExhD]}$] [CP [ModP [M □] [[$O_{[inExhS]}$] [∃ [TP [DP John] [VP [V hamuuna] [DP Gita-də Mala-də $_{[unExh]}$]]]]
b. Assertion: □ [G ∨ M]
c. Scalar Implicatures: Alt_S (G ∨ M) = { G ∧ M}
□ Exh_S (G ∨ M) = □ G∨ M ∧ □ ¬ [G ∧ M]
d. Domain Implicatures: Alt_D (□ [G ∨ M]) = {□ G, □ M }
Exh_D [□ [G ∨ M]] = □ [G ∨ M] ∧ ¬ □ G ∧ ¬ □ M
e. Total meaning: □ [G ∨ M] ∧ □ ¬ [G∧M] ∧ ¬ □ G ∧ ¬ □ M

In (36a), we have the disjunction construction with the two alternatives and the particle carrying an uninterpretable *Exh* feature (i.e. [*un*Exh]). The covert assertoric operator/emistemic modal

(i.e. □) scopes above the disjunction expression with the two alternatives existentially closed before it. The first covert exhahustivity operator for scalar alternatives (O_{ExhS}) with its interpretable *Exh* feature (i.e. [*in*Exh]) scopes below the doxastic operator (i.e. due to the constraint on local exhaustification). The second covert exhahustivity operator for domain alternatives (O_{ExhD}) with its interpretable *Exh* feature (i.e. [*in*Exh]) scopes over the doxastic operator (i.e. outside the CP domain that contains it). In (36c), we have the strong scalar implicature derived by local exhaustifcation with respect the scalar alternative. In (36d), we have the domain implicatues drawn by exhaustification with respect to epistemic domain alternatives. In (36e), we have the total meaning of a *-də* disjunction by the union of domain and scalar implicatures which gives rise to the meaning that the speaker knows that John met exactly one of Giita or Maala and the speaker does not know who.

The implicatures as derived in (36e) are equivalent to: □ [G ∨ M] ∧ ◇ ¬ G ∧ ◇ ¬ M ∧ ¬ ◇ (G ∧ M). Thus, the strong scalar implicature has consequences for strengthening the IIs derived of *-də* disjunction as in (23c)/(36d) leading to non-cancelability.

I extend the same analysis of the non-cancelability of *-də* disjunctions to that of *-də* indefinites. As for the *-də* disjunctions, the strong scalar implicatures of a *-də* indefinite are derived by way of exhaustification applied locally (i.e. below the doxastic operator) with respect to the scalar alternatives as in (37).

(37) Scalar Implicatures: Alt_S (G ∨ M ∨ S) = {G∧M, G∧S, M∧S, G∧M∧S}
□ Exh_S (G ∨ M ∨ S) = □ [G ∨ M ∨ S] ∧ □ ¬ [G∧M] ∧ □ ¬ [G∧S] ∧ □ ¬ [M∧S] ∧ □ ¬ [G∧M∧S]

Accordingly, the total meaning of a *-də* indefinite as in (2b) repeated here in (38) is derived as in (39).

(38) John kawə-də hamuuna. #æthtətə, mamə dannəwa kawə-də kiyəla.
John wh-də met. in fact I know who-də COMP
"John met somebody: ⇝The speaker does not know who. In fact, I know who. "

(39) a. [[$O_{[inExhD]}$] [ModP [M □] [[$O_{[inExhS]}$] [∃ [TP [DP John] [VP [V hamuun-a] [DP kaawə-hari/-də$_{[unExh]}$]]]]
b. Assertion: □ [G ∨ M ∨ S]
c. Scalar Implicatures: Alt_S (G ∨ M ∨ S) = {G∧M, G∧S, M∧S, G∧M∧S} □ Exh_S (G ∨ M ∨ S) = □ [G ∨ M ∨ S] ∧ □ ¬ [G∧M] ∧ □ ¬ [G∧S] ∧ □ ¬ [M∧S] ∧ □ ¬ [G∧M∧S]
d. Domain Implicatures: Alt_D (□ [G ∨ M ∨ S]) = {□ G, □ M, □ S}
Exh_D [□ [G ∨ M ∨ S]] = □ [G ∨ M ∨ S] ∧ ¬ □ G ∧ ¬ □ M ∧ ¬ □ S
e. Total meaning: □ [G ∨ M ∨ S] ∧ □ ¬ [G∧M] ∧ □ ¬ [G∧S] ∧ □ ¬ [M∧S] ∧ □ ¬ [G∧M∧S] ∧ ¬ □ G ∧ ¬ □ M ∧ ¬ □ S

The LF as derived in (39e) is equivalent to: □ [G ∨ M ∨ S] ∧ ◇ ¬ G ∧ ◇ ¬ M ∧ ◇ ¬ S ∧ ¬ ◇ (G ∧ M) ∧ ¬ ◇ (G ∧ S) ∧ ¬ ◇ (M ∧ S) ∧ ¬ ◇ (G ∧ M ∧ S). Thus, the strong scalar implicatures have consequences for strengthening the IIs already derived of a *-də* indefinite as in (2b) leading to non-cancelability.

5. Summary and conclusions

Due to the positive polarity (PP) character of the two particles: *-hari* and *-də* associated with exhautivity, this paper first argued for a distribution requirement with respect to the worlds epistemiclly accessible to a speaker to account for the ignorance implicatures of *-hari* and *-də* marked disjunctions and indefinites in Sinhala. This requirement was shown to prevent any alternative from being true in all the worlds epistemically accessible to a speaker which is responsible for ignorance implicatures constraining *knowing who*. Accounting for the cencelability of ignorance implictures of *-hari* disjunctions and indefinites, the optional scalar implicature/s of *-hari* due to its weak positive polarity behavior were shown to license (under a re-analysis) one or more alternatives being true in all the worlds epistemically accessible to a speaker which is compatible with the speaker *knowing who*. Accounting for the non-cencelability of ignorance implictures of *-də* disjunctions and indefinites, the obligatory scalar implicature/s of *-də* due to its strong positive polarity behavior were shown to constrain licensing (under a re-analysis) one or more alternatives being true in all the worlds epistemically accessible to a speaker which is responsible for obligatory ignorance implictures. It also extended the application of exhaustivity based approaches that were mostly limited to the domain of disjunction in recent proposals (cf. Meyer, 2013; Nicolae, 2017; a.m.o.) to the domain of indefinites to address certain issues still in debate in that domain.

References

Alonso-Ovalle, L. (2006). *Disjunction in alternative semantics*. Ph. D. thesis, University of Massachusetts, Amherst.

Alonso-Ovalle, L. and P. Menéndez-Benito (2003). Some epistemic indefinites. In *Proceedings of NELS*, Volume 33, pp. 1–12.

Alonso-Ovalle, L. and P. Menéndez-Benito (2008). Minimal domain widening. In *Proceedings of the 27th West Coast Conference on Formal Linguistics*, pp. 36–44. Somerville, MA: Cascadilla Proceedings Project.

Alonso-Ovalle, L. and P. Menéndez-Benito (2010). Modal indefinites. *Natural Language Semantics 18*(1), 1–31.

Bellert, I. (1969). On the use of linguistic quantifying operators in the logico-semantic structure representation of utterances. In *International Conference on Computational Linguistics*. Stockholm: KVAL.

Chierchia, G. Fox, D. and B. Spector (2012). Scalar implicature as a grammatical phenomenon. In Claudia Maienborn, Paul Portner and Klaus von Heusinger (eds.), *Semantics: An international handbook of natural language meaning,* vol. 3, 2297-2331. Berlin and Boston: de Gruyter.

Chierchia, G. (2004). Scalar implicatures, polarity phenomena, and the syntax/pragmatics interface. *Structures and beyond 3*, 39–103.

Chierchia, G. (2013). *Logic in grammar: Polarity, free choice, and intervention*. OUP Oxford.

Fox, D. (2007). Free choice and the theory of scalar implicatures. In Penka Stateva and Uli Sauerland (eds.), *Presupposition and implicature in compositional semantics,* 537-586. New York, NY: Palgrave-Macmillan.

Gazdar, G. (1979). *Pragmatics, implicature, presuposition and logical form.* Academic Press, N.Y.

Grice, H. P. (1975). Logic and conversation? In P. Cole and J. Morgan (eds.) *syntax and*

semantics, volume 3: Speech Acts.
Grice, H. P. (1989). *Studies in the Way of Words*. Harvard University Press, Cambridge, MA.
Horn, L. R. (1972). *On the semantic properties of logical operators in English.* Ph. D. thesis, University of California, Los Angeles, CA.
Kratzer, A. (2005). Indefinites and the operators they depend on: From Japanese to Salish. *Reference and quantification: The Partee effect*, 113–142.
Kratzer, A. and J. Shimoyama (2002). Indeterminate pronouns: The view from Japanese. In Y. Otsu (eds.), *Proceedings of the 3rd Tokyo conference on psycholinguistics*, 1-25. Tokyo: Hituzi Syobo.
Levinson, S. C. (2000). *Presumptive meanings: The theory of generalized conversational implicature*. MIT Press.
Menéndez-Benito, P. (2010). On universal free choice items. *Natural Language Semantics 18*(1), 33–64.
Meyer, M. C. (2013). *Ignorance and Grammar*. Ph. D. thesis, Massachusetts Institute of Technology.
Nicolae, A. C. (2017). Deriving the positive polarity behavior of plain disjunction. *Semantics and Pragmatics 10(5). 1-21*.
Potts, C. (2002). The syntax and semantics of As-parentheticals. *Natural Language & Linguistic Theory 20*(3), 623–689.
Potts, C. (2005). *The logic of conventional implicatures*. Oxford University Press.
Rooth, M. (1985). *Association with focus*. GLSA, Dept. of Linguistics, University of Massachusetts, Amherst.
Sauerland, U. (2004). Scalar implicatures in complex sentences. *Linguistics and philosophy 27*(3), 367–391.
Spector, B. (2014). Global positive polarity items and obligatory exhaustivity. *Semantics and Pragmatics 7*(11), 1–61.
Stalnaker, R. (1978). Assertion. *Syntax and Semantics 9*, 315–332.
Zimmermann, T. E. (2001). Free choice disjunction and epistemic possibility. *Natural language semantics 8*(4), 255–290.