Inquisitive Logical Triviality and Grammar

MSc Thesis *(Afstudeerscriptie)*

written by

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Abstract

In this thesis, I define the notion of *inquisitive logical triviality*, and investigate its connection to grammaticality in natural language. Inquisitive logical triviality is a property characterizing sentences which are either contradictory, or tautologous and non-inquisitive, purely in virtue of their logical vocabulary, and the presuppositions that this vocabulary triggers. I propose that inquisitive logical triviality is a source of systematic unacceptability of sentences, to the effect that sentences exhibiting this form of triviality are ungrammatical. I argue that this assumption allows us to explain various empirical puzzles involving indefinite and interrogative pronouns. First, it is shown to allow an account of previously unnoticed patterns of (un)grammaticality of constructions in which the exclusive particle *only* or an *it*-cleft associates with an indefinite pronoun or determiner phrase. Second, it is shown to allow a semantic account of the system of question formation in Yucatec Maya, a language with little-to-no interrogative-specific morphosyntax. Third, it is shown to allow an account for the cross-linguistic ability of focus to disambiguate quexistentials; words that can function both as indefinite and as interrogative pronouns.

Contents

Chapter 1

Introduction

This thesis is concerned with the connection between logical triviality and grammaticality. In particular, it investigates the connection between a particular type of logical triviality—*inquisitive* logical triviality—and the perceived ungrammaticality of certain types of constructions featuring indefinite pronouns, like *someone*, interrogative pronouns, like *who*, and words that are ambiguous between the two.

Inquisitive logical triviality (or IL-triviality, for short) is a property characterizing sentences which are either contradictory, or tautologous and *non-inquisitive*, purely in virtue of their *logical vocabulary*, and the presuppositions that this vocabulary triggers. Inquisitiveness is a property attributed to certain sentences in the formal semantic framework *Inquisitive Semantics* (Ciardelli et al., 2017). In this framework, the meaning of a sentence comprises not only *informative content*—the information state expressed by the sentence—but also *inquisitive content*, understood as the *issue* expressed by the sentence. Intuitively, a sentence like

(1) Alice laughed.

conveys the non-trivial piece of information that the actual world is such that Alice laughed. In contrast, a sentence like

(2) Did Alice laugh?

conveys the trivial piece of information that the world is either such that Alice laughed, or such that she did not. The communicative utility of (2) derives instead from the particular way in which it *disjoins* a trivial piece of information into two distinct possibilities for the actual world; one corresponding to a positive answer to the sentence, and the other to a negative one. We can think of this as the sentence expressing the *issue* of whether the world is such that Alice laughed, or such that she did not. Sentences which in this way distinguish between multiple possibilities are called *inquisitive*. Sentences which do not are called *non-inquisitive*.

If a sentence is tautologous and non-inquisitive, it neither serves to convey information, nor to direct attention to distinct possible states of affairs. It is natural to think that the communicative utility of such a sentence is therefore degraded. The same holds for contradictory sentences, conveying only the empty information state, and distinguishing no possibilities within it. The set of inquisitively logically trivial sentences comprises those sentences whose communicative utility is thusly degraded in virtue of the context- and interpretation invariant semantic properties associated with words expressing *logical constants*. Building on an influential idea by Gajewski (2009), I propose that inquisitive logical triviality is a source of *systematic unacceptability* of a sentence, to the effect that a sentence with this property is perceived as *ungrammatical*. The main aim of the thesis is to show that this assumption allows us to explain a number of empirical puzzles concerning indefinite and interrogative pronouns, outlined below.

1. **Selection properties of *only* and *it*-clefts.** Contemporary semantics for exclusive particles like *only*, such as the influential Coppock and Beaver (2014), correctly predict the felicity of examples like (3-a), but make incorrect or inconclusive predictions for examples like (3-b)-(3-e).

   (3) a. Only [Alice]$_F$ laughed.
   b. Only [Alice-or-Bob]$_F$ laughed.
   c. *Only [everyone]$_F$ laughed.
   d. ?Only [someone]$_F$ laughed.
   e. *Only [no one]$_F$ laughed.

   Likewise, contemporary accounts of the semantics of *it*-clefts, such as Velleman et al. (2012), correctly predict the felicity of (4-a), but make incorrect or inconclusive predictions for examples like (4-b)-(4-e).

   (4) a. It was [Alice]$_F$ who laughed.
   b. It was [Alice-or-Bob]$_F$ who laughed.
   c. ?It was [everyone]$_F$ who laughed.
   d. *It was [someone]$_F$ who laughed.
   e. *It was [no one]$_F$ who laughed.

   In general, both *only* and *it*-clefts reject many indefinite determiner phrases, such as those built from indefinite pronouns. To account for this observation, I will model the semantics of *only* and clefts within an extension of Inquisitive Semantics called *Presuppositional Inquisitive Semantics* (Roelofsen, 2015). This choice of framework allows us both to capture the presuppositions associated with *only* and *it*-clefts, and to model interrogatives featuring these elements more generally. On the proposed semantics, the starred examples come out as IL-trivial, which offers an explanation of their unacceptability.

2. **Questions in Yucatec Maya.** The Mayan language Yucatec features little to no interrogative-specific morphosyntax. Instead, it crucially makes use of indefinites, disjunctions, and clefts in the formation of questions (Tonhauser, 2003a; AnderBois, 2014). *Wh*-questions are formed through placing a word otherwise functioning as an indefinite pronoun in a focus/cleft construction:

(5)

[máax]$_F$	uk'	le	sa'-o'
someone/who	drink.AGF	the	atole-DISTAL

Who drank the atole? AnderBois (2012)

Alternative questions are formed through clefting a disjunction.

(6)

[Juan	wáa	Daniel]$_F$	uk'	le	sa'-o'
Juan	or	Daniel	drink.AGF	DEF	atole-DISTAL

Was it/It was Juan or Daniel who drank the atole AnderBois (2012)

The interpretation of the resulting construction as an alternative question is context-dependent: in *Context 1*, it reads as a question, but in *Context 2*, it reads as a clefted disjunctive declarative.

- **Context 1**: Addressee and speaker both agree that one of the speaker's two brothers (Juan and Daniel) drank the atole that had been on the table.
  (5) = *Was it Juan or Daniel who drank the atole?*
- **Context 2**: Addressee and speaker both agree that one of the speaker's siblings (Juan, Daniel and Maribel) drank the atole that had been on the table.
  (5) = *It was Juan or Daniel who drank the atole.*

I will show that together with an independently motivated treatment of indefinites in Yucatec Maya, our proposed semantics for clefts predicts these patterns. In particular, we will see that the interrogative readings of sentences in the language are forced precisely in the contexts where the declarative readings are tautologous and non-inquisitive, typically in virtue of being IL-trivial.

3. **The focus generalization for quexistentials.** Words that do double duty as indefinite pronouns and interrogative pronouns are attested in a wide range of languages beyond Yucatec Maya. For instance, in Dutch and German, we have the words *wat* and *was*, respectively, functioning as existential indefinites in certain environments, and as question words in others:

(7) Wat heb je gegeten?
what/something have you eaten
What did you eat? (Iatridou et al., 2018)

(8) Je heb wat gegeten.
you have what/something eaten
You have eaten something. (Iatridou et al., 2018)

(9) Wer $[\text{mag}]_F$ was?
who likes what/something
Who likes something? (Haida, 2007)

(10) Wer mag $[\text{was}]_F$?
who likes what/something
Who likes what? (Haida, 2007)

Following the ongoing work presented in Iatridou et al. (2018), I will refer to words with this multifunctional role as *quexistentials*.

In general, there is substantial cross-linguistic variation of the linguistic environments that serve to license the distinct readings of quexistentials. Nevertheless, there is a strong universal correlation between *focus marking* and the *absence* of the indefinite reading, captured by Iatridou et al. (2018) as the following *focus generalization*:

Focus Generalization. A focussed quexistential cannot be interpreted as an indefinite pronoun.

The only known exceptions to this generalization are environments in which the quexistential explicitly contrasts with a *scalar alternative* to the indefinite pronoun:

(11) Peter heeft wel $[\text{wat}]_F$ gegeten, maar niet $[\text{veel}]_F$/$[\text{alles}]_F$.
Peter has Foc what/something eaten but not much/everything
Peter has eaten something, but not much/everything.

I will show that the Focus Generalization, as well as the noted exceptions, can be taken to result from the existential reading of a focussed quexistential yielding an IL-trivial sentence, unless the quexistential is saliently contrasted with stronger scalar alternatives. When focus marked, the reading of the quexistential as an interrogative pronoun is forced as a means to avoid IL-triviality by contributing inquisitiveness.

1.1 Structure of the thesis

The thesis is structured as follows. Chapter 2 provides background material relevant for the forthcoming chapters. In particular, it discusses the connection between logical triviality and (un)grammaticality as envisaged by Gajewski (2009), and motivates a conception of *grammatically relevant* logical triviality as incorporating both *informative* and *inquisitive* triviality. The framework of Presuppositional Inquisitive Semantics is introduced in detail, and used to formally define the suggested concept of grammatically relevant logical triviality as *IL-triviality*. Chapter 3 proposes a semantics for *only* and for *it*-clefts couched within Presuppositional Inquisitive Semantics, and shows that the selection properties of these elements with respect to indefinite determiner phrases and pronouns follow from the proposed semantics, given the suggested role of IL-triviality in determining ungrammaticality. Chapter 4 introduces the patterns of question formation in Yucatec Maya, discusses the explanation of these patterns suggested by AnderBois (2012), and argues against this explanation. A new analysis is proposed using the semantics for clefts given in the previous chapter, which is shown to allow an explanation of the relevant patterns in terms of IL-triviality. Chapter 5 proposes a semantics for quexistentials, and shows that together with an independently motivated semantics for free focus, the proposed semantics for quexistentials lets us derive the Focus Generalization (and its exceptions) from the assumed connection between IL-triviality and ungrammaticality. Chapter 6 concludes.

Chapter 2

Inquisitive logical triviality

Since Stalnaker (1978), contradictions and tautologies are widely agreed to be *unassertable*. Of course, they are not therefore *ungrammatical*. For instance, the below constructions are semantically useless, but intuitively form part of the English language.

(1) It is raining and it is not raining.

(2) It is raining or it is not raining.

Under the common conception of grammaticality as *morphosyntactic well-formedness*, the grammaticality of (1) and (2) follows from the fact that the *forms* of these sentences adhere to the syntactic rules of English. Yet in the context of formal semantics, it is common to employ a more narrow conception of grammaticality, encompassing not only morposyntactic well-formedness, but also a kind of *semantic* well-formedness. The underlying intuition is that sentences may be *systematically unacceptable* on purely semantic grounds, to the effect that such sentences are, for all practical intents and purposes, *not part of the language*. Indeed, there are many examples of syntactically well-formed sentences which nevertheless elicit robust ungrammaticality judgments from native speakers (to an extent that, we should note, sentences like (1) and (2) do not). For instance, there is no established syntactic constraint predicting (3-c) and (3-d) to be *ill-formed*; yet, these sentences contrast starkly to both (3-a) and (3-b) in terms of acceptability (Barwise and Cooper, 1981).

(3) a. There is some happy cat.
    b. There is no happy cat.
    c. *There is every happy cat.
    d. *There is neither happy cat.

How should the property of *semantic well-formedness* be characterized, so as to conform to our intuitions about the demarcation of grammatical and ungrammatical sentences?

Clearly, it is not as simple as equating semantic well-formedness with (logical) *non-triviality*: as noted, sentences like (1) and (2) are intelligible, and frequently used for pragmatic purposes (Snider, 2015).

Despite widespread agreement on this point, formal semantic explanations of the perceived ungrammaticality of syntactically well-formed constructions typically take the form of showing that the given constructions come out as contradictory or tautologous under a proposed semantic treatment. For instance, on Barwise and Cooper (1981)'s classical analysis of *there*-existential sentences, the deviance of (3-c) and (3-d) is explained as a result of (3-c) expressing a tautology, and (3-d) expressing a contradiction.

Similarly, Dowty (1979) famously explained the contrasts outlined in (4) in terms of semantic triviality.

(4) a. Neko broke the toy in five minutes.
b. *Neko played with the toy in five minutes.
c. *Neko broke the toy for five minutes.
d. Neko played with the toy for five minutes.

On Dowty's analysis, the ungrammaticality of (4-b) follows from semantic assumptions under which *in x time* adverbials cannot modify atelic eventualities, such as the ones expressed by the verb *play*, without yielding a contradiction. Analogously, the ungrammaticality of (4-c) is derived from a semantics for *for x time* adverbials under which they cannot modify telic eventualities, such as the ones expressed by the verb *broke*, without yielding a contradiction.

Von Fintel (1993) influentially attributed the inability of non-universal quantifiers, like those in (5-b), to host connected exceptive phrases to the fact that such constructions express contradictions, under his proposed semantics.

(5) a. Every/no cat but Neko was happy.
b. *Some/*three/*many cats but Neko were happy.

In the same vein, Chierchia (2004) and Chierchia (2013) argued that the unacceptability of negative polarity items like *any* in upward entailing environments follows from constructions like (6-b) expressing contradictions.

(6) a. There aren't any cats here.
b. *There are any cats here.

Do all explanations of the perceived ungrammaticality of syntactically well-formed sentences in terms of logical triviality fail, given the perceived grammaticality of (1) and (2)? Not necessarily. Gajewski (2009) argues that there is a principled way of sifting out *grammatically relevant* logical triviality from its grammatically irrelevant counterpart. The given starred examples exhibit the former type of triviality, while

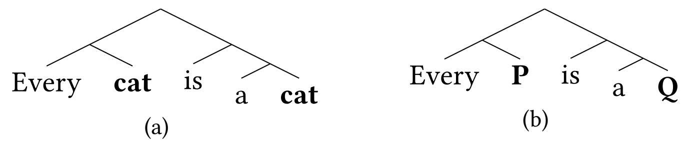


Figure 2.1: Logical form (left) and skeleton (right) of *Every cat is a cat.*

sentences like (1) and (2) exhibit only the former.

In this chapter, we will outline and expand upon this idea. Section 2.1 introduces Gajewski's notion of *L-triviality*, and motivates a strengthened version of this notion, incorporating not only informative, but also inquisitive content. Section 2.2 introduces the framework of Presuppositional Inquisitive Semantics, within which the proposed strengthened notion of L-triviality is formulated.

2.1 L-triviality and grammar

The key idea of Gajewski (2009) is that, while tautologies and contradictions are not *generally* ungrammatical, there is a *formally definable* subset of such sentences whose members *are* ungrammatical. Gajewski calls such sentences *logically trivial*, or L-trivial, for short. A sentence is L-trivial just in case it is tautologous (contradictory) in every model in which it is defined, for every *arbitrary* substitution of its *non-logical* terminal nodes. We can define the set of L-trivial sentences more formally using the concept of a *logical skeleton.*

> **Definition 2.1.1** (Logical skeleton)**.** To obtain the logical skeleton of a logical form α,
>
> - Identify the maximal constituents of α containing no logical elements;
> - Replace each such constituent with a variable of the same type.

Two example logical forms and their logical skeletons (in informal tree-form) are shown in Figure 2.1 and Figure 2.2, respectively, with non-logical vocabulary marked in boldface.

(7) Every cat is a cat.

(8) *There is every happy cat.

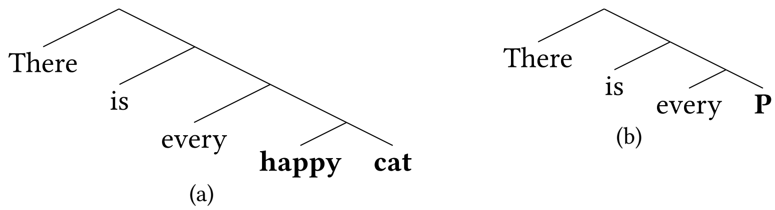


Figure 2.2: Logical form (left) and skeleton (right) of **There is every happy cat.*

Given this, L-triviality receives the below definition.

> **Definition 2.1.2** (L-triviality)**.** A sentence φ is *L-trivial* if and only the *logical skeleton* of φ receives the denotation 1 (0) in all interpretations in which it is defined.

Gajewski proposes that L-triviality is a sufficient condition for ungrammaticality:

(L-triviality and grammaticality). A sentence is ungrammatical if it contains an L-trivial constituent sentence.

Connecting to the previous discussion, we can assume that L-triviality provides a sufficient condition for *semantic ill-formedness*, which in turn is a sufficient condition for ungrammaticality in the generalized sense. To illustrate how this assumed connection between L-triviality and ungrammaticality can play an explanatory role, we consider again the contrast between the tautologous (7) and the unacceptable (8). First, note that (7) is *not* L-trivial: we can easily find two interpretations I, I' such that $[\![every]\!]^{\langle D,I\rangle}(I(\mathbf{P}))(I(\mathbf{Q})) \neq [\![every]\!]^{\langle D,I'\rangle}(I'(\mathbf{P}))(I'(\mathbf{Q}))$. Take, for instance, any I such that $I(\mathbf{P}) \subseteq I(\mathbf{Q})$ and I' such that $I'(\mathbf{P}) \supset I'(\mathbf{Q})$.

We cannot do the same with (8). Following Barwise and Cooper (1981)'s classical analysis of *there*-existential sentences, we assume that *there* denotes the domain of individuals D. The denotation of the logical skeleton of (8) can then be spelled out as follows:

$$[\![\textit{there is every } \mathbf{P}]\!]^{\langle D,I\rangle} = [\![every]\!]^{\langle D,I\rangle}(I(\mathbf{P}))(I(D))$$

It is easy to see that the truth-value of this logical skeleton is invariant. For any $\langle D, I\rangle$, we have that $I(\mathbf{P}) \subseteq D$, so that $[\![\textit{there is every } \mathbf{P}]\!]^{\langle D,I\rangle} = 1$. Hence, the logical skeleton of (8) is *true* in every interpretation I, meaning that the sentence is L-trivial.

Gajewski shows that the assumed connection between L-triviality and ungrammaticality further captures the general restriction on quantifiers in existential *there*-sentences under the analysis of Barwise and Cooper (1981)), as well as the selection restriction of connected exceptives to universal quantifiers under Von Fintel (1993)'s analysis. Chierchia (2013) uses the same notion of L-triviality to capture the pattern of

NPI licensing exemplified in (6), and (Abrusán, 2014) uses a slightly modified version to capture weak island violations, as well as the restriction on time adverbials illustrated in (4) under a Dowty (1979)-style analysis. L-triviality has further been used to capture the unacceptability of downward entailing quantifiers in comparative clauses (Gajewski, 2008), negative degree islands (Fox and Hackl, 2006), and the complement restrictions of anti-rogative verbs (Theiler et al., 2017).

While the assumed connection between L-triviality and ungrammaticality has evidently proven empirically successful, it has certain limitations. First, it hinges on an imprecise distinction between *logical* and *non-logical* vocabulary. Second, it does not immediately extend to cover patterns of ungrammaticality in the realm of *non-declarative* sentences, in particular *interrogative* sentences. We will address both of these issues below.

2.1.1 The logical vocabulary

How should the distinction between logical and non-logical vocabulary be drawn? This question is notoriously difficult to answer (see e.g., MacFarlane (2017) for an overview of the issues), and Gajewski offers no complete response. The perhaps most well-known definition of logical vocabulary, standardly attributed to Tarski (1986), consists in defining logical constants in terms of *permutation invariance*. The intuition behind this is compelling: a purely logical element should be *topic neutral*, and not depend on the identity of particular individuals in the domain. Such an element must be insensitive to certain types of changes made to the domain(s), such as permutations.

Gajewski (2009) proposes a provisory distinction along these lines, using Van Benthem (1989)'s generalized permutation invariance for expressions of types in the domains

- D_e: the set of individuals,
- D_t: the set of truth values $\{0, 1\}$,
- $D_{\langle a,b\rangle}$: the set of functions with domain D_a and range D_b, for some types a, b.

As usual, a permutation π_e of D_e is a one-to-one mapping from D_e to D_e. Given this, we define permutations of arbitrary domains in the hierarchy as in Definition 2.1.3.

Definition 2.1.3 (Permutations of arbitrary type domains (Van Benthem, 1989)**.** Given a permutation π of D_e, define

- $\pi_e = \pi$
- $\pi_t(x) = x$ for all $x \in D_t$,

- $\pi_{\langle a,b\rangle}$ is the function such that for all $f \in D_{\langle a,b\rangle}$:

$$\pi_{\langle a,b\rangle}(f) = \{\langle \pi_a(x), \pi_b(y)\rangle \mid \langle x, y\rangle \in f\}$$

This allows for a generalized definition of permutation invariance:

Definition 2.1.4 (Permutation invariance)**.** An item $\alpha \in D_a$ is *permutation invariant* if for any permutation π_a of D_a, $\pi_a(\alpha) = \alpha$.

Given the definition of permutations of D_t as identity maps, all expressions of types constructed from t only, such as the Boolean connectives, are trivially permutation invariant. Likewise, the determiners *some*, *all*, and *no*, as well as pronouns formed from these, such as *someone* or *something*, are all easily shown to be permutation invariant, on their standard treatment as (generalized) quantifiers. By defining logical constants through permutation invariance, these expressions can further be classified as *logical*:[1]

Definition 2.1.5 (Logical constants (Gajewski, 2009))**.** A lexical item α of type τ is *logical* if and only if α denotes a permutation invariant element of D_τ in all interpretations.

Thus, Definition 2.1.5 classifies the Boolean connectives and the mentioned determiners and pronouns as logical, in accordance with intuition. Yet, the definition is flawed. First, it classifies *too many* expressions as logical. For instance, Gajewski (2009) notes that it classifies a domain-denoting predicate like *exists* as logical, contrary to the intuition that it is not. Indeed, we do not want to predict that a sentence like *Someone exists* is L-trivial. Gajewski proposes to avoid this by imposing the further restriction that the logical constants preserved in a logical skeleton must be *functional* (or *closed-class*), rather than *lexical* (or *open-class*). The latter category encompasses both connectives, determiners, and the relevant pronouns, but excludes verbs, like *exists*.

Independently of this addition, however, Definition 2.1.5 will classify *too few* natural language expressions as logical. The determiner *every* can only take *countable* nouns as its first argument: constructions like **Every salt is on the table* are out, due to *salt* being a mass-noun. As noted by van Benthem (2002), this makes *every* non-permutation invariant, thus part of the non-logical vocabulary according to Definition 2.1.5.

I agree with van Benthem that this is undesirable, and will treat this as evidence not that *every* is non-logical, but that Definition 2.1.5 is severely incomplete, even if paired with the further condition that logical constants be functional. We will thus

[1] This definition is highly simplistic—see Gajewski (2009), footnote 8 and references therein for discussion and more sophisticated definitions—but suffices for our present purposes.

follow authors like Chierchia (2013) and Abrusán (2014) and treat Definition 2.1.5, plus functionality, as an *approximate* definition of logical constancy. In the absence of better alternatives, we stipulate that certain uncontroversially logical expressions, like *every*, are still part of the logical vocabulary, yet only defined as such by a presently unknown, but in principle possible, definition of logical vocabulary.

2.1.2 L-triviality and interrogative sentences

The extant applications of L-triviality are primarily aimed at explaining patterns of ungrammaticality in *declarative* sentences.[2] Declarative sentences are classically taken to express *propositions*, modeled as *sets of possible worlds.* At a given world w, a declarative sentence denotes a *truth value*; the value 1 (true) if w is contained in the proposition expressed by the sentence, and the value 0 (false) otherwise. Gajewski's L-triviality is defined for sentences denoting truth values, and therefore applies straightforwardly to declarative sentences.

As foreshadowed in the introduction, we will largely be concerned with *interrogative* sentences; that is, sentences expressing questions. Unlike declarative sentences, interrogative sentences are *not* standardly taken to denote truth values. For instance, on the classical *alternative semantics* account of questions, rooted in Hamblin (1973) and Karttunen (1977), an interrogative sentence denotes a *set of propositions*, each member corresponding to a possible answer to the interrogative at the world of evaluation. On the equally canonical *partition semantics* of Groenendijk and Stokhof (1984), an interrogative sentence instead denotes a *proposition*: the proposition corresponding to the true, exhaustive answer to the interrogative at the world of evaluation.

The assumption that interrogatives denote something different than truth values—be it propositions, sets of propositions, or something else entirely—is grounded in the insight that the *communicative purpose* of interrogative sentences differs fundamentally from that of declarative sentences. Declarative sentences are primarily used to *assert*, and one asserts in order to *convey* information (cf. Stalnaker, 1978). Interrogative sentences are primarily used to *ask*, and one asks in order to *request* information. The former type of act is often thought to be directly associated with truth values, for instance through a characterization of assertion as the act of *presenting a proposition as true* (see e.g., Pagin, 2016, Section 5.1 for discussion). In contrast, the latter type of act seems only *indirectly* associated with truth values: a corresponding characterization of *asking* would be as the act of presenting one or more propositions as *something that the speaker would like to know the truth value of.*

L-triviality can be seen as a property characterizing sentences that are, in virtue of

[2] The exception is Abrusán (2014), who derives contradictory meanings for interrogatives with weak island violations. However, the contradictions always derive from a contradictory *presupposition*, not directly from the at-issue content of the interrogative. Additionally, Theiler et al. (2017) are concerned with the semantics of interrogative sentences, but only use L-triviality to assess grammaticality for declarative sentences (although these contain *embedded* interrogative sentences).

their logical constants, useless for the purpose of asserting or conveying information. Its connection to grammaticality can then be seen as the result of a natural selection process, whereby languages reject forms with an invariantly degraded communicative utility. It is not a far step from this to assume that sentences that are, in virtue of its logical constants, also useless for the purpose of asking or requesting information, should be perceived as ungrammatical. Gajewski's L-triviality is only sensitive to truth values, and truth values seem separate from whatever property makes a sentence semantically suited for the use of requesting information. I will therefore propose an *enriched* version of L-triviality, aimed to be sensitive also to the formal determinants of this property. The proposal will be given within the formal framework for question semantics known as *Inquisitive Semantics* (Ciardelli et al., 2017). In this framework, the meaning of a sentence, whether declarative or interrogative, comprises not only *informative content*, but also *inquisitive content*. The former meaning component determines the ability of a sentence to be (semantically) used to convey information, and the latter component the ability of a sentence to be (semantically) used to request information. By taking into account both informational and inquisitive triviality, we will be able to assess the grammaticality of both declarative and interrogative sentences.

Our framework of choice will be an extension of Inquisitive Semantics aimed to capture also presuppositional content, *Presuppositional Inquisitive Semantics* (Roelofsen, 2015). It is widely acknowledged that certain lexical elements and constructions trigger presuppositions (e.g., Beaver and Geurts, 2014). A subset of such presuppositions are triggered by elements intuitively belonging to the *logical vocabulary*. For instance, under a Frege-Strawson analysis of the definite article, *the* triggers presuppositions of *existence* and *uniqueness*:

$$\textit{the} \rightsquigarrow \lambda P : \exists x \forall y (P(y) \leftrightarrow x = y).\lambda Q.\exists x (P(x) \wedge Q(x))$$

The notation follows Heim and Kratzer (1998), where $\lambda\varphi : [\ldots\varphi\ldots].\psi$ means that the content $[\ldots\varphi\ldots]$ is presupposed. Assuming, as is standard, that *the* forms part of the logical vocabulary, these presuppositions are carried by any logical skeleton containing *the* in a suitable position (crucially, not within the scope of an element blocking presuppositional projection, viz. a *plug* in the sense of Karttunen (1973)). Presuppositions triggered by logical vocabulary have played a part in most of the previously mentioned applications of L-triviality, and the present proposal will be no exception. The explanations of the empirical puzzles listed in the introduction will all require consideration of the presuppositions carried by the logical skeletons of the relevant constructions. Presuppositional Inquisitive Semantics is designed to capture the presuppositional content of both declaratives and interrogatives, and thereby perfectly suits our purpose. The next section introduces this framework, and concludes by defining the suggested enriched version of L-triviality.

2.2 Presuppositional Inquisitive Semantics

Traditionally, the meaning of a declarative sentence is identified with a proposition, in turn understood as an *information state* (e.g., Hintikka, 1962). An information state is a set of possible worlds, and a sentence expressing an information state s thereby conveys the information that the actual world is a member of s.

Inquisitive Semantics departs from this picture. In this framework, the meaning of a sentence, whether declarative or interrogative, is identified with a downward closed *set* of information states. The basic conceptual motivation for this is as follows. Sentences may not only convey that a specific information state contains the actual world, but may also distinguish between *multiple* information states, and thereby serve to raise the *issue* as to which of these information states contains the actual world. As a case in point, take the interrogative sentence in (9):

(9) Did Alice laugh?

Intuitively, this sentence does not convey any information: at most, it expresses the trivial piece of information that the world is either such that Alice laughed, or such that she did not. What it seems to do is rather to distinguish in this information state two distinct possibilities; one corresponding to the positive answer to the sentence (*Alice laughed*), and one corresponding to the negative answer (*Alice did not laugh*). Taking the meaning of the sentence to be a *set* of information states allows us to capture these two distinct possibilities for the actual world as the two *maximal* information states contained in the denotation of the sentence. Naturally, establishing that the world is contained in a subset of one of the maximal information states would serve to settle the issue of which of the two maximal states contains the actual world. We capture this by including in the sentence meaning also all *substates* of the maximal states, so that the meaning is *downward closed.*

This is not as far a departure from the traditional picture of the semantics of declaratives as it may seem. Consider a declarative sentence like (10):

(10) Alice laughed.

In contrast to the interrogative, this sentence is intuitively taken to convey the non-trivial piece of information that the actual world is such that Alice laughed. To capture this, we need not take the content of (10) to *be* the information state embodying this information. We might just as well say that the content of (10) *contains* this information state as its maximal element, and that it thereby conveys the information that the actual world is an element of this information state. This is precisely what is done in Inquisitive Semantics, guaranteeing that the traditional meaning of a sentence is always recoverable from its Inquisitive Semantics meaning. We say that the *informative content* of a sentence is the *union* of all information states in its meaning. We contrast this with the *inquisitive content* of a sentence, understood as the *issue* expressed by the sentence: the particular way in which the sentence distinguishes between distinct possibilities for the actual world.

This is the basic idea behind the treatment of the semantic content of both declarative and interrogative sentences as downward closed sets of information states. The presuppositional extension of this framework, Presuppositional Inquisitive Semantics, provides a means of deriving the *presuppositions* of sentences, and thereby model how a sentence' presupposition affects its semantic content.

2.2.1 Language and semantics

The system of Presuppositional Inquisitive Semantics, as presented in Roelofsen (2015), defines a semantics for a standard first-order language $\mathcal{L}$, extended with three *projection operators* '!', '?', and '†'. Apart from the latter, $\mathcal{L}$ has the usual components: a set of n-ary *predicate symbols* $(P, Q, R\ldots)$, a set of *individual constants* $(a, b, c\ldots)$, a set of *variables* $(x, y, z\ldots)$, the set $\{\vee, \wedge, \neg, \rightarrow\}$ of *connectives*, and the *quantifiers* $\exists$ and $\forall$. We will occasionally abbreviate an atomic sentence whose internal structure is irrelevant by a 0-place predicate symbol (e.g, $p, q, r\ldots$).

We evaluate formulae of $\mathcal{L}$ in *rigid first order information models* (Ciardelli et al., 2017, Chapter 4):

Definition 2.2.1 (Rigid first order information model)**.** A *rigid first order information model* for $\mathcal{L}$ is a triple $\langle W, I, D\rangle$, where:

- W is a set of possible worlds w,
- D is a domain of individuals d,
- I is an interpretation function, mapping each $w \in W$ to a first order model I_w, such that
  - the domain of I_w is D,
  - for every n-ary function symbol f in $\mathcal{L}$, $I_w(f) : D^n \rightarrow D$, with the condition that for every $v, w \in W$, $I_v(f) = I_w(f)$,
  - for every n-ary relation symbol R in $\mathcal{L}$, $I_w(R) \subseteq D^n$.

The assumption of *rigidity* amounts to the condition that the domain as well as the denotations of function symbols remain constant across worlds, and lets us avoid certain well-known issues associated with quantification across possible worlds. For additional simplicity, we will here only admit assignment functions g such that for every individual constant a, $g(a)(w) = g(a)(v)$ for every $v, w \in W$. Unless specified otherwise, we assume a fixed model, and omit notational reference to it (as well as to the assignment, when not considering quantified formulae in particular).

Each sentence in $\mathcal{L}$ is assigned a *presuppositional meaning*:

Definition 2.2.2 (Presuppositional meaning)**.** The *presuppositional meaning* of a sentence φ, denoted by $[\![\varphi]\!]$, is a pair $\langle \pi, [\varphi] \rangle$, where π is an information state, and $[\varphi]$ is a proposition restricted to π.

Definition 2.2.3 (Restricting a proposition to an information state)**.** If A is a set of information states and s an information state, then the restriction of A to s, denoted $A \upharpoonright s$, is the set $\{t \in A \mid t \subseteq s\}$.

We refer to the first element of the presuppositional meaning of a sentence φ as the *presupposition of* φ, and to the second element as the *proposition expressed by* φ, with the following general definition.

Definition 2.2.4 (Proposition)**.** The *proposition* expressed by a sentence φ, denoted by $[\varphi]$, is a non-empty, downward closed set of information states restricted to the presupposition φ.

Entailment can then be defined as the correlate of *set inclusion* (implicitly, for all models and assignments):

Definition 2.2.5 (Entailment)**.** $\varphi \vDash \psi$ if and only if $[\varphi] \subseteq [\psi]$.

Following Ciardelli et al. (2017) and Roelofsen (2015), we will occasionally say that a *proposition* $[\varphi]$ entails another proposition $[\psi]$ to mean that $[\varphi] \subseteq [\psi]$.

The proposition expressed by a sentence is also referred to as an *issue*, which we say is *resolved* by any of its elements. Given an issue, there will be certain information states which contain the minimal amount of information needed to resolve the issue. We call these the *alternatives* of the sentence.

Definition 2.2.6 (Alternatives)**.** The *alternatives* of a sentence φ, denoted by $\mathrm{alt}(\varphi)$, is the set of the maximal information states in $[\varphi]$.

Finally, we can capture the informative content of a sentence as the union of the proposition expressed by the sentence:

Definition 2.2.7 (Informative content)**.** The *informative content* of a sentence φ, denoted by $\mathsf{info}(\varphi)$, is the information state $\bigcup[\varphi]$.

This allows for a definition of *truth at a world* analogous to the classical case: we say that a sentence φ is true at a world w just in case w is included in $\mathsf{info}(\varphi)$.

Definition 2.2.8 (Truth)**.** A sentence φ is *true* at w if and only if $w \in \mathsf{info}(\varphi)$.

The presupposition of a given sentence is defined through a relation of *presupposition satisfaction* $\Vdash$ between information states and sentences. We define this relation recursively over the fragment of $\mathcal{L}$ excluding the projection operators, and return later to define the presuppositions of sentences featuring the latter.

Definition 2.2.9 (Presupposition satisfaction)**.**

$$
\begin{array}{lll}
s \Vdash_g P(t_1, \dots, t_n) & \text{always} & \\
s \Vdash_g P(t_1, \dots, t_n)_\varphi & \text{iff} & s \in [\varphi]_g \\
s \Vdash_g \neg\varphi & \text{iff} & s \Vdash_g \varphi \\
s \Vdash_g \varphi \wedge \psi & \text{iff} & s \Vdash_g \varphi \text{ and } s \cap \mathsf{info}_g(\varphi) \Vdash_g \psi \\
s \Vdash_g \varphi \vee \psi & \text{iff} & s \Vdash_g \varphi \text{ and } s - \mathsf{info}_g(\varphi) \Vdash_g \psi \\
s \Vdash_g \varphi \to \psi & \text{iff} & s \Vdash_g \varphi \text{ and } s \cap \mathsf{info}_g(\varphi) \Vdash_g \psi \\
s \Vdash_g \forall x.\varphi & \text{iff} & s \Vdash_{g[x/d]} \varphi \text{ for all } d \in D \\
s \Vdash_g \exists x.\varphi & \text{iff} & s \Vdash_{g[x/d]} \varphi \text{ for some } d \in D
\end{array}
$$

We exemplify briefly how these clauses are to be read. The first clause expresses that a non-presuppositional atomic sentence $P(t_1, \dots, t_n)$ is satisfied by every information state s. The second clause expresses that an atomic sentence presupposing φ, denoted by $P(t_1, \dots, t_n)_\varphi$, is satisfied by every information state contained in the proposition expressed by φ. The third clause expresses that a negated sentence $\neg\varphi$ is satisfied by every information state satisfying φ. Thus, this satisfaction relation will allow us to capture the fact that negation allows presuppositions to *project* from its prejacent (Karttunen, 1974). The presupposition of a given sentence is simply the *union* of all information states that satisfy it:

Definition 2.2.10 (Presuppositions)**.** The *presupposition* of a sentence φ, denoted by $\mathrm{presup}(\varphi)$, is the information state $\bigcup\{s \mid s \Vdash \varphi\}$.

Given our definition of $\Vdash$, the presupposition of $\neg\varphi$ is always the presupposition of φ.

In (Presuppositional) Inquisitive Semantics, connectives are taken to express basic set-theoretic operations: conjunction corresponds to $\cup$, disjunction to $\cap$, and implication and negation to $\Rightarrow$ and $*$, where:

- $A \Rightarrow B = \{s \mid \forall s' \subseteq s : \text{ if } s' \in A \text{ then } s' \in B\}$, and

- $A^* = \{s \mid \forall s' \subseteq s: \text{ if } s' \neq \emptyset \text{ then } s' \notin A\}$.

Together with the definition of presupposition satisfaction, these assumptions allow us to define the propositions expressed by any sentence of $\mathcal{L}$ (excluding projection operators).

Definition 2.2.11 (The proposition expressed by a sentence)**.**

$$
\begin{array}{lll}
[P(t_1, ..., t_n)]_g & := & \wp(\{\, w \mid \langle I_w(t_1), ..., I_w(t_n)\rangle \in I_w(P)\}) \\
[P(t_1, ..., t_n)_\varphi]_g & := & \wp(\{\, w \mid \langle I_w(t_1), ..., I_w(t_n)\rangle \in I_w(P) \text{ and } w \in \mathsf{info}(\varphi)_g\}) \\
[\neg\varphi]_g & := & [\varphi]_g^* \upharpoonright \mathsf{presup}_g(\neg\varphi) \\
[\varphi \wedge \psi]_g & := & ([\varphi]_g \cap [\psi]_g) \upharpoonright \mathsf{presup}_g(\varphi \wedge \psi) \\
[\varphi \vee \psi]_g & := & ([\varphi]_g \cup [\psi]_g) \upharpoonright \mathsf{presup}_g(\varphi \vee \psi) \\
[\varphi \rightarrow \psi]_g & := & ([\varphi]_g \Rightarrow [\psi]_g) \upharpoonright \mathsf{presup}_g(\varphi \rightarrow \psi) \\
[\forall x.\varphi]_g & := & \bigcap_{d \in D}[\varphi]_{g[x/d]} \upharpoonright \mathsf{presup}_g(\forall x.\varphi) \\
[\exists x.\varphi]_g & := & \bigcup_{d \in D}[\varphi]_{g[x/d]} \upharpoonright \mathsf{presup}_g(\exists x.\varphi)
\end{array}
$$

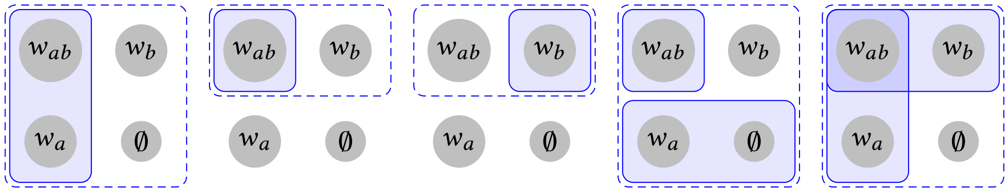
Together, Definitions 2.2.9, 2.2.10 and 2.2.11 provide a recursive characterization of the presuppositional meaning of any φ in $\mathcal{L}$ excluding the projection operators. Before turning to sentences featuring the latter, we illustrate the above definitions with examples.

Illustration

The diagrams in figure 2.3 illustrate the presuppositional meanings assigned to some sentences of $\mathcal{L}$ in a toy rigid first-order information model, with $W = \{w_{ab}, w_a, w_b, w_\emptyset\}$, $D = \{\boldsymbol{a}, \boldsymbol{b}\}$, and I such that $I_{w_{ab}}(P) = \{\boldsymbol{a}, \boldsymbol{b}\}$, $I_{w_a}(P) = \{\boldsymbol{a}\}$, $I_{w_b}(P) = \{\boldsymbol{b}\}$ and $I_{w_\emptyset}(P) = \emptyset$. The individuals in D are picked out by the obvious constants. For each sentence φ, presup(φ) is depicted as the areas with dashed borders, and alt(φ) as the shaded areas with solid borders. (Note that a set of alternatives suffice to uniquely determine a proposition.)

- Figure 2.3(a) depicts the meaning of a *non-presuppositional* atomic sentence P(a). Thus, the presupposition of this sentence is the whole logical space, and the proposition it expresses has as its only alternative the set of worlds in which P(a) holds.

- Figure 2.3(b) depicts the meaning of a *presuppositional* atomic sentence $\mathrm{P}(a)_{\mathrm{P}(b)}$. The presupposition of this sentence is the set of worlds in which P(b) holds, and has as its only alternative the set of all and only worlds in which P(a) holds, restricted to the presupposition.



(a) $\mathrm{P}(a)$ (b) $\mathrm{P}(a)_{\mathrm{P}(b)}$ (c) $\neg\mathrm{P}(a)_{\mathrm{P}(b)}$ (d) $\neg\mathrm{P}(b) \vee \mathrm{P}(a)_{\mathrm{P}(b)}$ (e) $\exists x\mathrm{P}(x)$

Figure 2.3: Presuppositional meanings of some simple sentences of $\mathcal{L}$.

- Figure 2.3(c) depicts the negation of the previous sentence, $\neg\mathrm{P}(a)_{\mathrm{P}(b)}$. The presupposition of this sentence is the same as that of its non-negated counterpart, namely the set of worlds in which $\mathrm{P}(b)$ holds. Its only alternative is the set of worlds in which $\mathrm{P}(a)$ is false, restricted to the presupposition.

- Figure 2.3(d) depicts the meaning of $\neg\mathrm{P}(b) \vee \mathrm{P}(a)_{\mathrm{P}(b)}$. The presupposition of this sentence is the union of all states s such that (i) s satisfies $\neg\mathrm{P}(b)$, which holds trivially for any state, and (ii) $s - \mathsf{info}(\neg\mathrm{P}(b))$ satisfies $\mathrm{P}(a)_{\mathrm{P}(b)}$. Since $W - \mathsf{info}(\neg\mathrm{P}(b)) = \mathsf{presup}(\mathrm{P}(a)_{\mathrm{P}(b)}) = \{w_{ab}, w_b\}$, the presupposition of $\neg\mathrm{P}(b) \vee \mathrm{P}(a)_{\mathrm{P}(b)}$ is the whole of W. The proposition expressed by this sentence is obtained by taking the union of $[\neg\mathrm{P}(b)] = \{\mathrm{P}(a), \emptyset\}$ and $[\mathrm{P}(a)_{\mathrm{P}(b)}] = \{w_{ab}\}$, resulting in two alternatives: the set of worlds in which $\mathrm{P}(b)$ is false, and the set of worlds in which both $\mathrm{P}(a)$ and $\mathrm{P}(b)$ are true.

- Figure 2.3(e) depicts the meaning of $\exists x\mathrm{P}(x)$. The presupposition of this sentence is the union of all states s satisfying $L(a)$ or $L(b)$, which amounts to W. The proposition expressed by the sentence is obtained by taking the union of $[L(a)] = \{w_{ab}, w_a\}$ and $[L(b)] = \{w_{ab}, w_b\}$, resulting in two alternatives: the set of worlds in which $\mathrm{P}(a)$ is true, and the set of worlds in which $\mathrm{P}(b)$ is true.

Note that each of the example sentences are *informative*: their informative contents exclude some worlds from their presuppositions.

Definition 2.2.12 (Presupposition-relative informativity)**.** A sentence φ is *informative* just in case $\mathsf{info}(\varphi) \neq \mathsf{presup}(\varphi)$.

The example sentences depicted in 2.3(d) and 2.3(e) are also *inquisitive*: they have more than one alternative in the presupposition.

Definition 2.2.13 (Presupposition-relative inquisitiveness)**.** A sentence φ is *inquisitive* just in case $\mathsf{info}(\varphi) \notin [\varphi]$.

This is not coincidental: it is easy to see from the semantics of $\vee$ and $\exists$ that *any* sentence featuring one of these elements with widest scope is inquisitive, unless its presupposition is the inconsistent state. In contrast, atomic sentences and sentences featuring $\neg$ with wide scope are always non-inquisitive.

The *projection operators* '!', '?' and '†' each affects the informativity or the inquisitiveness of a sentence. The semantics of these operators are given in 2.2.14.

Definition 2.2.14 (Projection operators)**.**

- $[\![!\varphi]\!] := \langle \mathsf{presup}(\varphi), \wp(\mathsf{info}(\varphi))\rangle$
- $[\![?\varphi]\!] := \langle \mathsf{presup}(\varphi), [\varphi] \cup \wp(\mathsf{presup}(\varphi) - \mathsf{info}(\varphi))\rangle$
- $[\![\dagger\varphi]\!] := \langle \mathsf{info}(\varphi), [\varphi]\rangle$

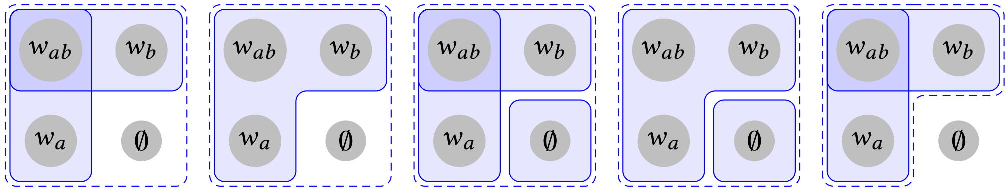
Each projection operator is thus a function from presuppositional meanings to presuppositional meanings. The first, '!', takes a presuppositional meaning $\langle \pi, A\rangle$ and yields the meaning $\langle \pi, A'\rangle$, where A' is just like A but *flattened* into the non-inquisitive proposition with the same informative content as A. Thus, ! guarantees *non-inquisitiveness*. Figure 2.4(b) illustrates this.

The second operator, '?', takes a presuppositional meaning $\langle \pi, A\rangle$ and yields the meaning $\langle \pi, A'\rangle$, where A' is just like A, but with the alternative $\pi - \bigcup A$ added (along with its subsets). Thus, '?' guarantees *non-informativity*, and ensures *inquisitiveness* whenever $\langle \pi, A\rangle$ is informative (or equivalently, $\pi - \bigcup A$ is non-empty). Figures 2.4(c) and 2.4(d) illustrate this.

The third operator, '†', takes a presuppositional meaning $\langle \pi, A\rangle$ and yields the meaning $\langle \pi', A\rangle$, where π' is just like π, but *reduced* to coincide with the informative content of $\langle \pi', A\rangle$. Thus, '†' guarantees *non-informativity*. Figure 2.4(e) illustrates this.

2.2.2 From form to meaning

With the semantics of the formal language in place, we will now outline how natural language sentences are translated into the formal language. The sentences which we will consider in the following chapters are all of the following types, where $\uparrow$ and $\downarrow$ signify *pitch rise* and *pitch fall*, respectively.



(a) $\mathrm{P}(a) \vee \mathrm{P}(b)$ (b) $!(\mathrm{P}(a) \vee \mathrm{P}(b))$ (c) $?(\mathrm{P}(a) \vee \mathrm{P}(b))$ (d) $?!(\mathrm{P}(a) \vee \mathrm{P}(b))$ (e) $\dagger(\mathrm{P}(a) \vee \mathrm{P}(b))$

Figure 2.4: Presuppositional meanings of some sentences of $\mathcal{L}$ featuring projection operators.

Closed declaratives.

(11) Alice laughed↓.

(12) Alice-or-Bob laughed↓.

(13) [Alice]$_F$ laughed↑ or [Bob]$_F$ laughed↓.

A closed declarative sentence is declarative sentence pronounced with a final pitch fall. Of this type, we will consider *monoclausal declaratives*, both *non-disjunctive*, like (11), and *disjunctive*, like (12), and *biclausal disjunctive declaratives*, like (13).

Open interrogatives.

(14) Did Alice laugh↑?

(15) Did Alice-or-Bob laugh↑?

(16) Who laughed↑?

An open interrogative sentence is an interrogative sentence pronounced with a final pitch rise. Of this type, we will consider *polar questions*, both *non-disjunctive*, like (14), and *disjunctive*, like (15), and *wh*-questions, like (16).

Closed interrogatives.

(17) Did [Alice]$_F$ laugh↑ or (did) [Bob]$_F$ laugh↓?

A closed interrogative sentence is an interrogative sentence pronounced with a final pitch fall. Of this type, we will only consider *alternative questions*, like (17).

Given our restricted attention to these sentence types, we can omit ↑ and ↓ without ambiguity, and will often do so. Here and elsewhere, the marking $[\cdot]_F$ signifies that an element is *focussed*, which is conveyed in English by prosodic prominence (emphasis) (e.g., Jackendoff, 1972). Biclausal disjunctive sentences are most naturally produced with focus on the contrasting elements in the respective disjuncts, as indicated. The absence of elements marked by $[\cdot]_F$ in the other examples does not mean that instances of these sentence types never feature focussing of certain elements, only that they need not. We postpone a discussion of the potential semantic effects of (free) focus until Chapter 5.

Drawing on Zimmermann (2000), (Presuppositional) Inquisitive Semantics treats sentences of the given types as *lists* (Ciardelli et al., 2017, Chapter 6). Lists consist of $n > 0$ *clauses* (syntactic CP:s), separated by disjunction, as illustrated in Figure 2.5.

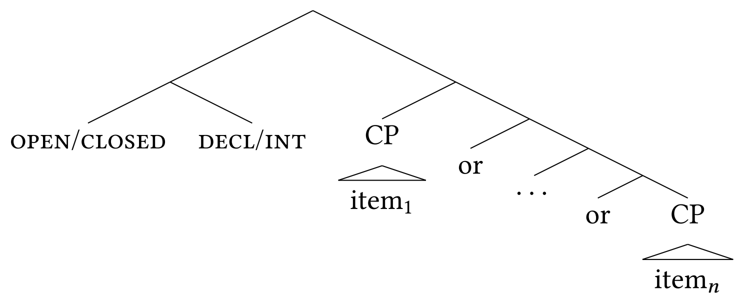


Figure 2.5: The logical form of a list with n items.

The clauses are referred to as *list items*, and the sequence of list items separated by disjunction as the *body* of the list. The *head* of the list, scoping over its body, consist of a combination of a *completion marker*, OPEN or CLOSED, and a *list classifier*, DECL or INT. OPEN marks the list as open-ended, and is signaled by rising intonation on the final list item. CLOSED marks the list as closed, and is signaled by falling intonation on the final list item. DECL classifies the list as a *declarative*, and INT classifies it as *interrogative*. Each list item is headed by a *clause type marker* C_{DECL} or C^n_{INT}, depending on whether the list classifier is DECL or INT, respectively. The remainder of an item is a *tense phrase* (TP).

The body of a list is translated as follows. Any disjunction, whether occurring in or between list items, is translated as $\vee$. The clause type markers C_{DECL} and C^n_{INT} are both translated as !. n is the number of *wh*-phrases in the c-command domain of C^n_{INT}, and we will return to outline the interaction between these elements when giving the translation of interrogative pronouns.

The content of the tense phrase is translated largely as is standard in first order formalizations of natural language, with the following cases deserving special attention. I will take the natural language quantifier *some* to correspond to $!\exists$, the quantifier *every* (and *all*) to $\forall$, and the quantifier *no* to $\neg\exists$. The translation of pronouns formed from these elements will involve the corresponding formal quantifier, together with a *restrictor* capturing the animacy condition of the pronoun in question. For instance, the pronouns *someone* and *something* differ in animacy, and should therefore translate with different restrictors:

(18) a. *someone* $\rightsquigarrow \lambda P.!\exists x.\textsc{human}(x) \wedge P(x)$
b. *something* $\rightsquigarrow \lambda P.!\exists x.\textsc{non-human}(x) \wedge P(x)$

To simplify, however, we will leave domain restrictions implicit, and evaluate sentences in toy models with domains consisting exclusively of human individuals.

We will take interrogative pronouns to be the *inquisitive* correlates of existential indefinite pronouns, so that for instance:

(19) *who* $\rightsquigarrow \lambda P.\exists x P(x)$

This conforms to the treatment of interrogative pronouns of Theiler (2014) and AnderBois (2012), among others. For our case, this treatment needs to be paired with certain syntactic assumptions. As is standard, we assume that interrogative pronouns (or strictly speaking, the *determiner phrases* they head) have the syntactic feature [+Wh]. Following Pesetsky (2000), we assume that $C^n_{\textsc{int}}$ has n specifier positions, probes its c-command domain for n phrases with the [+Wh] feature, and *attracts* each of these to its n specifier positions, according to the principle *Attract Closest* (adapted from Chomsky, 1995, p. 297).

Attract closest. A head which attracts a given kind of constituent attracts the closest constituent of the given kind.[3]

The closest [+Wh]-item is attracted to the topmost specifier position; any additional [+Wh]-items are "tucked in" to the next highest specifier position, and so forth until each specifier position is occupied (Richards, 1997). Each movement operation leaves behind a variable trace coindexed with the moved element. As for the semantic composition, we assume with Kotek (2014) that whenever an i-indexed [Wh]-element encounters a sentence with a free variable x_i, this triggers λ-abstraction over x_i, so that by function application, x_i may be replaced by a variable bound by the pronoun's quantifier. To illustrate, the last steps in the compositional derivation of the CP *who*$_1$ *loves whom*$_2$ will look as in Figure 2.6.

The general rule for translation the body of a list is summarized in (20), where φ_i the formalization of TP$_i$.

(20) Rule for translating the body of a list:
a. $[[\mathrm{C}_{\textsc{decl/int}}\ \mathrm{TP}_1]$ or ... or $[\mathrm{C}_{\textsc{decl/int}}\ \mathrm{TP}_n]] \rightsquigarrow !\varphi_1 \vee \ldots \vee !\varphi_n$

[3] α is *closer* to X than β if and only if α asymmetrically c-commands β.

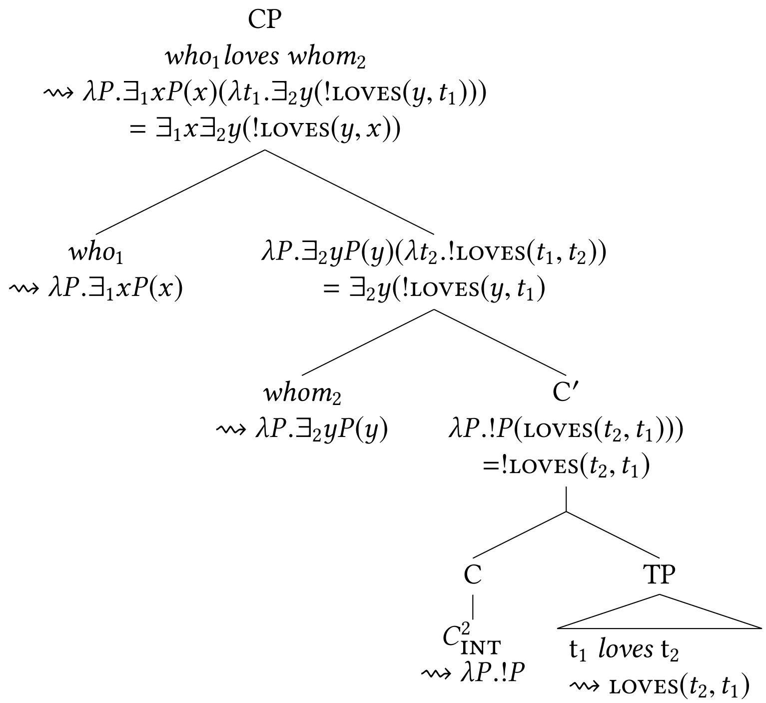


Figure 2.6: Compositional derivation of the CP who_1 *loves* $whom_2$

As in Roelofsen (2015), we define the translations of the relevant combinations of list classifiers and clause type markers in terms of the three projection operators, according to the rule given in (21). B is again of type $\langle\langle s, t\rangle, t\rangle$, thus the type of the body of a list.

(21) Rules for translating the head of a list:

a. [closed decl] $\rightsquigarrow \lambda B.!B$
b. [open int] $\rightsquigarrow \lambda B.?B$
c. [closed int] $\rightsquigarrow \lambda B. \dagger \langle ?\rangle B$

Here, '$\langle ?\rangle$' is a conditional version of the '?' operator, such that $\langle ?\rangle\varphi = ?\varphi$ if φ is non-inquisitive, and $\langle ?\rangle\varphi = \varphi$ otherwise.

2.2.3 Illustration

We are now fully equipped to go from natural language form to meaning for sentences of the relevant types, and will briefly illustrate the full process.

Closed declaratives.

(22) Alice laughed↓. $\rightsquigarrow !!\textsc{laughed}(a)$

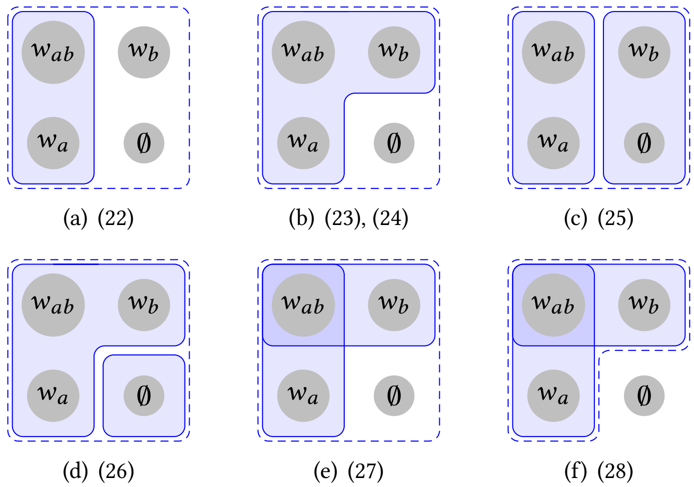


Figure 2.7: The presuppositional meanings of some example natural language sentences.

(23) Alice-or-Bob laughed↓. $\rightsquigarrow !!(\textsc{laughed}(a) \vee \textsc{laughed}(b))$

(24) $[\text{Alice}]_F$ laughed↑ or $[\text{Bob}]_F$ laughed↓. $\rightsquigarrow !(!\textsc{laughed}(a) \vee !\textsc{laughed}(b))$

The closed declaratives are translated as indicated by $\rightsquigarrow$. Figure 2.7 illustrates the presuppositional meanings assigned to these sentences in a four-world, two-individual model analogous to the previous ones. Note that the two disjunctive sentences have the same presuppositional meaning. This is not quite accurate. Biclausal disjunctive sentences are typically interpreted *exhaustively*; that is, (24) is typically taken to convey that *one, and only one* of Alice and Bob laughed. This effect could be taken to result from the presence of a covert exhaustivity operator, as proposed by Roelofsen (2015), or perhaps from the semantics of focus, which will be discussed in Chapter 5. For the purposes of this thesis, it will be sufficient to show that exhaustivity is predicted when the two disjuncts are *clefted*, as in *It was $[\text{Alice}]_F$ (who laughed)* ↑ *or (it was) $[\text{Bob}]_F$ who laughed*↓. This will be done in Chapter 4, and further discussion of biclausal disjunctives is postponed until then.

Open interrogatives.

(25) Did Alice laugh↑? $\rightsquigarrow ?!\textsc{laughed}(a)$

(26) Did Alice-or-Bob laugh↑? $\rightsquigarrow ?!(\textsc{laughed}(a) \vee \textsc{laughed}(b))$

(27) Who laughed↑? $\rightsquigarrow ?\exists x !\textsc{laughed}(x)$

The open interrogatives are translated as indicated, and Figure 2.7 illustrates their presuppositional meanings.

Closed interrogatives.

(28) Did [Alice]$_F$ laugh↑ or (did) [Bob]$_F$ laugh↓?
$\rightsquigarrow \dagger\langle ? \rangle(!\textsc{laughed}(a) \vee !\textsc{laughed}(b))$

The alternative question is translated as indicated, and Figure 2.7 illustrates its presuppositional meaning. Like biclausal disjunctive declaratives, alternative questions are typically interpreted exhaustively. For the same reasons as given for the former type of sentence, we do not derive the exhaustive interpretation here.

Given that the operator '!' only affects the meaning of inquisitive sentences, we will often simplify translations by omitting '!' whenever its argument is non-inquisitive. Likewise, given that '$\langle ? \rangle$' only affects the meaning of non-inquisitive sentences, we may simplify translations by omitting this operator whenever its argument is inquisitive. Both '!' and '?' are idemponent, so that we may further simplify by abbreviating any sequence !! or ?? as ! and ?, respectively.

This concludes our survey of the system of Presuppositional Inquisitive Semantics, and we can now turn to define the suggested enriched notion of L-triviality.

2.2.4 Inquisitive logical triviality

As we have seen, Presuppositional Inquisitive Semantics distinguishes between the *informative* and the *inquisitive* contents of sentences. Both types of content can be trivial: if a sentence φ is not informative (by Definition 2.2.12), or its informative content is the *inconsistent state* φ, we say that *the informative content of* φ *is trivial*. If a sentence φ is not inquisitive (by Definition 2.2.13), we say that *the inquisitive content of* φ *is trivial*.

In addition, if both the informative and inquisitive content of a sentence φ is trivial, we say that φ is *trivial*, simpliciter. If the logical skeleton of φ is trivial in each interpretation, we say that φ is *inquisitively logically trivial* (or IL-trivial, for short):

Definition 2.2.15 (Inquisitive logical triviality)**.** A sentence φ is *IL-trivial* if and only if the logical skeleton of φ is trivial in all interpretations in which it is defined.

As before, the logical skeleton of a sentence keeps fixed the logical constants occurring in the sentence, and replaces any other constituent with a typed variable open for re-interpretation. In the chapters to come, we will assume that the logical skeleton of a sentence preserves clause type markers and classifiers, as well as a set of expressions stipulated to be logical, including in particular sentence connectives, the quantificational determiners *every, all, some, no*, the indefinite pronouns built from these, and interrogative pronouns. We will also come to treat the exclusive particle *only* and *it*-clefts as expressing logical constants, in the form of type $\langle T, T \rangle$ operators. Although most of these expressions can be classified as logical through an intensional version of the condition on permutation invariance (including invariance to permutations of the domain D_s), not all can (recall the discussion of *every*), and this stipulative definition is therefore to be preferred.

In analogy to Gajewski (2009), we will assume that IL-triviality is a source of ungrammaticality of sentences, in accordance with the following principle:

Principle of IL-triviality and grammaticality. A sentence is perceived as ungrammatical if it contains an IL-trivial constituent.

The assumption that this principle is sound is the core of this thesis. The upcoming chapters will show that this assumption allows us to explain various patterns of ungrammaticality involving indefinite and interrogative pronouns, thereby providing indirect support for the principle.

Chapter 3

A semantics for *only* and clefts

The exclusive particle *only* is known to be *focus sensitive*: its semantic contribution to the sentence in which it occurs depends on the placement of *focus* within its scope. (We say equivalently that *only associates with focus*, and that whatever focussed expression on which its semantic contribution currently depends is its *associate*.) For instance, the sentences below (from Velleman et al. (2012)) give rise to distinct exclusive inferences depending on which element in the complex determiner phrase *John's eldest daughter* receives focus marking.

(1) a. Only [John's]$_F$ eldest daughter liked the movie.
$\rightarrow$ *Nobody else's eldest daughter liked the movie.*
b. Only John's [eldest]$_F$ daughter liked the movie.
$\rightarrow$ *None of John's other daughters liked the movie.*

In this chapter, we will be concerned with constructions in which *only* associates with a focussed *quantified determiner phrase*, either in the form of a quantified pronoun, as in (2), or a complex phrase, as in (3).

(2) a. *Only [everyone]$_F$ liked the movie.
b. ?Only [someone]$_F$ liked the movie.
c. *Only [no one]$_F$ liked the movie.

(3) a. Only [every girl]$_F$ liked the movie. $\rightarrow$ No boys liked the movie.
b. *Only [every]$_F$ girl liked the movie.
c. Only every [girl]$_F$ liked the movie. $\rightarrow$ Not every boy liked the movie.

As indicated, the acceptability of such constructions is remarkably restricted. Among quantified pronouns, *only* is marginally acceptable with *someone*, yielding the interpretation *someone but not everyone*, but unacceptable with the universal pronouns *everyone* and *no one*. *Only* is likewise unacceptable with a complex universally quantified determiner phrase in case focus falls on the quantifier, as illustrated in (3-b), but acceptable if focus instead falls on the full DP, as in (3-a), or on the quantifier restrictor, as in (3-c). In a context where the property of being a *girl* contrasts with the property of being a *boy*, (3-a) can be used to imply that *no boys liked the movie*, and (3-c) to imply that *not every boy liked the movie.*

There is, to the best of my knowledge, no extant account of the semantics of *only* that addresses these facts.[1] The literature on focus sensitivity tends to take variations on (4), featuring a focussed proper name, as the base case (e.g., Horn, 1969; Rooth, 1985, 1992; Krifka, 1992; Beaver and Clark, 2009; Coppock and Beaver, 2014, and many others):

(4) Only [Alice]$_F$ liked the movie.

We can paraphrase this sentence as *Alice liked the movie, and no one other than Alice liked the movie.* Since Horn (1969), a widely held view is that (3-a) *presupposes* the first of these conjuncts, and makes *at-issue* the second.[2] This does not explain the pattern in (2) and (3): for instance, we predict that (2-a) conveys the same information as *Everyone liked the movie*, which is not by itself problematic.

In this chapter, I will formulate a version of the above semantics for *only* within Presuppositional Inquisitive Semantics, and show how this semantics allows us to derive the unacceptability of the starred examples as a consequence of these constructions being IL-trivial. Given that the patterns of interest appear already in declarative sentences, L-triviality could, strictly speaking, be sufficient to derive the outlined restrictions. The 'lift' to Inquisitive Semantics, which in turn requires the use of IL-triviality, is motivated by independent concerns: we want an account that is general enough to model occurrences of *only* with disjunctive associates, as in (5), and in interrogatives, as in (6).

(5) Only [Alice-or-Bob]$_F$ liked the movie.

(6) Did only [Alice]$_F$ like the movie?

Our chief aim will still be to provide a semantics that captures the outlined restrictions on the associates of *only*. The discussion of examples like (5) and (6) will therefore be limited, but serve to illustrate how the proposed semantics for *only* extends to disjunctive and interrogative sentences.

In addition to the semantics of *only*, we will discuss the semantics of *it-clefts*, like that in (7).

(7) It was [Alice]$_F$ who liked the movie.

[1]The closest to an exception is Erlewine (2014), who notes the pattern in (2), but is unable to explain it (Erlewine, 2014, footnote 114).

[2]As per convention, I use "at-issue" to refer to the part of the content of a sentence that is *asserted* by asserting the sentence, *asked* by posing the sentence as a question, and so forth, corresponding to *what is said* in the Gricean sense (Grice, 1975).

Just like *only*, *it*-clefts are focus sensitive: their interpretation depends on the placement of focus within their pivot (the constituent between *it was* and the subordinate clause):

(8) a. It was [John's]$_F$ eldest daughter who liked the movie.
→ *Nobody else's eldest daughter liked the movie.*
b. It was John's [eldest]$_F$ daughter who liked the movie.
→ *None of John's other daughters liked the movie.*

Velleman et al. (2012) argue that the semantics of *it*-clefts is essentially the reverse of that of *only*: a construction like (7) presupposes that *no one other than Alice liked the movie*, and makes at-issue that *Alice liked the movie.* Indeed, it is clear that clefts are similar to *only* in the sense that they, too, reject many quantified determiner phrases:

(9) a. ?It was [everyone]$_F$ who liked the movie.
b. *It was [someone]$_F$ who liked the movie.
c. *It was [no one]$_F$ who liked the movie.

(10) a. It was [some girls]$_F$ who liked the movie. → No boys liked the movie.
b. *It was [some]$_F$ girls who liked the movie.
c. It was some [girls]$_F$ who liked the movie. → No boys liked the movie.

An *it*-cleft is marginally acceptable with *everyone*, but unacceptable with *someone* and *no one.* Some speakers—including the author—dislike the particular example in (9-a), but agree that others are much better, such as (11) (from Dufter, 2009):

(11) In this case, it is [everyone]$_F$ who is being discriminated against.

Just as for *only*, the acceptability of *it*-clefts featuring complex quantified determiner phrases varies with the placement of focus within the DP. When the quantifier is *some*, the cleft is unacceptable with focus on the quantifier, as illustrated in (10-b), but acceptable if focus instead includes the whole DP, as in (10-a), or on the quantifier restrictor, as in (10-c). In a context where the property of being a *girl* contrasts with the property of being a *boy*, (10-a) and (10-c) can both be used to imply that *no boys liked the movie.*

The pattern in (9) has received somewhat more attention than the corresponding pattern for *only*. Especially, examples like (9-c) have been used to argue for treating *it*-clefts as presupposing *existence* of someone satisfying the cleft predicate (the predicate of the subordinate clause, here *liked the movie*), for instance in Percus (1997). This, however, does not explain why *it*-clefts also reject *someone.* To explain the full range of observations, I will define a semantics for *it*-clefts within Presuppositional Inquisitive Semantics, and show how this semantics allows us to derive the unacceptability of the starred examples as a consequence of these constructions being IL-trivial. Again, the choice of an inquisitive semantics is motivated by its increased generality: it allows us to model the semantics of interrogatives containing clefts, such as the polar question in (12), and of clefts associating with disjunctions, as in (13).

(12) Was it [Alice]$_F$ who laughed?

(13) It was [Alice-or-Bob]$_F$ who laughed.

Just as for *only*, the discussion of disjunctive and interrogative sentences with *it*-clefts will remain limited. The need for an inquisitive semantics for clefts will however become pressing in the upcoming chapter (Chapter 4), and we will then see how our proposed semantics for *it*-clefts applies to a larger set of disjunctive and interrogative sentences involving clefting.

The chapter is structured as follows. Section 3.1 introduces some basic assumptions about the semantics of focus relevant for the discussions both of *only* and of clefts. Section 3.2 discusses one prominent contemporary account of the semantics of *only*—the *scalar* analysis of exclusive particles proposed by Coppock and Beaver (2014)—and outlines its limitations. A new semantics for the particle is defined within Presuppositional inquisitive semantics, and the key predictions of this semantics are spelled out, in particular for constructions in which *only* occurs with a focussed quantified DP. Section 3.3 discusses one prominent previous account of the semantics of *it*-clefts—the *only*-inspired analysis proposed by Velleman et al. (2012)—and outlines its limitations. A new semantics for *it*-clefts is given within Presuppositional inquisitive semantics, and the key predictions of this semantics are spelled out, in particular for constructions in which clefts occur with a focussed quantified DP. Section 3.4 concludes.

3.1 The semantics of focus sensitivity

We have seen that both *only* and *it*-clefts are focus sensitive, as indicated by the observations that their semantic contribution to a sentence seems to vary with the placement of focus within their scope. As is commonplace, we will capture this fact by taking both *only* and clefts to operate on the set of *focus alternatives* of the sentence they modify. Following Rooth (1985, 1992)'s classical compositional treatment of focus and focus sensitivity, we associate expressions with both an ordinary semantic value—here, a presuppositional inquisitive semantic value $[\![\cdot]\!]$—and a *focus semantic* value, $[\![\cdot]\!]^f$. Rooth took the focus semantic value of a focus marked expression α_τ to be the set of semantic values of type τ, possibly pragmatically restricted to a set of contextually relevant values, C. In the present setting, this allows for a recursive definition of the focus semantic value of any expression in the language as in Definition 3.1.1.

Definition 3.1.1 (Focus semantic values)**.** The focus semantic value of a terminal node α of type τ is

- $D_\tau \cap C$ if α_τ is focus marked,

- $\{[\alpha_\tau]\}$ otherwise.

The focus semantic value of a non-terminal node $\alpha_\tau := \beta_{\langle\sigma,\tau\rangle}(\gamma_\sigma)$ is

- $D_\tau \cap C$ if α_τ is focus marked,
- $\{f(g) \mid f \in [\![\beta_{\langle\sigma,\tau\rangle}]\!]^f$ and $g \in [\![\gamma_\sigma]\!]^f\}$ otherwise.

Note that $[\alpha] \in [\![\alpha]\!]^f$ always holds (unless C is such that $[\alpha]$ itself is deemed irrelevant).

Hence, while the ordinary, presuppositional meaning of a sentence φ will be a pair of a presupposition and a proposition, its focus semantic value will be a *set* of propositions. The underlying intuition is that the elements of the focus semantic value constitutes *alternatives* to the ordinary semantic value of an expression, and that these alternatives may serve as input to a focus sensitive operator. The input of the focus semantic operator in turn determines its contribution to the ordinary semantic value of the expression in which it occurs. In this way, focus sensitive operators *link* focus semantic values to ordinary semantic values. Since different placements of focus within a complex expression α may yield different focus semantic values for α, these differences may end up affecting the ordinary semantic value of a construction in which α occurs as the argument of a focus sensitive operator.

As indicated in the chapter introduction, we will primarily consider examples featuring focussed instances of *two-place quantifiers*, like *some* (of semantic type $\langle\langle e,T\rangle,\langle\langle e,T\rangle,T\rangle\rangle$), *one place (generalized) quantifiers*, like *someone* or *some girls* (of type $\langle\langle e,T\rangle,T\rangle$), and (conjunctions and disjunctions of) *proper names* (of type e). To exemplify, then, we will have that the focus semantic value of *[Alice]$_F$ laughed* is the set

$$[\![[Alice]_F\, laughed]\!]^f_g = \{[\text{LAUGHED}(x)]_{g[x/d]} \mid d \in D_e \cap C\}$$

where C is for instance a restriction to the subset of *human* individuals in D_e, according to the model at hand.

Focus semantic values of scalar items

We will be interested especially in the focus semantic values that are relevant for assessing the *IL-triviality* of a given construction. As IL-triviality is a *semantic* notion, *pragmatic* restrictions of focus semantic values resulting from C will be ignored. Does this mean that we need to always treat the focus semantic value of a focussed expression as its full type domain, when assessing whether a given construction is IL-trivial? Not necessarily. As already indicated, the semantics of *only* and clefts involve *exclusion* of alternatives to their argument. In particular, they involve exclusion of alternatives that *entail* the argument. Since Horn (1972), it is common to assume that certain expressions are lexically associated with an *entailment scale*, often called a *Horn scale*. The

Horn scale of an expression φ is a tuple of expressions of the same type and complexity as φ, ordered by entailment into a scale of increasing informational strength.

(14) Some examples of Horn scales.

a. $\langle$*some, many, most, all*$\rangle$
b. $\langle$*not all, few, no(ne)*$\rangle$
c. $\langle$*one, two, three, four...*$\rangle$
d. $\langle$*or, and*$\rangle$

The expressions in these examples are known as *scalar terms*, and are assumed to have a particularly strong conventionalized association with their Horn scales (see e.g., Chierchia, 2004). As stated, we will assume that both *only* and *it*-clefts operate on the alternatives to a focussed expression which are related to the expression by entailment. In the context of these operators, then, we will only need to look at a subset of the focus semantic value of a focussed scalar term α to determine whether the construction α occurs in is trivial or not: the subset containing the semantic values of the expressions on α's Horn scale. In fact, we can simplify even further, and look only at the set of the semantic values of the *extreme* expressions on the term's scale, given that the scalar terms that we will be concerned with are all extremes (*every/all, some*, and *no*). Either the exclusion operation removes the other extreme, or it does not. If it does, it follows that it would also have excluded any values in between the extremes, if they had been present. If it does not, it follows that it would have preserved all of these values, if present.

Without loss of generality, then, we can restrict attention to models including only the semantic values of the scalar extremes in the focus semantic value of a focussed scalar term. Thus, we will always have that the focus semantic value of focussed *some* is the set

$$[\![[some]_F]\!]^f = \{[some], [every]\}.$$

Indefinite pronouns built from scalar quantifiers will be treated similarly, assuming, for instance, that the focus semantic value of focussed *someone* is always the set of ordinary semantic values of *someone* and *everyone*. Note that the assumption is *not* that the focus semantic value of a focussed (extreme) scalar term α is restricted to these semantic values *in general*. Rather, the assumption is that if α in this construction systematically cannot be made sense of with respect to the restricted focus semantic value, then α cannot be made sense of with respect to a broader focus semantic value, either. We will see that this assumption is, if nothing else, explanatory with respect to the observed patterns of (un)grammaticality.

3.2 *Only*

The exclusive particle *only*—and its cross-linguistic counterparts—give rise to exhaustivity inferences, as illustrated by the contrast between (15) and (16).

(15) $[\text{Alice}]_F$ laughed, and $[\text{Bob}]_F$ did, too.

(16) #Only $[\text{Alice}]_F$ laughed, and $[\text{Bob}]_F$ did, too.

The exhaustive component of *only* is standardly taken to be the at-issue contribution of the particle (Horn, 1969; Rooth, 1985; Krifka, 1992; Beaver and Clark, 2009; Coppock and Beaver, 2014). The proposition expressed by the prejacent of *only*—here, *Alice laughed*—is instead taken to be *presupposed*. The latter assumption is motivated by the observation that this component may not be felicitoulsy targeted by answer particles like *no*, as illustrated by (17), nor by *yeah*, as illustrated by (18).

(17) a. A: Only $[\text{Alice}]_F$ laughed.
b. B: No, {Bob laughed, too. / #Alice didn't laugh}.

(18) a. A: Not only $[\text{Alice}]_F$ laughed.
b. B: Yeah, {Bob laughed, too. / #Alice didn't laugh}.

The pattern in (18) indicates that the prejacent *projects* from under negation, the hallmark of a presupposition.

These examples also illustrate that *only* makes exhausitivity (relative to the presupposition) at-issue. This content is felicitously targeted by *no*, as illustrated by (17-b), and by *yeah*, as illustrated by (18-b).

In this section, we define a semantics for *only* in Presuppositional inquisitive semantics that captures these patterns. This semantics will draw on the treatment of *only* proposed by Coppock and Beaver (2014), and we therefore begin by stating their proposal, and discuss its limitations.

3.2.1 Coppock and Beaver (2014) on *only*

Coppock and Beaver (2014) define the two-fold contribution of *only* via two focus-sensitive operators, $\textsc{min}_S$ and $\textsc{max}_S$, operating on a set of alternatives to a sentence with a focussed constituent. While Coppock and Beaver define the alternatives to such a sentence through a *question under discussion*, we will here define them as *classical* Roothian focus semantic values, potentially restricted by contextual relevance. The difference is superficial given the present purposes.

Definition 3.2.1 ($\textsc{min}_S$ and $\textsc{max}_S$ (adapted from Coppock and Beaver (2014))). Let $[\![\varphi]\!]_c^f$ be the classical focus semantic value of φ, and $\geq, >$ an ordering over

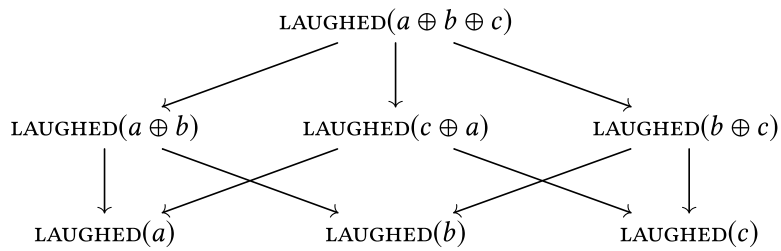


Figure 3.1: Entailment of answers to *Who laughed?*

the alternatives in $[\![\varphi]\!]_c^f$ according to strength.

(19) a. $\textsc{min}_S(\varphi) = \lambda w.\exists\psi \in [\![\varphi]\!]_c^f[\psi(w) \wedge (\psi \geq \varphi)]$
"There is a true alternative in $[\![\varphi]\!]_c^f$ at least as strong as φ."

b. $\textsc{max}_S(\varphi) = \lambda w.\forall\psi \in [\![\varphi]\!]_c^f[(\psi > \varphi) \rightarrow \neg\psi]$
"No true alternative in $[\![\varphi]\!]_c^f$ is strictly stronger than φ."

The *strength ranking* between propositions is per default based on classical logical entailment, but pragmatics may license other rankings.[3] Here, we will only consider the *semantic* ranking given by entailment.

According to Coppock and Beaver, a declarative sentence *only*(φ) presupposes $\textsc{min}_S(\varphi)$, and makes $\textsc{max}_S(\varphi)$ at-issue:

(20) $[\![\text{only}]\!]_c = \lambda p.\lambda w : \textsc{min}_S(p)(w).\textsc{max}_S(p)(w)$

We illustrate this by outlining the meaning assigned to the sentence (21).

(21) Only [Alice]$_F$ laughed.

Coppock and Beaver assume that the placement of focus in this construction restricts the set of relevant focus semantic values to those corresponding to answers to the question *Who laughed?*. For a domain of individuals {Alice, Bob, Carol}, the answers to this question are taken to be those indicated in 3.1, with the entailment relation represented by arrows:

Given this set of answers, related by entailment as indicated in Figure 3.1, (21) comes with the presupposition in (22-b), and makes at-issue (22-c):

[3]For instance, the ranking according to Alice being a *post-doc* outranks her being a *graduate student*, licensing the inference in (i):

(i) Alice is only a [graduate student]$_F$. $\rightarrow$ *Alice is not a post-doc.*

Of course, someone's being a post-doc does not entail one's being a graduate student, yet there is a common-knowledge hierarchical ranking between these properties.

(22) a. Only $[\text{Alice}]_F$ laughed.
b. Presupposition: $\textsc{min}_S(\textsc{laughed}(a))$
$= \textsc{laughed}(a) \vee \textsc{laughed}(ab) \vee \textsc{laughed}(ac) \vee \textsc{laughed}(abc)$
c. At-issue: $\textsc{max}_S(\textsc{laughed}(a))$
$= \neg\textsc{laughed}(ab) \wedge \neg\textsc{laughed}(ac) \wedge \neg\textsc{laughed}(abc)$

Together, these contributions entail $\textsc{laughed}(a)$, and the negation of all other alternatives in Figure 3.1, yielding the intuitive reading of *Only [Alice]$_F$ laughed* as *Alice laughed, and nobody other than Alice laughed.* Thus, this semantics for *only* correctly predicts the pattern in (23).

(23) #Only $[\text{Alice}]_F$ laughed, and $[\text{Bob}]_F$ did, too.

It likewise explains the patterns in (24) and (25).

(24) a. A: Only $[\text{Alice}]_F$ laughed.
b. B: No, {Bob laughed too. / #Alice didn't laugh}.

(25) a. A: Not only $[\text{Alice}]_F$ laughed.
b. B: Yeah, {Bob laughed too. / #Alice didn't laugh}.

In (24), Speaker A's utterance presupposes that Alice laughed, and makes at-issue the proposition that nobody in addition to Alice, such as Bob, laughed. It therefore only the latter that can be felicitously targeted by *no*. In (25), Speaker A's utterance presupposes that Alice laughed, and makes at-issue the proposition that somebody in addition to Alice, such as Bob, laughed. It is therefore only the latter that can be felicitously targeted by *yeah*.

Limitations of Coppock and Beaver (2014)'s treatment of *only*

Coppock and Beaver's account makes certain promising predictions for declaratives featuring quantified determiner phrases with *every*. For instance, if we assume that $[\![[everyone]_F]\!]^f_c = \{[\![everyone]\!]_c, [\![someone]\!]_c\}$, their account allows us to derive that a sentence like (26) presupposes that *Everyone laughed*, and redundantly makes at-issue the same proposition.

(26) *Only $[\text{everyone}]_F$ laughed.

If we can show that this redundancy derives from the logical components of the sentence, we may account for its systematic unacceptability.

Still, Coppock and Beaver's treatment of *only* makes other, less welcome, predictions. First, their account struggles with constructions in which *only* associates with a focussed *disjunction*, as in (27):

(27) Only $[\text{Alice-or-Bob}]_F$ laughed.

On Coppock and Beaver's account, this sentence is contradictory. To see this, assume—intuitively—that the focus semantic value of a focussed disjunction includes the ordinary semantic values of its disjuncts. That is, the focus semantic value of *[Alice-or-Bob]$_F$ laughed* includes the ordinary semantic values of *Alice laughed* and *Bob laughed*. Of course, both of these disjuncts entail their disjunction, so that $\textsc{max}_S$ contributes the information that both of these disjuncts are false. But then the disjunction must be false as well, contradicting the presupposition that the disjunction holds.

Second, Coppock and Beaver's account does not handle the full range of data on *only* associating with focussed determiner phrases featuring the quantifier *no*. They take the focus structure of a sentence like (28) to indicate that the sentence' intended context of evaluation is one in which the question *Who laughed?* is under discussion.

(28) *Only [no one]$_F$ laughed.

As discussed further in Velleman et al. (2012)'s exposition of Coppock and Beaver's account, the question *Who laughed?* may be taken to presuppose that *Someone laughed*, so that the intended context of evaluation of (28) is restricted to accommodate this information. Naturally, such a context is incompatible with the information conveyed by the prejacent of (28), resulting in inconsistency.

We may tentatively grant the assumption that *wh*-questions come with the relevant existential presupposition. We may also grant that this "indirect" association between an utterance of (28) and an existential presupposition suffices to explain the perception of the sentence as *systematically* unacceptable. Still, such an explanation of the unacceptability of (28) does not extend to account for the unacceptability of constructions like (29):

(29) *Only [no girls]$_F$ laughed.

The proposition expressed by *No girls laughed* is fully compatible with the presupposition that *Someone laughed*. In the context with Alice, Bob, and Carol, this proposition equals the proposition expressed by *Bob laughed*. But clearly, *Only [Bob]$_F$ laughed* is fine, while (29) is not.

Finally, Coppock and Beaver's semantics for *only* is designed to account for the contribution of *only* in declarative sentences. Thus, without pairing the proposal with a semantics for interrogative sentences, we cannot assign meanings to questions featuring *only*, like the polar question in (30):

(30) Did only [Alice]$_F$ laugh?

Intuitively, (64) raises the issue as to whether only Alice laughed, or someone *in addition to* Alice laughed. This is indicated by the pattern in (31).[4]

[4]Some informants disagree with this judgement when the dialogue is presented in isolation, judging that Speaker A need not presuppose that Alice laughed. I think this is due to two factors. First, the

(31) a. A: Did only [Alice]$_F$ laugh?
b. B: No, {Bob laughed too / #Alice didn't laugh}.
c. B′: Yes, nobody else laughed.

These observations indicate that the explanation of the unacceptability of (26) and sentences like it ultimately needs to take another semantics for the exclusive particle as its starting point. The upcoming section will propose such a semantics, and show that it avoids the problematic predictions. The issue regarding disjunctive associates is an instance of the well-known *exclusion problem* for disjunctions. This has comparably well-known solutions, for instance in the form of Fox (2007)'s *innocent exclusion*. In brief, Fox defines an exclusion operation that takes care to exclude only those alternatives to an expression φ that can be jointly negated without contradicting φ. We will implement a version of this in our semantics for *only*, and see that this allows a more intuitive treatment of these examples.

The unacceptability of (29) suggests that the existential presupposition associated with *only* is stronger than what was assumed by Coppock and Beaver. In this sentence, the presuppositional requirement seems to be not that the prejacent of *only* is *compatible* with *Someone laughed*, but rather that the prejacent *entails Someone laughed*. We will see that there is a way of implementing this idea in the semantics for *only* that allows us to capture the systematic unacceptability of sentences like (29), without predicting that *only* is bad with *all no*-DP:s: examples like (32) are fine.

(32) Only no [girls]$_F$ laughed.

As the resulting semantics for *only* will assume the framework of Presuppositional Inquisitive Semantics, it will straightforwardly extend to cover both declarative and interrogative sentences featuring the particle.

3.2.2 *Only* in Presuppositional Inquisitive Semantics

Similarly to Coppock and Beaver (2014), we define the semantics of *only* via two operators MIN and MAX. Each operator takes a sentence as input—intuitively, the prejacent of *only*—and returns an information state. MIN(φ) simply returns the informative content of φ, capturing that *at least* φ holds. Conversely, we want MAX(φ) to capture that, out of the propositions in $[\![\varphi]\!]^f$, *at most* $[\varphi]$ holds at the actual world. Given the discussion of disjunctive associates in the previous section, we want to avoid that MAX(φ) thereby

preferred way of posing a question of the given form and same intended meaning is with focus on *only*: it then contrasts with the alternative not only Alice. Second, the intended reading is enforced if the dialogue is contrasted with one in which Speaker A utters a sentence *broad* focus on the constituent *only Alice*:

(i) A: Did [only Alice]$_F$ laugh?

This is robustly judged as not presupposing that Alice laughed, and when presented in parallel to Speaker A's utterance in (31), the latter is judged as presupposing that Alice laughed.

excludes the possibility that φ itself holds. For instance, if φ is of the form $\psi \vee \chi$, so that $[\psi], [\chi] \in [\![\varphi]\!]^f$, we do not want $\textsc{max}(\varphi)$ to exclude the possibility that ψ holds at the actual world *as well as* the possibility that χ holds at the actual world. We arrive at a suitable definition for $\textsc{max}(\varphi)$ that avoids this through the following steps.

First, we collect the set of *overlaps* between the informative content of φ and the information conveyed by the propositions in $[\![\varphi]\!]^f$ that $[\varphi]$ is not included in:

(33) $\mathsf{overlap}(\varphi) = \{s \mid s = \mathsf{info}(\varphi) \cap \bigcup p \text{ for some } p \in [\![\varphi]\!]^f \text{ such that } [\varphi] \nsubseteq p\}$

Recall that inclusion corresponds to *entailment*, so that $\mathsf{overlap}(\varphi)$ collects the information states that support both $[\varphi]$ and some proposition not entailed by $[\varphi]$. We want the information state $\textsc{max}(\varphi)$ to exclude as many of these overlaps as possible, without excluding the whole of $\mathsf{info}(\varphi)$. Drawing on Fox (2007), we define an operation $\textsc{iex}$ that extracts from $\mathsf{overlap}(\varphi)$ all information states that are *innocently excludable* from $\mathsf{info}(\varphi)$: all information states that are contained in *every* maximal subset A of $\mathsf{overlap}(\varphi)$ such that $\bigcup A$ can be removed from any alternative in $[\varphi]$ without fully eliminating it.[5]

(34) $\textsc{iex}(\varphi) = \bigcap\{A \mid A \text{ is a maximal subset of } \mathsf{overlap}(\varphi) \text{ such that:}$
$\forall \alpha \in \mathsf{alt}(\varphi) : \alpha - \bigcup A \neq \emptyset\}$

Thus, the members of $\textsc{iex}(\varphi)$ are those states that can *always* be removed when removing as many overlaps as possible from the alternatives in $[\varphi]$ without eliminating any of them. Given our definition of overlap, this means that the set $W - \bigcup \textsc{iex}(\varphi)$ is the information state that is consistent with as few propositions in $[\![\varphi]\!]^f$ as possible, while still being consistent with every alternative in $[\varphi]$. For the case where φ has a single alternative, this amounts to $W - \bigcup \textsc{iex}(\varphi)$ being "classically" consistent with φ, in the sense of being consistent with $\mathsf{info}(\varphi)$. This is indeed what we want $\textsc{max}(\varphi)$ to yield, and we therefore define this, together with $\textsc{min}(\varphi)$, as in Definition 3.2.2.

Definition 3.2.2 ($\textsc{min}$ and $\textsc{max}$)**.**

- $\textsc{min}(\varphi) := \mathsf{info}(\varphi)$
- $\textsc{max}(\varphi) := W - \bigcup \textsc{iex}(\varphi)$

To capture the strong existential presupposition associated with *only*, we will assume that the presuppositional component of the particle amounts to the inconsistent state, unless its prejacent entails its own *existential focus closure.* [6]

[5] Obviously, both $\textsc{iex}$ and overlap can be given more general definitions, taking an additional set as input, rather than being hard-coded to operate on the sets $[\![\varphi]\!]^f$ and $\mathsf{overlap}(\varphi)$, respectively, for an input φ. For our very dedicated purposes, however, the stated definitions are more convenient.

[6] Existential focus closure draws inspiration from Schwarzschild (1999), who defines a namesake oper-

Definition 3.2.3 (Existential focus closure)**.** The *existential focus closure* of an expression φ, denoted by $\textsc{efc}(\varphi)$, is the result of substituting any focus marked constituents $\alpha_1, ..., \alpha_n : \alpha_1, ..., \alpha_n \in D_e \cup D_{\langle\langle e,T\rangle,T\rangle}$ in φ for $\alpha'_1, ..., \alpha'_n$, and applying $!\exists u_1 ... !\exists u_n$ to the result, where $u_1, ..., u_n \in D_e$ and do not occur free in φ. We define α'_i as

- u_i if $\alpha_i \in D_e$
- $\lambda P.P(u_i)$ if $\alpha_i \in D_{\langle\langle e,T\rangle,T\rangle}$.

The existential focus closure of a sentence φ containing a focussed expression of type e or $\langle\langle e,T\rangle,T\rangle$—that is, a focussed individual denoting expression or one-place quantifier—amounts to the proposition that some individual satisfies the property denoted by the non-focussed part of the prejacent. For sentences without focussed subconstituents of the relevant types, the existential focus closure is vacuous.

Our definition of *only*, incorporating the above components, can now be given as in Definition 3.2.4.

Definition 3.2.4 (The semantics of *only*)**.** $[\![only(\varphi)]\!] = \langle\pi, A\rangle$, where

- $\pi = \textsc{min}(\varphi)$ if $\varphi \vDash \textsc{efc}(\varphi)$,
  $\emptyset$ otherwise
- $A = \wp(\textsc{max}(\varphi)) \upharpoonright \pi$

Thus, a construction *only*(φ) presupposes that φ is true, if φ entails its existential focus closure, and presupposes the inconsistent state otherwise.[7] Since $\mathsf{info}(\varphi)$ never includes

ation where the focussed element is simply *removed*, rather than replaced with a type-identical variable. As far as I can see, Schwarzchild's operation only works as intended for the simple case when the focussed constituent is an individual denoting expression in subject position, and the operation in 3.2.3 is therefore to prefer.

[7]There are cases which at first glance seem to contradict this assumption. For instance, the sentence *less than two people laughed* does not seem to entail that *some people laughed*, as evidenced by the acceptability of sentences like (i).

(i) Jack read fewer than three books. In fact, he read none. (Mayr, 2013)

Yet, constructions like (ii) seem at least marginally acceptable:

(ii) ?Only [fewer than two people]$_F$ laughed.

We can hypothesize that this is due to *fewer than x A* triggering a conventionalized scalar implicature to *some A*, which *no A*, for obvious reasons, does not license. Potentially, then, the requirement that the prejacent entails its existential focus closure should be loosened to be satisfied also when certain *pragmatic enrichments* of the prejacent entail the existential focus closure.

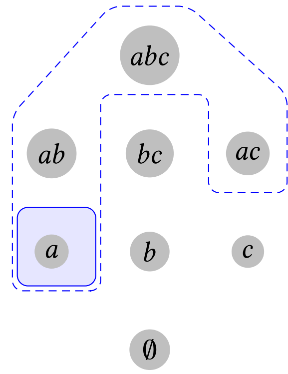


Figure 3.2: Presuppositional meaning of (35): *Only [Alice]$_F$ laughed.*

worlds not in presup(φ), *only*(φ) will automatically presuppose what φ presupposes. This captures that presuppositions *project* out of *only*. Finally, *only*(φ) makes at-issue the proposition that is consistent with as few propositions in $[\![\varphi]\!]^f$ as possible, while being consistent with every alternative in $[\varphi]$. Note that this proposition is always *non-inquisitive*, since it is always a power set of an information state.

Illustration

To illustrate the workings of this semantics, we consider the predicted contribution of *only* to some simple sentences. Consider first the declarative in (35), with the (simplified) formal translation indicated by $\rightsquigarrow$. Focus marking is indicated by underlining.

(35) Only [Alice]$_F$ laughed. $\rightsquigarrow$ *only*($\textsc{laughed}(\underline{a})$)

In a context with a domain consisting of Alice ($\boldsymbol{a}$), Bob ($\boldsymbol{b}$), Carol ($\boldsymbol{c}$), picked out by the obvious constants, we have that $[\![\underline{a}]\!]^f = [\![\underline{b}]\!]^f = [\![\underline{c}]\!]^f = \{\boldsymbol{a}, \boldsymbol{b}, \boldsymbol{c}\}$, and can then represent the presuppositional meaning of (35) as in Figure 3.2 (only alternatives shown). To improve readability of the diagram, we abbreviate any world w_i as i.

Before discussing it further, we describe how this meaning is derived. Since $\textsc{efc}(\textsc{laughed}(\underline{a})) =!\exists u \textsc{laughed}(\underline{a})$, we have that $\textsc{laughed}(\underline{a}) \vDash \textsc{efc}(\textsc{laughed}(\underline{a}))$, and therefore the *presupposition* of (35) is the set $\textsc{min}(\textsc{laughed}(\underline{a})) = \mathsf{info}(\textsc{laughed}(\underline{a})) = \{w_a, w_{ab}, w_{ac}, w_{abc}\}$.

The *proposition* expressed by the sentence is the set of states $[only(\textsc{laughed}(\underline{a}))]$, defined as $\wp(\textsc{max}(\textsc{laughed}(\underline{a}))) \upharpoonright \{w_a, w_{ab}, w_{ac}, w_{abc}\}$. We spell this out as follows. overlap($\textsc{laughed}(\underline{a})$) gives us a set of two states:

- the state $\{w_{ab}, w_{abc}\}$, which is the overlap $\mathsf{info}(\textsc{laughed}(\underline{a})) \cap \mathsf{info}(\textsc{laughed}(b))$, and

- the state $\{w_{ac}, w_{abc}\}$, which is the overlap $\mathsf{info}(\textsc{laughed}(\underline{a})) \cap \mathsf{info}(\textsc{laughed}(c))$.

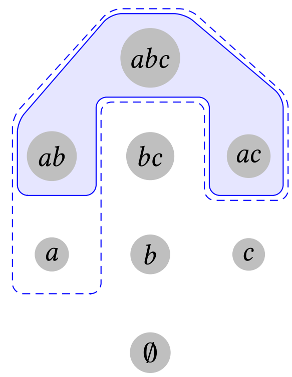


Figure 3.3: Presuppositional meaning of (37): *Not only [Alice]$_F$ laughed.*

The union of these states, $\{w_{ab}, w_{ac}, w_{abc}\}$, can be removed from info(LAUGHED($\underline{a}$)) = $\{w_a, w_{ab}, w_{ac}, w_{abc}\}$ without yielding the empty set. Therefore, MAX(LAUGHED($\underline{a}$)) is the set W − IEX(LAUGHED($\underline{a}$)) = $W - \{w_{ab}, w_{ac}, w_{abc}\} = \{w_a, w_b, w_c, w_{bc}, w_\emptyset\}$. Thus, the proposition reduces to the set $\wp(\{w_a, w_b, w_c, w_{bc}, w_\emptyset\}) \upharpoonright \{w_a, w_{ab}, w_{ac}, w_{abc}\} = \{\{w_a\}, \emptyset\}$.

As Figure 3.2 illustrates, the sentence *Only [Alice]$_F$ laughed* presupposes that the actual world is such that *Alice laughed* is true, and with respect to this expresses the proposition whose only alternative embodies the information that *Alice, and no one else, laughed.* The proposed semantics thereby accounts for the pattern in (36).

(36) a. A: Only [Alice]$_F$ laughed.
b. B: No, {Bob laughed, too. / #Alice didn't laugh}.

Consider now the negated declarative in (37), with the indicated (simplified) formal translation.

(37) Not only [Alice]$_F$ laughed. $\rightsquigarrow$ ¬*only*(LAUGHED($\underline{a}$))

Figure 3.3 depicts the presuppositional meaning of this sentence, which is derived as follows. Since negation adds noting to the presuppositions of its prejacent, the *presupposition* of the sentence is again the set $\{w_a, w_{ab}, w_{ac}, w_{abc}\}$. The *proposition* expressed by the sentence is the set [¬*only*(LAUGHED($\underline{a}$))], defined as [*only*(LAUGHED($\underline{a}$))]* $\upharpoonright \{w_a, w_{ab}, w_{ac}, w_{abc}\}$. Since we already know that [*only*(LAUGHED($\underline{a}$))] = $\{\{w_a\}, w_\emptyset\}$, we derive that [*only*(LAUGHED($\underline{a}$))]* is the set $\{\{w_a\}\}^* = \{s \mid \forall s' \subseteq s : \text{ if } s' \neq \emptyset \text{ then } s' \notin \{\{w_a\}\}\} = \wp(W) - \{\{w_a\}\}$. The proposition then reduces to the set $\wp(W) - \{\{w_a\}\} \upharpoonright \{w_a, w_{ab}, w_{ac}, w_{abc}\} = \wp\{w_{ab}, w_{ac}, w_{abc}\}$.

Like its non-negated counterpart, the sentence *Not only [Alice]$_F$ laughed* presupposes that *Alice laughed*, but instead expresses the proposition whose only alternative is the state embodying the information that *Alice, and someone else, laughed.* The pro-

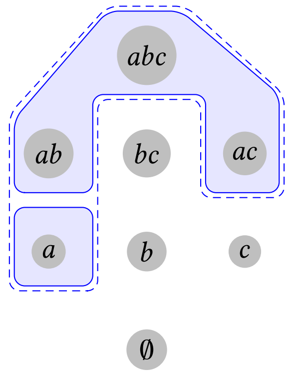


Figure 3.4: Presuppositional meaning of (39): *Did only* $[Alice]_F$ *laugh?*

posed semantics thereby accounts for the pattern in (38).

(38) a. A: Not only $[\text{Alice}]_F$ laughed.
b. B: Yeah, {Bob laughed, too. / #Alice didn't laugh}.

Consider now the polar question in (39), with the indicated (simplified) formal translation.

(39) Did only $[\text{Alice}]_F$ laugh? $\rightsquigarrow$ $?only(\textsc{laughed}(\underline{a}))$

Figure 3.4 depicts the presuppositional meaning of this sentence. This is derived as follows. Since '?' adds nothing to the presupposition of its prejacent, the *presupposition* of this sentence is again the state $\{w_a, w_{ab}, w_{ac}, w_{abc}\}$. The *proposition* expressed by the sentence is the set $[?only(\textsc{laughed}(\underline{a}))]$, defined as $[only(\textsc{laughed}(\underline{a}))]$ $\cup$ $\wp(\text{presup}(only(\textsc{laughed}(\underline{a}))) - \text{info}(only(\textsc{laughed}(\underline{a}))))$. We know from earlier that $[only(\textsc{laughed}(\underline{a}))] = \{\{w_a\}, \emptyset\}$, so that we get $\text{info}(only(\textsc{laughed}(\underline{a}))) = \{w_a\}$, and $\text{presup}(only(\textsc{laughed}(\underline{a}))) = \{w_a, w_{ab}, w_{ac}, w_{abc}\}$. Thus, the proposition reduces to the union of $\{\{w_a\}, \emptyset\}$ and $\wp(\{w_a, w_{ab}, w_{ac}, w_{abc}\} - \{w_a\}) = \wp(\{w_{ab}, w_{ac}, w_{abc}\})$.

Like its declarative counterpart, the sentence *Did only* $[Alice]_F$ *laugh?* presupposes that *Alice laughed*, but makes at issue the proposition with the two alternatives corresponding to the information that *Alice, and noone else, laughed*, and that *Alice, and someone else, laughed*, respectively. The proposed semantics thereby accounts for the pattern in (40).

(40) a. A: Did only $[\text{Alice}]_F$ laugh?
b. B: No, {Bob laughed too / #Alice didn't laugh}.
c. B′: Yes, nobody else laughed.

Finally, consider the disjunctive declarative sentence in (41), with the indicated (simplified) formal translation.

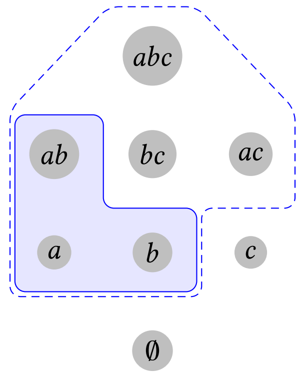


Figure 3.5: Presuppositional meaning of (41): *Only [Alice-or-Bob]$_F$ laughed.*

(41) Only [Alice-or-Bob]$_F$ laughed. $\rightsquigarrow$ $only(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}))$

Figure 3.5 depicts the presuppositional meaning of this sentence, which is derived as follows. Since $\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}) \vDash\, !\exists v !\exists u(\textsc{laughed}(u) \vee \textsc{laughed}(v))$, we have that $\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}) \vDash \textsc{efc}(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}))$. Thus, the *presupposition* of the sentence is the state $\textsc{min}(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b})) = \mathsf{info}(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b})) = \{w_a, w_b, w_{ab}, w_{ac}, w_{bc}, w_{abc}\}$.

The *proposition* expressed by the sentence, $[only(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}))]$, is defined as $\wp(\textsc{max}(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}))) \upharpoonright \{w_a, w_b, w_{ab}, w_{ac}, w_{bc}, w_{abc}\}$. Now, $\mathsf{overlap}(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}))$ gives us a set of five states: the set $A = \{w_a, w_{ab}, w_{ac}, w_{abc}\}$, which is the overlap with $\mathsf{info}(\textsc{laughed}(a))$, the state $B = \{w_b, w_{ab}, w_{bc}, w_{abc}\}$, which is the overlap with $\mathsf{info}(\textsc{laughed}(b))$, the state $C = \{w_{ac}, w_{bc}, w_{abc}\}$, which is the overlap with $\mathsf{info}(\textsc{laughed}(c))$, the state $A \cup C$, which is the overlap with $\mathsf{info}(\textsc{laughed}(a) \vee \textsc{laughed}(c))$, and the state $B \cup C$, which is the overlap with $\mathsf{info}(\textsc{laughed}(b) \vee \textsc{laughed}(c))$. Out of these, only C is *innocently excludable*; thus, we have that $\textsc{max}(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b})) = W - \{w_{ac}, w_{bc}, w_{abc}\} = \{w_a, w_b, w_c, w_{ab}, w_\emptyset\}$. This means that the proposition reduces to the set $\wp(\{w_a, w_b, w_c, w_{ab}, w_\emptyset\}) \upharpoonright \{w_a, w_b, w_{ab}, w_{ac}, w_{bc}, w_{abc}\} = \wp(\{w_a, w_b, w_{ab}\})$.

This sentence presupposes that the actual world is such that at least one of Alice and Bob laughed, and makes at-issue the proposition whose only alternative is the state embodying the information that *at least one of Alice and Bob laughed, and no one else laughed.* This reading accords with intuition, and moreover shows that the proposed semantics avoids Coppock and Beaver (2014)'s problematic prediction that *only* cannot associate with disjunctions without yielding a contradiction.

3.2.3 *Only* and IL-triviality

We now turn to outline the predictions made by the proposed semantics for constructions in which *only* associates with a determiner phrase featuring one of the quantifiers *every*, *some*, and *no*.

Only every-

We first consider sentences where the focussed expression is an *every-* pronoun, like (42).

(42) *Only [everyone]$_F$ laughed. $\rightsquigarrow$ *only*$(\underline{\forall} x \textsc{laughed}(x))$

To increase readability, we indicate focus marking on a full one-place quantifier in the formal language through underlining of the quantifier symbol.

On our semantics, this sentence is IL-trivial: its logical skeleton always expresses a tautologous, non-inquisitive proposition. Recall that non-inquisitiveness holds for all sentences with wide-scope *only*. To show that (42) is IL-trivial, then, we only need to show that the *informative content* of its logical skeleton is always trivial. The proof is simple and given below. As motivated, we restrict attention to the class of interpretations such that the focus semantic value of focussed *everyone* includes at most the ordinary semantic value of *everyone* and *someone*.

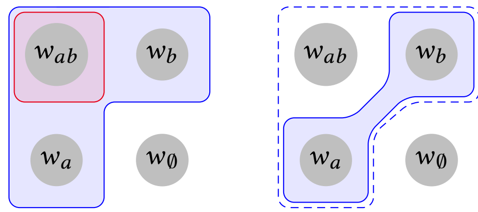
Proof. Let M, g be an arbitrary model and assignment such that $[\![\underline{\forall} x \boldsymbol{P}(x)]\!]^f_{M,g} = \{[!\exists x \boldsymbol{P}(x)]_{M,g}, [\forall x \boldsymbol{P}(x)]_{M,g}\}$. The interpretation of the logical skeleton of (42) in M with respect to g is given in (43).

(43) $[\![only(\underline{\forall} x \boldsymbol{P}(x))]\!]_{M,g} = \langle \pi, A\rangle$, where

- $\pi = \textsc{min}_{M,g}(\underline{\forall} x \boldsymbol{P}(x))$ if $\underline{\forall} x \boldsymbol{P}(x) \vDash \textsc{efc}(\underline{\forall} x \boldsymbol{P}(x))$,
  $\emptyset$ otherwise
- $A = \wp(\textsc{max}_{M,g}(\underline{\forall} x \boldsymbol{P}(x)) \restriction \pi$

We show that $\mathsf{info}_{M,g}(A) = \pi$. First, note that $\textsc{efc}(\underline{\forall} x \boldsymbol{P}(x)) =!\exists u \boldsymbol{P}(u)$, and that $\underline{\forall} x \boldsymbol{P}(x) \vDash \textsc{efc}(\underline{\forall} x \boldsymbol{P}(x))$ thereby holds. Thus, $\pi = \textsc{min}_{M,g}(\underline{\forall} x \boldsymbol{P}(x)) = \mathsf{info}_{M,g}(\underline{\forall} x \boldsymbol{P}(x))$. We further have that $\mathsf{overlap}_{M,g}(\underline{\forall} x \boldsymbol{P}(x)) = \{\mathsf{info}_{M,g}(\underline{\forall} x \boldsymbol{P}(x))\}$. Since $\mathsf{info}_{M,g}(\underline{\forall} x \boldsymbol{P}(x))$ is the maximal element of $[\underline{\forall} x \boldsymbol{P}(x)]_{M,g}$, the unique overlap is not innocently excludable. Thus, we get that $\textsc{max}_{M,g}(\underline{\forall} x \boldsymbol{P}(x)) = W$, so that $A = \wp(W) \restriction \mathsf{info}_{M,g}(\underline{\forall} x \boldsymbol{P}(x)) = \mathsf{info}_{M,g}(\underline{\forall} x \boldsymbol{P}(x))$, which is what we wanted to show. $\square$

This indicates a general pattern. (42) is IL-trivial as a consequence of the focussed quantifier being the *strongest* on its scale, for this means that all of the focus alternatives of the (smallest) sentence φ in which the quantifier occurs are entailed by φ. Since entailment corresponds to inclusion, the unique overlap between the informative contents of



(a) $[\![(45)]\!]^f$ (b) $[\![(45)]\!]$

Figure 3.6: Focus semantic value and presuppositional meaning of (45).

φ and its focus alternatives is $\mathsf{info}(\varphi)$ itself. This is never innocently excludable; hence, the proposition expressed will have a trivial informative content.

By this reasoning, we also get that (44-b) is IL-trivial:

(44) a. Only [every girl]$_F$ laughed. $\longrightarrow$ No boys laughed.
 b. *Only [every]$_F$ girl laughed.
 c. Only every [girl]$_F$ laughed. $\longrightarrow$ Not every boy laughed.

In contrast, (44-a) and (44-c) are predicted to be meaningful. The former can, for instance, be used to exclude the focus alternative expressed by *Some boys laughed*, which neither entails nor is entailed by *Every girl laughed*. The latter can, for instance, be used to exclude the focus alternative expressed by *Every boy laughed*, which again neither entails nor is entailed by *Every girl laughed*.

Only some-

We first consider the case where the focussed expression is a *some*-pronoun, as in (45).

(45) ?Only [someone]$_F$ laughed.
 (Simplified) translation: $only(\exists x\textsc{laughed}(x))$

This is not IL-trivial: it has a felicitous reading as, for instance, *Someone, but not everyone, laughed*. To see this, consider the case where $[\![[someone]_F]\!]^f_g = \{[someone]_g, [everyone]_g\}$, and we have our usual two-person toy model. The focus semantic value of *[Someone]$_F$ laughed* is depicted in 3.6(a), with the alternative of *Everyone laughed* in red, and the alternative of *Someone laughed* in blue.

The presuppositional meaning of the sentence is depicted in 3.6(b). The presupposition corresponds to the information conveyed by *Someone laughed*, and the proposition expressed innocently excludes the state corresponding to the information conveyed by *Everyone laughed*. (We do not attempt at an explanation of the '?'-judgement here.)

We do not predict that any of the sentences in (46) are ungrammatical. In the right model, (46-a) and (49-c) may both be used to exclude the focus alternative expressed by *Some boys laughed.* Similarly, (46-b) may be used to exclude the focus alternative expressed by *Every girl laughed.*

(46) a. Only [some girls]$_F$ laughed. → No boys laughed.
b. Only [some]$_F$ girls laughed. → Not all girls laughed.
c. Only some [girls]$_F$ laughed. → No boys laughed.

Only no-

We first consider sentences where the focussed expression is a *no*-pronoun, like (47).

(47) *Only [no one]$_F$ laughed.
(Simplified) translation: $only(\underline{\neg\exists} x\textsc{laughed}(x))$

This is IL-trivial: its logical skeleton always expresses the set of the inconsistent state.[8]

Proof. Let M, g be an arbitrary model and assignment.

(48) $[\![only(\underline{\neg\exists} x\boldsymbol{P}(x))]\!]_{M,g} = \langle \pi, A\rangle$, where
- $\pi = \textsc{min}(\underline{\neg\exists} x\boldsymbol{P}(x))$ if $\underline{\neg\exists} x\boldsymbol{P}(x) \vDash \textsc{efc}(\underline{\neg\exists} x\boldsymbol{P}(x)))$,
$\emptyset$ otherwise
- $A = \wp(\textsc{max}(\underline{\neg\exists} x\boldsymbol{P}(x)) \restriction \pi$

Since $\textsc{efc}(\underline{\neg\exists} x\boldsymbol{P}(x)) = !\exists u\boldsymbol{P}(u) = \neg\neg\exists u\boldsymbol{P}(u)$, it is immediately clear that $\underline{\neg\exists} x\boldsymbol{P}(x) \nvDash \textsc{efc}(\underline{\neg\exists} x\boldsymbol{P}(x)))$. Thus, $\pi = \emptyset$, so that $A = \{\emptyset\}$ follows. □

We can additionally show that (49-a) and (49-b) are IL-trivial, and that (49-c) is not.

(49) a. *Only [no girls]$_F$ laughed.
b. *Only [no]$_F$ girls laughed.
c. Only no [girls]$_F$ laughed. → Some boys laughed.

The IL-triviality of (49-a) follows from the condition that the prejacent of *only* entails its own existential focus closure, just like the IL-triviality of (47) did. The IL-triviality of (49-b) follows analogously to the IL-triviality of (42) and (44-b), since *no* is the strongest quantifier on its scale. In contrast, (49-c) is meaningful: it may for instance be used to exclude the logically independent focus alternative *No boys laughed.*

This concludes the discussion of our proposed semantics for *only*, and our predictions regarding the (un)grammaticality of sentences featuring focussed quantified determiner phrases.

[8] It should be noted that the IL-triviality of (47) is not crucially dependent on the assumption that *only* requires its prejacent to entail its existential focus closure (although the proof outlined here makes use of this assumption). Were we to discard this assumption, IL-triviality can instead be derived in analogy to the IL-triviality of *Only [everyone]$_F$ laughed*: like *every*, *no* is the strongest quantifier on its Horn scale.

3.3 Clefts

Like *only*, *it*-clefts give rise to exhaustivity inferences, as illustrated by the contrast between (50) and (51).

(50) $[\text{Alice}]_F$ laughed, and $[\text{Bob}]_F$ did, too.

(51) #It was $[\text{Alice}]_F$ who laughed, and $[\text{Bob}]_F$ did, too.

Unlike *only*, the exhaustive component of an *it*-cleft seems presupposed, rather than made at-issue. It is not felicitously targeted by *no*, as illustrated by (52), nor by *yeah*, as illustrated by (53).

(52) a. A: It was $[\text{Alice}]_F$ who laughed.
b. B: No, {#Bob laughed, too / Alice didn't laugh}.

(53) a. A: It wasn't $[\text{Alice}]_F$ who laughed.
b. B: Yeah, {#Bob laughed, too / Alice didn't laugh}.

These examples also illustrate that an *it*-cleft makes the proposition expressed by the prejacent (relative to the presupposition) at-issue. This proposition is felicitously targeted by *no*, as illustrated by (52-b), and by *yeah*, as illustrated by (53-b).

In this section, we define a semantics for *it*-clefts in Presuppositional Inquisitive Semantics that captures these patterns. This semantics will draw on the treatment of clefts proposed by Velleman et al. (2012), and we therefore begin by stating their proposal, and discuss its limitations.

3.3.1 Velleman et al. (2012) on clefts

Velleman et al. (2012) propose to capture the outlined patterns by treating clefts as making the *reverse* contribution from Coppock and Beaver (2014)'s *only*. An *it*-cleft, on their semantics, presupposes the (classical) proposition that its prejacent is the strongest among its focus alternatives, and makes at-issue the (classical) proposition that the prejacent is true.

(54) $[\![only]\!]_c = \lambda p.\lambda w : \textsc{min}_S(p)(w).\textsc{max}_S(p)(w)$

(55) $[\![\textsc{cleft}]\!]_c = \lambda p.\lambda w : \textsc{max}_S(p)(w).\textsc{min}_S(p)(w)$

We repeat Coppock and Beaver's definition of $\textsc{min}_S$ and $\textsc{max}_S$, used also by Velleman et al., for convenience.

Definition 3.3.1 ($\textsc{min}_S$ and $\textsc{max}_S$ (adapted from Coppock and Beaver (2014))**.** Let $[\![\varphi]\!]_c^f$ be the (contextually restricted) classical focus semantic value of φ, and $\geq, >$ an ordering over the alternatives in $[\![\varphi]\!]_c^f$ according to strength.

(56) a. $\textsc{min}_S(\varphi) = \lambda w.\exists\psi \in [\![\varphi]\!]^f_c[\psi(w) \wedge (\psi \geq \varphi)]$
"There is a true alternative in $[\![\varphi]\!]^f_c$ at least as strong as φ."
b. $\textsc{max}_S(\varphi) = \lambda w.\forall\psi \in [\![\varphi]\!]^f_c[(\psi > \varphi) \rightarrow \neg\psi]$
"No true alternative in $[\![\varphi]\!]^f_c$ is strictly stronger than φ."

Assuming the same focus semantic value of *[Alice]$_F$ laughed* as when discussing Coppock and Beaver's *only*, including the propositions expressed by the sentences *Alice laughed, Bob laughed, Carol laughed, Alice and Bob laughed ... Alice and Bob and Carol laughed*, the meaning assigned to (57-a) can be spelled out as follows.

(57) a. It was [Alice]$_F$ who laughed.
b. Presupposition: $\textsc{max}_S(\textsc{laughed}(a))$
$= \neg\textsc{laughed}(ab) \wedge \neg\textsc{laughed}(ac) \wedge \neg\textsc{laughed}(abc)$
c. at-issue: $\textsc{min}_S(\textsc{laughed}(a))$
$= \textsc{laughed}(a) \vee \textsc{laughed}(ab) \vee \textsc{laughed}(ac) \vee \textsc{laughed}(abc)$

Together, these contributions entail $\textsc{laughed}(a)$, and the negation of all other alternatives. This yields the intuitive reading of *It was [Alice]$_F$ who laughed* as *Alice laughed, and nobody other than Alice laughed.* Thus, the semantics correctly predicts the pattern in (58):

(58) #It was [Alice]$_F$ who laughed, and [Bob]$_F$ did, too.

The assumed division of labour between presupposed and at-issue content additionally captures the patterns in (59) and (60).

(59) a. A: It was [Alice]$_F$ who laughed.
b. B: No, {#Bob laughed, too. / Alice didn't laugh}.

(60) a. A: It wasn't [Alice]$_F$ who laughed.
b. B: Yeah, {#Bob laughed, too. / Alice didn't laugh}.

In (59), Speaker A's utterance presupposes that *Bob did not laugh* and makes at-issue the proposition that *Alice laughed*, and it is therefore only the latter that can be felicitously targeted by *no.* In (60), Speaker A's utterance presupposes that *Bob did not laugh* and makes at-issue the proposition that *Alice did not laugh*, and it is therefore only the latter that can be felicitously targeted by *yeah.*

Limitations of Velleman et al. (2012)'s account of clefts

Not surprisingly, Velleman et al.'s semantics for *it*-clefts inherits certain problematic predictions from Coppock and Beaver (2014)'s semantics for *only.* Like Coppock and Beaver's *only*, Velleman et al.'s $\textsc{cleft}_S$ runs into trouble when its argument features a focussed disjunction, as in (61).

(61) It was [Alice-or-Bob]$_F$ who laughed.

Recall that the operator MAX_S does not exclude *innocently*: when given a disjunctive argument, it negates both disjuncts. Thus, on Velleman et al.'s account, the cleft in (61) presupposes that *neither* Alice nor Bob laughed, and makes at-issue the proposition that *either* Alice or Bob laughed. This makes for inconsistency.

Velleman et al. also follow Coppock and Beaver's recipe for *only* in attributing an *indirect* existential presupposition to CLEFT_S: they assume that a sentence like (62) is prototypically evaluated with respect to the question *Who laughed?*, which in turn presupposes that *Someone laughed.* This suffices to predict at least systematic *infelicity* of (62):

(62) *It was [no one]$_F$ who laughed.

However, the suggested treatment does not suffice to explain the observation that *it*-clefts are unacceptable with the more general class of determiner phrases with the quantifier *no*, as outlined in (63).

(63) a. *It was [no girls]$_F$ who laughed.
b. *It was [no]$_F$ girls who laughed.
c. *It was no [girls]$_F$ who laughed.

The conditional existential presupposition that we suggested for *only* is too weak to capture this pattern. Recall that this presupposition amounted to the requirement that the prejacent entail its existential focus closure. Assuming that clefts too carry this presupposition suffices only to derive contradictions from (63-a) and (63-b), not from (63-c). The existential focus closure of *No [girls]$_F$ laughed* simply corresponds to the sentence *No girls laughed*, which is trivially entailed by itself.

What the above pattern suggests is that an *it*-cleft requires its prejacent to entail existence with respect to the *cleft predicate* (*laughed*, in the above examples), rather than to the—often more complex—property expressed by the prejacent without the focussed constituent. We will see that implementing this idea will let us explain the unacceptability of (63-c) on the basis of the fact that *No girls laughed* fails to entail *Someone laughed.*

Finally, like Coppock and Beaver's semantics for *only*, Velleman et al.'s CLEFT_S is meant to account for clefted declaratives, and does not immediately apply to interrogatives featuring clefts, like (64):

(64) Was it [Alice]$_F$ who laughed?

Intuitively, (64) raises the issue as to whether Alice, and only Alice, laughed, or someone other than Alice laughed. This is indicated by the pattern in (71).

(65) a. A: Was it [Alice]$_F$ who laughed?

b. B: Yes, {#and Bob laughed too / no one else laughed}.
c. B′: No, someone else laughed.

3.3.2 Clefts in Presuppositional Inquisitive Semantics

We follow Velleman et al. and define the semantic contribution of *it*-clefts through an operator CLEFT. Definition 3.3.2 gives our semantics for this operator, where $\textsc{pred}^{\varphi}$ is the translation of the *cleft predicate* of $\textsc{cleft}(\varphi)$.

Definition 3.3.2 (The semantics of CLEFT)**.** $[\![\textsc{cleft}(\varphi)]\!] = \langle \pi, A \rangle$, where

- $\pi = \textsc{max}(\varphi) \cap \mathsf{presup}(\varphi) \cap \mathsf{info}(!\exists x \textsc{pred}^{\varphi}(x))$ if $\varphi \vDash !\exists x \textsc{pred}^{\varphi}(x)$, $\emptyset$ otherwise
- $A = \wp(\textsc{min}(\varphi)) \upharpoonright \pi$

This is spelled out as follows. If φ does not entail the existence of an individual satisfying the cleft predicate, the presupposition of $\textsc{cleft}(\varphi)$ amounts to the inconsistent state. Otherwise, the presupposition is the intersection of (i) $\textsc{max}(\varphi)$, which is the information state that is consistent with as few propositions in $[\![\varphi]\!]^f$ as possible, while being consistent with every alternative in $[\varphi]$, and (ii) the presupposition of φ itself, (iii) the state embodying the information that there exists some individual satisfying the cleft predicate. (ii) captures that presuppositions *project* out of clefts. (iii) makes direct the existential presupposition treated as indirect by Velleman et al. (2012). The propositional component equals the proposition expressed by $!\varphi$, restricted to the cleft presupposition. Note that this proposition is always *non-inquisitive*.

Illustration

Just as for *only*, we illustrate the proposed semantics for CLEFT with four simple sentences. First, consider the clefted declarative in (66).

(66) It was [Alice]$_F$ who laughed. $\rightsquigarrow \textsc{cleft}(\textsc{laughed}(\underline{a}))$

Like before, we assume a domain consisting of Alice ($\boldsymbol{a}$), Bob ($\boldsymbol{b}$), Carol ($\boldsymbol{c}$), so that $[\![\underline{a}]\!]^f = [\![\underline{b}]\!]^f = [\![\underline{c}]\!]^f = \{\boldsymbol{a}, \boldsymbol{b}, \boldsymbol{c}\}$. The presuppositional meaning of (66) is then the meaning depicted in Figure 3.3.2 (only alternatives shown). This is derived as follows. Since $\textsc{laughed}(\underline{a}) \vDash !\exists x \textsc{laughed}(x)$, the *presupposition* of the sentence is the set $\textsc{max}(\textsc{laughed}(\underline{a})) \cap \mathsf{presup}(\textsc{laughed}(\underline{a})) \cap \mathsf{info}(!\exists x \textsc{laughed}(x))$. Since $\textsc{laughed}(\underline{a})$ is atomic, we have that $\mathsf{presup}(\textsc{laughed}(\underline{a})) = W$. $\mathsf{info}(!\exists x \textsc{laughed}(x))$ is simply the set of worlds in which *Someone laughed*; $W - \{w_{\emptyset}\}$. Recall from Section 3.2.2 and the illustrations of the semantics for *only* that $\textsc{max}(\textsc{laughed}(\underline{a})) = \{w_a, w_b, w_c, w_{bc}, w_{\emptyset}\}$ in

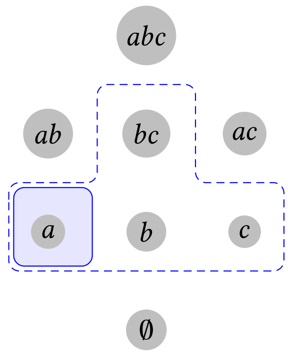


Figure 3.7: Presuppositional meaning of (66): *It was [Alice]$_F$ who laughed.*

the given model. Thus, the presupposition as a whole reduces to the set $(W - \{w_\emptyset\}) \cap \{w_a, w_b, w_c, w_{bc}, w_\emptyset\} = \{w_a, w_b, w_c, w_{bc}\}$.

The *proposition* expressed by the sentence is the set $[\textsc{cleft}(\textsc{laughed}(a)))]$, defined as $\wp(\textsc{min}(\textsc{laughed}(\underline{a}))) \restriction \{w_a, w_b, w_c, w_{bc}\}$. Since we have that $\textsc{min}(\textsc{laughed}(\underline{a})) = \mathsf{info}(\textsc{laughed}(\underline{a})) = \{w_a, w_{ab}, w_{ac}, w_{abc}\}$, the proposition reduces to the set $\wp(\{w_a, w_{ab}, w_{ac}, w_{abc}\}) \restriction \{w_a, w_b, w_c, w_{bc}\} = \{\{w_a\}, \emptyset\}$.

As Figure 3.3.2 illustrates, the sentence *It was [Alice]$_F$ who laughed* presupposes that the actual world is such that someone laughed, and if Alice laughed, then no one else did. With respect to this, it expresses the proposition whose only alternative embodies the information that *Alice, and no one else, laughed.* The proposed semantics thereby accounts for the pattern in (67-b).

(67) a. A: It was [Alice]$_F$ who laughed.
b. B: No, {#Bob laughed, too. / Alice didn't laugh}.

Next, consider the negated clefted declarative in (68).

(68) It wasn't [Alice]$_F$ who laughed. $\rightsquigarrow \neg\textsc{cleft}(\textsc{laughed}(\underline{a}))$

Figure 3.8 depicts the presuppositional meaning of this sentence, which is derived as follows. Since negation adds noting to the presuppositions of its prejacent, the *presupposition* of the sentence is again the set $\{w_a, w_b, w_c, w_{bc}\}$. The *proposition* expressed by the sentence is the set $[\neg\textsc{cleft}(\textsc{laughed}(\underline{a}))]$, defined as $[\textsc{cleft}(\textsc{laughed}(\underline{a}))]^* \restriction \{w_a, w_b, w_c, w_{bc}\}$. We already know that $[\textsc{cleft}(\textsc{laughed}(\underline{a}))] = \{\{w_a\}, \emptyset\}$, and can thereby derive that $[\textsc{cleft}(\textsc{laughed}(\underline{a}))]^* = \{\{w_a\}, \emptyset\}^* = \{s \mid \forall s' \subseteq s : \text{ if } s' \neq \emptyset \text{ then } s' \notin \{\{w_a\}\}\} = \wp(W) - \{\{w_a\}\}$. Thus, the proposition reduces to the set $\wp(W) - \{\{w_a\}\} \restriction \{w_a, w_b, w_c, w_{bc}\} = \wp(\{w_b, w_c, w_{bc}\})$.

Like its non-negated counterpart, the sentence *It was not [Alice]$_F$ who laughed* presupposes that *Someone laughed, and if Alice laughed, then no one else did.* It expresses the proposition whose only alternative is the state embodying the information that *Al-*

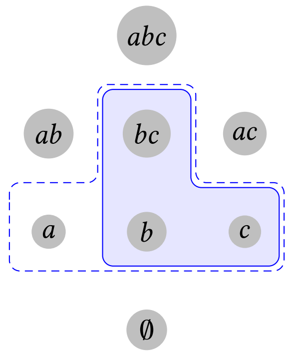


Figure 3.8: Presuppositional meaning of (68): *It was not [Alice]$_F$ who laughed.*

ice did not laugh, and someone else did. The proposed semantics thereby accounts for the pattern in (69).

(69) a. A: It was not [Alice]$_F$ who laughed.
b. B: Yeah, {#Bob laughed, too. / Alice didn't laugh}.

Consider now the polar question with a cleft in (70).

(70) Was it [Alice]$_F$ who laughed? $\rightsquigarrow$?$\textsc{cleft}(\textsc{laughed}(\underline{a}))$

Figure 3.9 depicts the presuppositional meaning of this sentence, which is derived as follows. Since '?' adds nothing to the presupposition of its prejacent, the *presupposition* of the sentence is the set $\text{presup}(\textsc{cleft}(\textsc{laughed}(\underline{a}))) = \{w_a, w_b, w_c, w_{bc}\}$. The *proposition* expressed by the sentence is the set $[?\textsc{cleft}(\textsc{laughed}(\underline{a}))]$, defined as $[\textsc{cleft}(\textsc{laughed}(\underline{a}))] \cup \wp(\text{presup}(\textsc{cleft}(\textsc{laughed}(\underline{a}))) - \text{info}(\textsc{cleft}(\textsc{laughed}(\underline{a}))))$. We know from the discussion of the non-negated declarative cleft that $[\textsc{cleft}(\textsc{laughed}(\underline{a}))]$ is the set $\{\{w_a\}, \emptyset\}$, so that $\text{info}(\textsc{cleft}(\textsc{laughed}(\underline{a}))) = \{w_a\}$. This means that proposition reduces to $\{\{w_a\}, \emptyset\} \cup \wp(\{w_a, w_b, w_c, w_{bc}\} - \{w_a\}) = \{\{w_a\}, \emptyset\} \cup \wp(\{w_b, w_c, w_{bc}\})$.

Like its declarative counterpart, the sentence *Was it [Alice]$_F$ who laughed?* presupposes that *Someone laughed, and if Alice laughed, then no one else did.* It expresses the proposition with two alternatives, one corresponding to the information that *Alice, and no one else, laughed*, and the other corresponding to the information that *Alice did not laugh, and someone else did.* The proposed semantics thereby accounts for the pattern in (71).

(71) a. A: Was it [Alice]$_F$ who laughed?
b. B: Yes, {#and Bob laughed too / no one else laughed}.
c. B′: No, someone else laughed.

Finally, consider the clefted disjunctive declarative in (72).

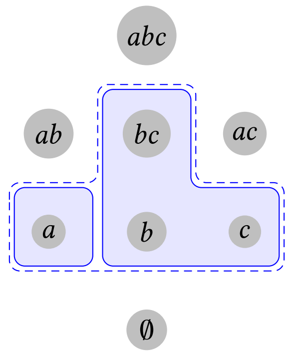


Figure 3.9: Presuppositional meaning of (70): *Was it [Alice]$_F$ who laughed?*

(72) It was [Alice-or-Bob]$_F$ who laughed. $\rightsquigarrow$ $\textsc{cleft}(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}))$

Figure 3.10 depicts the presuppositional meaning of this sentence, which is derived as follows. Since $\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}) \vDash\, !\exists x \textsc{laughed}(x)$, the *presupposition* of the sentence is the state $\textsc{max}(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b})) \ \cap$ presup$(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b})) \cap$ info$(!\exists u!\exists v(\textsc{laughed}(u) \vee \textsc{laughed}(v)))$. Now, presup$(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}))$ is defined as the state $\bigcup\{s \mid s \vDash \ \textsc{laughed}(\underline{a})$ and $s -$ info$(\textsc{laughed}(\underline{a})) \vDash \ \textsc{laughed}(\underline{a})\}$. Since atomic sentences like $\textsc{laughed}(\underline{a})$ and $\textsc{laughed}(\underline{a})$ are satisfied by any state, this in turn equals W. We further have that info$(!\exists u!\exists v(\textsc{laughed}(u) \vee \textsc{laughed}(v)))$ = info$(!\exists v \textsc{laughed}(v)) = W - \{w_\emptyset\}$. Finally, recall from Section 3.2.2 and the discussion of *Only [Alice-or-Bob]$_F$ laughed* that $\textsc{max}(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}))$ is the state $\{w_a, w_b, w_c, w_{ab}, w_\emptyset\}$ in the given model. Thus, the presupposition of the sentence reduces to the state $W - \{w_\emptyset\} \cap \{w_a, w_b, w_c, w_{ab}, w_\emptyset\} = \{w_a, w_b, w_c, w_{ab}\}$.

The *proposition* expressed by the sentence, $[\textsc{cleft}(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}))]$, is defined as $\wp(\textsc{min}(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}))) \upharpoonright \{w_a, w_b, w_c, w_{ab}\}$. Since $\textsc{min}$ = info, this is the set $\wp(\{w_a, w_b, w_{ab}, w_{bc}, w_{ac}, w_{abc}\}) \upharpoonright \{w_a, w_b, w_c, w_{ab}\} = \wp(\{w_a, w_b, w_{ab}\})$.

Thus, the sentence *It was [Alice-or-Bob]$_F$ who laughed* presupposes that the actual world is such that *Someone laughed, and if Alice, Bob, or both laughed, then no one else did.* With respect to this, the sentence expresses the proposition with the sole alternative corresponding to the information that *Alice, Bob, or both laughed.* This reading accords with intuition, and moreover shows that the proposed semantics avoids Velleman et al. (2012)'s problematic prediction that *it*-clefts cannot associate with disjunctions without yielding a contradiction.

3.3.3 Clefts and IL-triviality

We now turn to outline the predictions made by the proposed semantics for constructions in which *it*-clefts associate with a determiner phrase featuring one of the quantifiers *every, some*, and *no*.

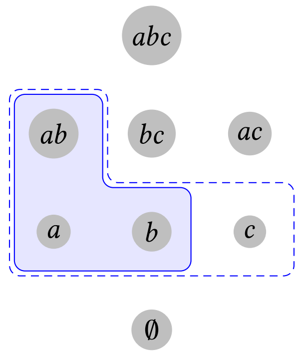


Figure 3.10: Presuppositional meaning of *It was [Alice-or-Bob]$_F$ who laughed.*

It-clefts with *some*

We first consider the case where the focussed element is a *some*-pronoun, as in (73).

(73) *It was [someone]$_F$ who laughed. $\rightsquigarrow$ $\textsc{cleft}(\underline{!\exists} x \textsc{laughed}(x))$

On our semantics, this sentence is IL-trivial: its logical skeleton always expresses a tautologous, non-inquisitive proposition. Recall that non-inquisitiveness holds for all sentences with wide-scope $\textsc{cleft}$. Therefore, to show that (73) is IL-trivial, it suffices to show that the *informative content* of its logical skeleton always is trivial. The proof is given below.

Proof. Let M, g be an arbitrary model and assignment such that $[\![\lambda P.\underline{!\exists} x P(x)]\!]^f_{M,g} = \{[\lambda P.!\exists x P(x)]_{M,g}, [\lambda P.\forall x P(x)]_{M,g}\}$. The interpretation of the logical skeleton of (73) in M with respect to g is spelled out in (74).

(74) $[\![\textsc{cleft}(\underline{!\exists} x \boldsymbol{P}(x))]\!]_{M,g} = \langle \pi, A \rangle$, where

- $\pi = \textsc{max}_{M,g}(\underline{!\exists} x \boldsymbol{P}(x)) \cap \mathsf{presup}_{M,g}(\underline{!\exists} x \mathbf{P}(x)) \cap \mathsf{info}(!\exists x \mathbf{P}(x))$
  if $\underline{!\exists} x \mathbf{P}(x) \vDash !\exists x \mathbf{P}(x)$,
  $\emptyset$ otherwise
- $A = \wp(\textsc{min}_{M,g}(\underline{!\exists} x \boldsymbol{P}(x))) \restriction \pi$

We show that $\mathsf{info}_{M,g}(A) = \pi$. Since $\underline{!\exists} x \mathbf{P}(x) \vDash !\exists x \mathbf{P}(x)$ holds trivially, we have that $\pi = \textsc{max}_{M,g}(\underline{!\exists} x \boldsymbol{P}(x)) \cap \mathsf{presup}_{M,g}(\underline{!\exists} x \mathbf{P}(x)) \cap \mathsf{info}(!\exists x \mathbf{P}(x))$. This gives us that $\pi \subseteq \mathsf{info}_{M,g}(!\exists x \mathbf{P}(x))$. Since $\textsc{min}_{M,g} = \mathsf{info}_{M,g}$, we know that $A = \wp(\mathsf{info}_{M,g}(\underline{!\exists} x \boldsymbol{P}(x))) \restriction \pi$. It follows that $\pi \subseteq \mathsf{info}_{M,g}(A)$, since $\mathsf{info}_{M,g}(!\exists x \boldsymbol{P}(x)) = \mathsf{info}_{M,g}(\underline{!\exists} x \boldsymbol{P}(x))$. Since $\mathsf{info}_{M,g}(A) \subseteq \pi$ holds by definition of A as restricted to π, this shows that $\mathsf{info}_{M,g}(A)$ must equal π. $\square$

By analogous reasoning, we get that (75-b) is IL-trivial.

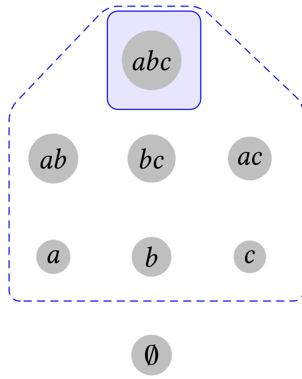


Figure 3.11: Presuppositional meaning expressed by *It was [everyone]$_F$ who laughed.*

(75) a. It was [some girls]$_F$ who laughed. ⟶ No boys laughed.
b. *It was [some]$_F$ girls who laughed.
c. It was some [girls]$_F$ who laughed. ⟶ No boys laughed.

In contrast, (75-a) and (80-c) are meaningful: both may, for instance, be used to exclude the focus alternative expressed by *Some boys laughed.*

It-clefts with *every*

(76) ?It was [everyone]$_F$ who laughed. $\rightsquigarrow$ $\textsc{cleft}(\forall x \textsc{laughed}(x))$

This sentence is not IL-trivial: it presupposes that *Someone laughed*, and restricted to this expresses the same proposition as *Everyone laughed.* Figure 3.11 depicts this reading in our three-person toy model. (We do not attempt at an explanation of the '?'-judgement.)

The account does not predict that any of the sentences in (77) are ungrammatical.

(77) a. It was [every girl]$_F$ who laughed. ⟶ No boys laughed.
b. It was [every]$_F$ girl who laughed.
c. It was every [girl]$_F$ who laughed. ⟶ Not every boy laughed.

In an all-girl context, (77-b) can be used just like (76). In a context including both girls and boys, (77-a) may be used to exclude the potential focus alternative expressed by *Some boys laughed.* Similarly, (77-c) may be used to exclude the potential focus alternative expressed by *Every boy laughed.*

It was no-

We first consider the case where a cleft associates with a focussed *no*-pronoun, as in (78).

(78) *It was [no one]$_F$ who laughed. $\rightsquigarrow$ $\textsc{cleft}(\underline{\neg\exists} x \textsc{laughed}(x))$

This sentence is IL-trivial: its logical skeleton always expresses the contradiction. This is a consequence of the assumption that clefts come with an existential presupposition, and can be shown as follows.

Proof. Let M, g be an arbitrary model and assignment. The interpretation of the logical skeleton of (78) in M with respect to g is spelled out in (79).

(79) $[\![\textsc{cleft}(\underline{\neg\exists} x \boldsymbol{P}(x))]\!]_{M,g} = \langle \pi, A \rangle$, where

- $\pi = \textsc{max}_{M,g}(\underline{\neg\exists} x \boldsymbol{P}(x)) \cap \mathsf{presup}_{M,g}(\underline{\neg\exists} x \mathbf{P}(x)) \cap \mathsf{info}(!\exists x \mathbf{P}(x))$ if $\underline{\neg\exists} x \boldsymbol{P}(x) \vDash \neg\exists x \boldsymbol{P}(x)$, $\emptyset$ otherwise
- $A = \wp(\textsc{min}_{M,g}(\underline{\neg\exists} x \boldsymbol{P}(x))) \upharpoonright \pi$

Since $\underline{\neg\exists} x \boldsymbol{P}(x) \nvDash \neg\exists x \boldsymbol{P}(x)$, we get that $\pi = \emptyset$, so that $A = \wp(\textsc{min}_{M,g}(\underline{\neg\exists} x \boldsymbol{P}(x))) \upharpoonright \pi = \{\emptyset\}$. □

By perfectly analogous reasoning, we get that the sentences in (80) are all IL-trivial: they each presuppose the inconsistent state, given the existential presupposition of the *it*-cleft.

(80) a. *It was [no girls]$_F$ who laughed.
b. *It was [no]$_F$ girls who laughed.
c. *It was no [girls]$_F$ who laughed.

This concludes our survey of the proposed semantics for clefts, and its predictions with respect to the observed patterns of ungrammaticality.

3.4 Conclusion

In this chapter, we have proposed a semantics for *it*-clefts and for the exclusive particle *only*. The treatment of *only* drew inspiration mainly from Coppock and Beaver (2014)'s analysis of exclusives, and improved on it in several ways.

First, our proposal modeled *only* as excluding only alternatives that were *innocently excludable*, following Fox (2007). This improved in particular the predictions for constructions in which *only* associates with a focussed disjunction, which on Coppock and Beaver's proposal were mistakenly predicted to have contradictory meanings. Second, our proposal modeled *only* as coming with a conditional existential presupposition, which improved the predictions for constructions in which *only* associates with a focussed determiner phrase quantified by *no*. Finally, our proposal modeled *only* within a version of Inquisitive Semantics, which can let us account for the contribution of *only* not just to declarative sentences, but also to interrogative sentences. This was illustrated by the case of polar questions featuring the particle.

The treatment of *it*-clefts drew inspiration mainly from the analysis given by Velleman et al. (2012), and improved on this in several ways. Our proposal modeled *it*-clefts as involving *innocent exclusion*, improving the predictions for clefted sentences with focussed disjunctions. We further treated *it*-clefts as coming with both an unconditional and a conditional existential presupposition. Unlike the case with *only*, where the existential presupposition targeted the full prejacent, the existential presupposition of clefts targeted the cleft predicate. This made the existential presupposition of clefts stronger than that of *only*, as indicated by the even more general pattern of ungrammaticality of *it*-clefts associating with DP:s quantified by *no*. Finally, our proposal modeled *it*-clefts so as to account for their contribution in both declarative and interrogative sentences, illustrated by the case of polar questions with clefts.

Just as for *only*, we showed that the inability of *it*-clefts to associate with certain quantified determiner phrases, in particular those built from indefinite pronouns like *someone* and *no one*, could be explained in terms of IL-triviality. Since we were interested in patterns of ungrammaticality that arise already in declarative sentences, considerations of *inquisitive content* did not play any crucial part in the derivations. In the chapters to come, this will change, and the need to assume a connection between trivial inquisitive as well as informative content and grammaticality become apparent.

Chapter 4

Questions in Yucatec Maya

In this chapter, we will be concerned with the curious pattern of question formation found in the Mayan language Yucatec. This language features little to no interrogative-specific morphosyntax, and instead makes crucial use of quexistentials and disjunction in the formation of questions. Quexistentials, as may be recalled from the introduction, are words that may function both as indefinites and interrogative pronouns. In Yucatec Maya, all words functioning as interrogative pronouns can also function as indefinites (Tonhauser, 2003b). For instance, *who* translates as *máax*, which may also mean *(some)one*; *what* translates as *báax*, which may also mean *(some)thing*, and *where* translates as *táax*, which may also mean *(some)place*. *Wh*-questions are formed through placing a quexistential in a focus/cleft construction, as in (1):

(1) [máax]$_F$ uk' le sa'-o'
someone/who drink.AgF the atole-Distal
Who drank the atole? AnderBois (2012)

Without focus/clefting, the quexistential gets its indefinite interpretation:

(2) yan máax t-u yuk'-aj le sa'-o'
exists someone/who Pfv-A.3 drink.Status Def atole-Distal
Someone drank the atole. AnderBois (2012)

The focus/cleft construction (primarily indicated by the AgF="Agent Focus"-morphology on the verb) likewise occurs outside of interrogatives, and then functions like an *it*-cleft:

(3) [Juan]$_F$ uk' le sa'-o'
Juan drink.Agent.Focus the atole-Distal
It was Juan who drank the atole. AnderBois (2012)

Alternative questions are formed through focus/clefting a disjunction, as in (5).

(4) [Juan wáa Daniel]$_F$ uk' le sa'-o'
Juan or Daniel drink.AgF Def atole-Distal
Was it/It was Juan or Daniel who drank the atole AnderBois (2012)

As noted by AnderBois (2012), the interpretation of the resulting construction as an alternative question is context-dependent: in Context 1, it reads as a question, but in Context 2, it reads as a clefted disjunctive declarative.

- Context 1: Addressee and speaker both agree that one of the speaker's two brothers (Juan and Daniel) drank the atole that had been on the table.

  (4) = *Was it Juan or Daniel who drank the atole?*

- Context 2: Addressee and speaker both agree that one of the speaker's siblings (Juan, Daniel and Maribel) drank the atole that had been on the table.

  (4) = *It was Juan or Daniel who drank the atole.*

The general pattern, according to AnderBois (2012), is that a sentence with a focus/clefted disjunction reads as an interrogative whenever the contextual alternatives *exhaust* the alternatives of the disjunction. When this is not the case, and some relevant alternative not included among the disjuncts is possible, the sentence always reads as a declarative.

Like the quexistential, the disjunction can occur in an unambiguous assertion, and is then featured in the canonical subject position, without focus/clefting:

(5) t-u yuk'-aj le sa'-o' Juan wáa Daniel
Pfv-A.3 drink-Status Def atole-Distal Juan or Daniel
Juan or Daniel drank the atole. AnderBois (2012)

Polar questions likewise feature the disjunction *wáa*, with or without focus/clefting:

(6) [Juan wáa]$_F$ uk' le sa'-o'
Juan or drink.AgF Def atole-Distal
Was it Juan who drank the atole? AnderBois (2012)

(7) táan-wáaj u yuk'-ik le sa'-o' Juan
Prog-or A.3 drink-Status Def atole-Distal Juan
Is Juan drinking the atole? AnderBois (2012)

As indicated, the disjunction in a polar question takes only one overt argument, here the clause corresponding to *Juan drank/is drinking the atole*.

In this chapter, I will propose a semantic account of this system of question formation. Given the lack of interrogative-specific markers, I will treat sentences in Yucatec Maya as (surface-)structurally ambiguous between declarative and interrogative, with the declarative as the default reading. Given the semantics for clefts proposed in the previous chapter, we will then be able to explain the above patterns through

	Inquisitive	Non-inquisitive
Informative	Assertion	Assertion
Non-informative	Question	Assertion

Table 4.1: Inquisitive principle I

the assumption that sentences receive an unambiguous interrogative reading precisely when the declarative reading would be IL-trivial. Context-dependent interrogatives, such as the alternative question, can in turn be shown to result as a means of avoiding a weaker, contextual type of triviality.

The chapter is structured as follows. Section 4.1 presents an extant account of questions in Yucatec Maya from which the current proposal draws much inspiration, that of AnderBois (2012), and outlines its main limitations. Section 4.2 proposes our alternative account, and shows how it avoids the problematic predictions made by its predecessor. Section 4.3 concludes.

4.1 AnderBois on questions in Yucatec Maya

AnderBois (2012) proposes an account of the observations outlined above using a version of Inquisitive Semantics similar to Presuppositional Inquisitive Semantics. On his version of the framework, there are no clause type markers or complementizers. The syntactic/semantic distinction between sentences as interrogatives and declaratives is replaced with a distinction between sentences with prototypically requesting and prototypically assertive (or non-requesting) *force*. Sentences which are prototypically used to ask questions are classified as *questions*, and sentences which are not are classified as *assertions*.

Whether a sentence can be used to ask a question is taken to be determined by its informative and inquisitive properties. In particular, sentences which are *non-informative and inquisitive* are classified as questions. Sentences which are informative or non-inquisitive are classified as assertions. This is summarized as *Inquisitive Principle I* in Table 4.1.

Just as we have done in Presuppositional Inquisitive Semantics, AnderBois defines *informativity* as *presupposition-relative*: for a sentence φ with presupposition $\text{presup}(\varphi)$, φ is informative just in case $\text{info}(\varphi) \subset \text{presup}(\varphi)$. Inquisitiveness is, in contrast, defined relative to the maximal information state: a sentence φ is inquisitive just in case $\text{info}(\varphi) \notin [\varphi]^{ab}$, where $[\varphi]^{ab}$ is the proposition expressed by φ *without* restriction to $\text{presup}(\varphi)$.

Recall that the in the current versions of Inquisitive Semantics, including Presuppositional Inquisitive Semantics, the complementizer C_{DECL} is taken to introduce *non-inquisitive closure*, in form of the operator '!'. Without a complementizer with this effect, sentences with wide-scope inquisitive elements—that is, disjunctions or exis-

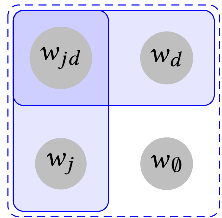


Figure 4.1: The presuppositional meaning of (8) and (9) in a four-world model.

tential quantifiers—will always be inquisitive. For instance, the sentences (8) and (9) are both translated as inquisitive sentences, so that their semantic content coincides in models with a domain consisting of only Juan and Daniel. Figure 4.1 illustrates this.

(8) Juan or Daniel drank the atole. $\rightsquigarrow$ $\textsc{drank}(a)(j) \vee \textsc{drank}(a)(d)$

(9) Someone drank the atole. $\rightsquigarrow$ $\exists x \textsc{drank}(a)(x)$

To AnderBois, the reason that these sentences are not interpreted as questions is wholly due to the fact that they are informative, and exclude worlds from their presupposition. According to the Inquisitive Principle I, then, these sentences must function as assertions rather than questions.

Given the assumptions summarized in the Inquisitive Principle I, AnderBois proposes to derive the pattern of question formation in Yucatec Maya from the claim that the focus/cleft construction triggers an *existential presupposition*. Certain inquisitive sentences will be uninformative relative to this presupposition, and therefore classify as questions according to the principle. We first outline how this is to work for *wh*-questions, and then proceed to consider alternative questions and polar questions.

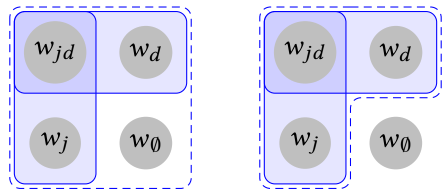
4.1.1 ***Wh*-questions**

Assuming that universally, both indefinite and interrogative pronouns translate as inquisitive existentials, AnderBois can assign words that are ambiguous between these types of pronouns a uniform translation. Thus, the Yucatec Mayan quexistential *máax* translates as in (10).

(10) *máax* $\rightsquigarrow$ $\lambda P.\exists x P(x)$

Given this, both (11) and (12) are formalized as in (13).

(11) [máax]$_F$ uk' le sa'-o'
someone/who drink.AgF the atole-Distal
Who drank the atole?



(a) (11) (b) (12)

Figure 4.2: Presuppositional meanings expressed by (11) and (12) according to AnderBois (2012).

(12) yan máax t-u yuk'-aj le sa'-o'
exists someone/who Pfv-A.3 drink.Status Def atole-Distal
Someone drank the atole.

(13) (11) and (12) $\rightsquigarrow \exists x(\textsc{drank}(a)(x))$

While not explicit in this formalization, the focus/clefting of the quexistential in (11) is taken to trigger the existential presupposition that *Someone drank the atole*, to the effect that the meanings assigned to (11) and (12), respectively, still come apart. These meanings are illustrated in 4.2, where it can be seen that while both sentences are taken to express the same issue, their presuppositions differ.

Thus, while both of these sentences are inquisitive, containing two maximal elements, (12) is additionally *informative*—it excludes the possibility that *no one drank the atole*. (11) is not informative, as it presupposes that *Someone drank the atole*. This classifies the latter sentence as a question with respect to the Inquisitive Principle I, while the former is classified as an assertion.

4.1.2 Focussed/clefted disjunctions

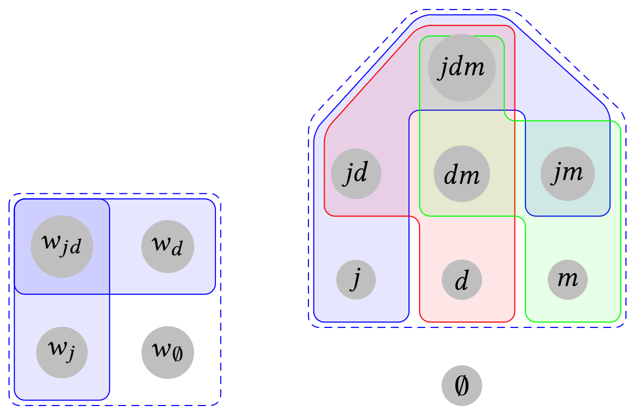
Recall the pattern of interpretation of focussed/clefted disjunction in context, exemplified again by the sentence (14):

(14) [Juan wáa Daniel]$_F$ uk' le sa'-o'
Juan or Daniel drink.AgF Def atole-Distal
Was it/It was Juan or Daniel who drank the atole

AnderBois formalizes this sentence as in (15):

(15) $\textsc{drank}(a)(j) \vee \textsc{drank}(a)(d)$

The focus/clefting of the disjunction is assumed to trigger an existential presupposition, again corresponding to the information that *Someone drank the atole.* Given this, the presuppositional meaning of (14) corresponds to the diagram in Figure 4.9 in Context



(a) (14) in Context 1 (b) (14) in Context 2

Figure 4.3: Presuppositional meanings expressed by (14) in Context 1 and Context 2, respectively, according to AnderBois (2012).

1, and to Figure 4.10 in Context 2.

- Context 1: Addressee and speaker both agree that one of the speaker's two brothers (Juan and Daniel) drank the atole that had been on the table.

  (14) = *Was it Juan or Daniel who drank the atole?*

- Context 2: Addressee and speaker both agree that one of the speaker's siblings (Juan, Daniel and Maribel) drank the atole that had been on the table.

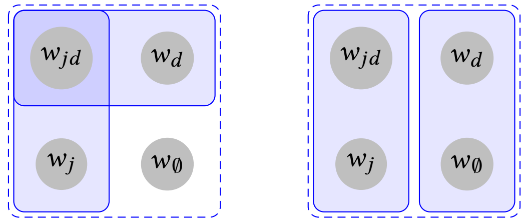
  (14) = *It was Juan or Daniel who drank the atole.*

Thus, in Context 1, (14) is *uninformative* relative to its presupposition. By Inquisitive Principle I, the sentence must therefore function as a question in this context. It is noted (AnderBois, 2012, footnote 9) that the meaning assigned to this question does not capture the *exclusivity* associated with alternative questions in Yucatec Maya: strictly, the question should exclude the possibility that both Juan and Daniel drank the atole. Apart from a hint at the possibility of deriving this through pragmatics, this issue is left open.

In Context 2, the sentence is *informative* relative to its presupposition: it excludes the possibility that Maribel drank the atole. By Inquisitive Principle I, the sentence must therefore function as an assertion in this context.

4.1.3 Polar questions

Recall that polar questions may be formed through focus/clefting a disjunction with only one overt argument, as in (17).



(a) (17) (b) (18)

Figure 4.4: The presuppositional meanings of a polar question with a focus/cleft (a) and a polar question without a focus/cleft (b) in Context 1, according to AnderBois (2012).

(16) [Juan wáa]$_F$ uk' le sa'-o'
Juan or drink.AgF Def atole-Distal
Was it Juan who drank the atole?

AnderBois motivates a treatment of these constructions as featuring a *covert* disjunct, expressing "the *exhaustive* set of *like elements* which is *disjoint* from the overt disjunct" (AnderBois, 2012, Section 5.2). For (17), *Juan* (rather than the full clause *Juan drank the atole*) is taken to be the overt disjunct, so that the covert disjunct corresponds, informally, to *someone but not Juan.* The full construction is taken to thereby translate as in (17), informally expressing the disjunction of *Juan drank the atole* and *Someone but not Juan drank the atole.*

(17) $\textsc{drink}(a)(j) \vee !\exists x(\textsc{drink}(a)(x) \wedge x \neq j)$

The focus/cleft again introduces the presupposition that *Someone drank the atole*, so that the proposition expressed by (17) is always *uninformative* relative to its presupposition. Figure 4.4(a) illustrates the presuppositional meaning of (17) in Context 1 from earlier.

Without focussing/clefting, an (overtly) unary disjunction corresponds to a regular polar question in English:

(18) táan-wáaj u yuk'-ik le sa'-o' Juan
Prog-or A.3 drink-Status Def atole-Distal Juan
Is Juan drinking the atole?

Without focussing/clefting, the position of the unary disjunction is prosodically determined: it always attaches to the first prosodic word (here, the progressive marker Prog), which indicates that it does not take a specific subconstituent as semantic argument. Rather, AnderBois argues, it disjoins the full overt clause from a covert second argument. Given the assumption about the nature of the covert disjunct relative to the overt one applied in the case of a polar question with focus/clefting, this gives us that the covert argument is the negation of the overt argument. Thus, the sentence in (18) translates as in (19).

(19) $\textsc{drink}(a)(j) \vee \neg\textsc{drink}(a)(j)$

Figure 4.4(b) illustrates the presuppositional meaning of 4.4(a) in Context 1 from earlier. In this context, the sentence is inquisitive, but uninformative, classifying it as a question according to Inquisitive Principle I.

Now, this treatment of polar questions makes them indistinguishable from disjunctions with polar opposite disjuncts. But then if (19) is classified as a question, then the Yucatec Maya correlate of *Juan drank the atole, or Juan didn't drink the atole* should, too. As we've seen, however, overtly binary disjunctions without focus/clefting are unambiguously interpreted as declaratives (or assertions, in AnderBois' terminology). To distinguish between polar questions and trivial disjunctions which are not questions, AnderBois modifies the Inquisitive Principle I to include a consideration of L-triviality. Recall that sentences are L-trivial if they are *uninformative* purely as a consequence of logical form. An overt disjunction *Juan drank the atole, or Juan did not drink the atole* is trivial, but not L-trivial: if we substitute one occurrence of *Juan drank the atole* for a non-equivalent sentence, the disjunction is no longer trivial. When the disjunction has only one overt argument, we do not have this option: the interpretation of the covert disjunct is taken to be fully dependent on the interpretation of the overt disjunct. Therefore, the polar question disjunctions are L-trivial.

Inquisitive Principle II A sentence φ is a *question* if and only if

- φ is inquisitive, and
- φ is uninformative by L-triviality.

Otherwise, φ is an assertion.

According to the new principle, a sentence can function as a question only if it is inquisitive and uninformative in virtue of its logical vocabulary; otherwise, it is an assertion. This correctly predicts that (18) must be used as a question, without predicting that overtly binary, trivial disjunctions function as questions.

4.1.4 Limitations of AnderBois (2012)'s account

While AnderBois' account of questions in Yucatec Maya is original and thought-provoking, there are several reasons to think that it cannot be the whole story. The most immediate issue is simple: the proposed Inquisitive Principle II does not hold within Yucatec Maya. We have seen that the disjunction in (40) is not uninformative by L-triviality: it is informative in AnderBois' Context 2. Nevertheless, it can function as a question in Context 1.

(20)	[Juan	wáa	Daniel]$_F$	uk'	le	sa'-o'
	Juan	or	Daniel	drink.AgF	Def	atole-Distal

Was it/It was Juan or Daniel who drank the atole

It seems, then, that AnderBois still needs to assume Inquisitive Principle I to account for the behavior of this sentence, or by other means postulate that inquisitiveness paired with a contextually induced triviality forces a question reading. But this is difficult to uphold in a system where any sentence with a wide-scope disjunction or indefinite is inquisitive. Even when looking solely at data from Yucatec Maya, we observe that while sentences like (21) and (22) are said to be unambiguous assertions, they will classify as questions in any context making their informative content trivial, given that they are inquisitive. For instance, Inquisitive Principle I mis-classifies the disjunctive (22) as a question in Context I, and the indefinite (21) as a question in both Context I and Context II (recall that it is common ground in both contexts that one sibling drank the atole).

(21)	yan	máax	t-u	yuk'-aj	le	sa'-o'
	exists	someone/who	Pfv-A.3	drink.Status	Def	atole-Distal

Someone drank the atole.

(22)	t-u	yuk'-aj	le	sa'-o'	Juan	wáa	Daniel
	Pfv-A.3	drink-Status	Def	atole-Distal	Juan	or	Daniel

Juan or Daniel drank the atole.

There are also arguments from cross-linguistic data. It is, for instance, unclear from AnderBois' account why *it*-clefts do not *universally* turn sentences with wide-scope disjunctions or indefinites into questions. If we grant AnderBois that the only semantic contribution of the cleft is an existential presupposition, a construction like

(23) *It was [someone]$_F$ who drank the atole.

should function as a question (by both Inquisitive Principle I and II), rather than being ungrammatical. There is discussion of this point in AnderBois (2012), Section 3.5, and the claim is that the existential presupposition of the Yucatec Mayan cleft-construction differs from that of the English *it*-cleft presupposition in that the latter, but not the former, is itself inquisitive. That is, the Yucatec Mayan focus/cleft construction gives rise to existential presuppositions representable by formulae $!\exists x\varphi(x)$, while it-clefts give rise to presuppositions representable by formulae $\exists x\varphi(x)$. This would mean that not only the informative content of (23) is systematically trivial, but also its inquisitive content, relative to its presupposition.

Of course, for this explanation to pan out, AnderBois' account would need to be amended with a presupposition-relative definition of inquisitiveness, like the one used in Presuppositional Inquisitive Semantics. Even with this in place, independent evidence for this particular cross-linguistic difference of cleft-presuppositions is sparse. In fact, there is evidence to the contrary, at least if one assumes AnderBois' general framework. If the (only) role of the English *it*-cleft is to contribute an existential presupposition, (24) patterns with (23) in that it is neither informative nor inquisitive with respect to its presupposition. Thus, we predict that it cannot be a question, contrary to fact.

(24) Who was it that drank the atole?

The above argument amounts to the question of why indefinite pronouns cannot universally function as question words, and inquisitive sentences in general function as questions. We can also make the converse argument: why is it that an interrogative pronoun in English cannot function as an existential indefinite? It is very difficult to see how this could be explained without assuming non-synonymy of indefinite and interrogative pronouns, or a syntactic difference (or both, as in our case).

Given these reasons for doubt, we will present a novel account of questions in Yucatec Maya. It will draw on AnderBois' ideas about the importance of *triviality* for the disambiguation of sentences in the language, but integrate these ideas with more standard syntactic and semantic assumptions. Together with our assumptions about IL-triviality and its connection to grammaticality, this will give improved predictions at both the construction-specific and the general level.

4.2 A new account of questions in Yucatec Maya

To account for the relevant data, we will make the following key assumptions. First, the lack of overt morphosyntactic markers of the clause types interrogative/declarative in Yucatec Maya does not mean that the language does not have, or distinguish between, these clause types. We will therefore treat sentences of Yucatec Maya uniformly with their English counterparts, as list structures. However, we will assume that sentences in Yucatec Maya are (surface) structurally ambiguous between interrogative and declarative; that is, between being DECL-lists and INT-lists. (Like AnderBois, we do not discuss imperatives.) This is a safe assumption given the attested lack of interrogative-specific morphosyntax.

Sentences are assumed to be systematically disambiguated as follows. Per default, a sentence is read as a DECL-list. This is motivated by the need of—presumably costly—marking (most) of the interrogative readings through focus/clefting. The reading as an INT-list is however forced in the following cases (and for the data at hand, the following cases only):

1. The DECL-reading is IL-trivial, or
2. the DECL-reading is *contextually trivial*, and the INT-reading is *not* contextually trivial.

By "contextually trivial", we mean that a sentence is, *in a given context of communication*, neither informative nor inquisitive.[1]

As for the interpretation of smaller elements, we will not assume that focus/clefts in Yucatec Maya have a language-specific semantics, but instead treat focus/clefting as expressing the CLEFT-operator. Like AnderBois, we treat quexistentials as inquisitive existentials. However, we additionally assume that they are "feature ambiguous", in the sense of having an *optionally* active grammatical [Wh]-feature. Per default, this feature is inactive (represented as [-Wh]) but rendered active (represented as [+Wh]) in case the reading as [-Wh] yields IL-triviality. This allows agreement with an interrogative complementizer, and will thereby allow us to assign the wide-scope that the quexistential needs for the interpretation as an interrogative pronoun.

Together, these assumptions require something to be said about the *focus semantics* of quexistentials. Given cross-linguistic data to be further discussed in Chapter 5, it is closest at hand to assume that a focussed quexistential has the same focus semantic value as the corresponding focussed interrogative pronoun would have had, in the given context. We treat interrogative pronouns as one-place quantifiers; however, their focus semantic value is not intuitively taken to be a set of semantic values of other elements in $D_{\langle\langle e,T\rangle,T\rangle}$ (or $D_{\langle\langle e,t\rangle,t\rangle}$, in a classical system). It is difficult to think of contexts in which an interrogative pronoun contrasts with, say, a scalar quantifier. Authors interested in focussed interrogative pronouns tend to instead assume that their focus semantic value is a subset of the domain of individuals (Beck, 2006; Cable, 2007). We will make a compromise here, and assume that the focus semantic value of a focussed interrogative pronoun is restricted to the semantic values of the one-place quantifiers corresponding to *Montagovian individuals*: type *e*-expressions *lifted* to the type of a one-place quantifier (cf. Partee, 1987). This allows us to keep broadly Roothian, in the sense that the focus semantic value of an expression includes only elements in its own type domain. Thus, we postulate that the focus semantic value of a focussed *wh*-pronoun is a set like below:

$$[\![[wh\text{-}]_F]\!]^f_g = [\![\lambda P.\exists x P(\underline{x})]\!]^f_g = \{[\lambda P.P(x)]_{g[x/d]} \mid d \in D_e \cap C\}.$$

To keep track of the difference between the focus marking of indefinite and interrogative pronouns in the formal language, we indicate focus marking by underlining the *variable* bound by the quantifier, rather than on the quantifier itself. As stated, we take focussed quexistentials to receive the same type of focus semantic interpretation, including only (Montagovian) individuals.

[1]Note that this possibility of reinterpretation is only claimed to hold for sentences which are structurally ambiguous between declarative and interrogative. Hence, we do not predict that overtly declarative sentences, like declarative sentences in English, can be reinterpreted as interrogatives in context. We will however see in Chapter 5 that at least the first bullet point carries over to other languages in which sentences featuring quexistentials may be ambiguous between declarative and interrogative.

Finally, we assume that in general, disjunction is the n-ary operator defined in (25), where P_i is a proposition-type variable.[2]

(25) $\lambda P_1 ... \lambda P_n . \langle ? \rangle . P_1 \vee ... \vee P_n$

English disjunction requires $n > 1$, so that the conditional '?'-operator is vacuous. The Yucatec Mayan disjunction *wáa* allows $n = 1$, and in case its one argument is non-inquisitive, applies '?' to it. As before, we assume that an overt disjunction may correspond to a disjunction either within or between list items. This set of assumptions will be needed to account for the formation of both declarative disjunctive sentences and polar questions in the language.

Before applying these assumptions to the set of data from Yucatec Maya, we will describe a general treatment of four types of cleft constructions that were not discussed in the previous chapter, but which are of immediate relevance.

4.2.1 Clefted *wh*-questions and biclausal disjunctions

We will consider four types of constructions: disjunctive polar questions with clefts, like (27), clefted biclausal disjunctive declaratives, like (27), clefted alternative questions, like (28), and clefted *wh*-questions, like (29).

(26) Was it [Alice-or-Bob]$_F$ who laughed?
$\rightsquigarrow ?\textsc{cleft}(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}))$

(27) It was [Alice]$_F$ (who laughed) or (it was) [Bob]$_F$ who laughed.
$\rightsquigarrow\ !(\textsc{cleft}(\textsc{laughed}(\underline{a})) \vee \textsc{cleft}(\textsc{laughed}(\underline{b})))$

(28) Was it [Alice]$_F$ (who laughed) or (was it) [Bob]$_F$ who laughed?
$\rightsquigarrow \dagger(\textsc{cleft}(\textsc{laughed}(\underline{a})) \vee \textsc{cleft}(\textsc{laughed}(\underline{b}))$

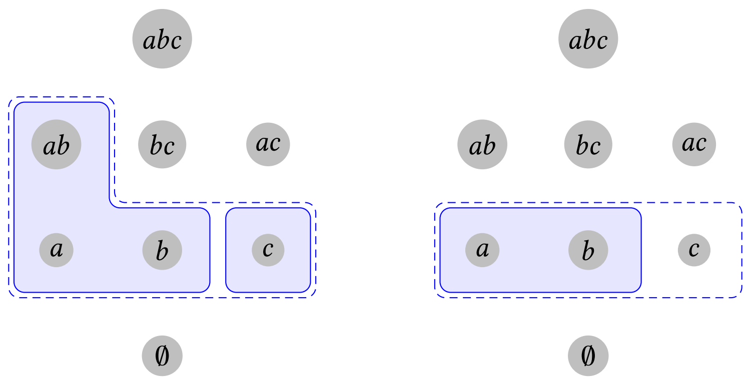
(29) Who was it that laughed?
$\rightsquigarrow ?\exists x(\textsc{cleft}(\textsc{laughed}(\underline{x})))$

We first consider the disjunctive polar question with a cleft in (26). The presuppositional meaning assigned to this sentence in our three-person toy model is depicted in Figure 4.5(a).

As indicated, a disjunctive polar question with a cleft is taken to express the issue of whether at most one or more of its disjuncts hold, or none of its disjuncts hold. In the given model, this meaning is derived as follows. Since '?' does not affect the presuppositional content of a sentence, the *presupposition* of the sentence in this model is the set presup($\textsc{cleft}(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}))$), which we know from the discussion of clefted disjunctive declaratives in Section 3.3.2 equals the state $\{w_a, w_b, w_c, w_{ab}\}$.

The *proposition* expressed by the sentence is the set $[?\textsc{cleft}(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}))]$, defined as the union of $[\textsc{cleft}(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}))]$ and the

[2] Thanks to my supervisor, Floris Roelofsen, for suggesting this.



(a) $[\![(26)]\!]$ (b) $[\![(27)]\!]$

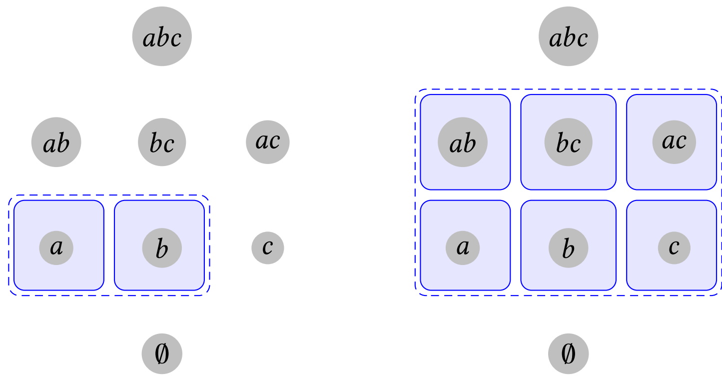
Figure 4.5: Presuppositional meanings of (26): *Was it [Alice-or-Bob]$_F$ who laughed?* and (27): *It was [Alice]$_F$ (who laughed) or (it was) [Bob]$_F$ who laughed.*

power set of $\text{presup}(\textsc{cleft}(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}))) - \text{info}(\textsc{cleft}(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b})))$. We know from Section 3.3.2 that the former is the proposition $\wp(\{w_a, w_b, w_{ab}\})$, so that $\text{info}(\textsc{cleft}(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}))) = \{w_a, w_b, w_{ab}\}$. This means that the proposition $[?\textsc{cleft}(\textsc{laughed}(\underline{a}) \vee \textsc{laughed}(\underline{b}))]$ spells out as $\wp(\{w_a, w_b, w_{ab}\}) \cup \wp(\{w_a, w_b, w_c, w_{ab}\} - \{w_a, w_b, w_{ab}\}) = \wp(\{w_a, w_b, w_{ab}\}) \cup \wp(\{w_c\})$, as depicted.

Consider now the clefted biclausal disjunctive declarative, *It was [Alice]$_F$ (who laughed) or (it was) [Bob]$_F$ who laughed.* This translates as $!(\textsc{cleft}(\textsc{laughed}(\underline{a})) \vee \textsc{cleft}(\textsc{laughed}(\underline{b})))$, and its presuppositional meaning in the model is depicted in Figure 4.5(b).

As exemplified, we take a clefted disjunctive declarative to presuppose that if one of the prejacents of its disjuncts hold, then it holds exclusively, and to express the proposition that one and only one of these prejacents hold. In the given model, this is derived as follows. Since '!' does not contribute anything to the presupposition of its prejacent, the *presupposition* of the sentence is the set $\text{presup}(\textsc{cleft}(\textsc{laughed}(\underline{a})) \vee \textsc{cleft}(\textsc{laughed}(\underline{b})))$, defined as the union of all states $s : s \vDash \textsc{cleft}(\textsc{laughed}(\underline{a}))$ and $s - \text{info}(\textsc{cleft}(\textsc{laughed}(\underline{a}))) \Vdash \textsc{cleft}(\textsc{laughed}(\underline{b}))$. We know from the discussion of the simple declarative clefts in Chapter 3, Section 3.3.2 that $\text{presup}(\textsc{cleft}(\textsc{laughed}(\underline{a}))) = \{w_a, w_b, w_c, w_{bc}\}$, and $\text{info}(\textsc{cleft}(\textsc{laughed}(\underline{a}))) = \{w_a\}$. Analogously, we have that $\text{presup}(\textsc{cleft}(\textsc{laughed}(\underline{b}))) = \{w_a, w_b, w_c, w_{ac}\}$ and $\text{info}(\textsc{cleft}(\textsc{laughed}(\underline{a}))) = \{w_b\}$. The maximal subset s of $\{w_a, w_b, w_c, w_{bc}\}$ such that $s - \{w_a\} \subseteq \{w_a, w_b, w_c, w_{ac}\}$ is the state $\{w_a, w_b, w_c\}$, and the presupposition of the sentence thereby reduces to this.

The sentence expresses the *proposition* $[!(\textsc{cleft}(\textsc{laughed}(\underline{a})) \vee \textsc{cleft}(\textsc{laughed}(\underline{b})))]$, is defined as $\wp(\text{info}(\textsc{cleft}(\textsc{laughed}(\underline{a})) \vee \textsc{cleft}(\textsc{laughed}(\underline{b}))))$. This is equivalent to $\wp(\text{info}(\textsc{cleft}(\textsc{laughed}(\underline{a}))) \cup \text{info}(\textsc{cleft}(\textsc{laughed}(\underline{b}))))$, which we know from before



(a) $[\![(28)]\!]$ (b) $[\![(29)]\!]$

Figure 4.6: Presuppositional meanings assigned to (28): *Was it [Alice]$_F$ (who laughed) or (was it) [Bob]$_F$ who laughed?* and (29): *Who was it that laughed?*

equals the set $\wp(\{w_a\} \cup \{w_b\}) = \wp(\{w_a, w_b\})$.

We now consider the clefted alternative question *Was it [Alice]$_F$ (who laughed) or (was it) [Bob]$_F$ who laughed?*, translating as $\dagger(\textsc{cleft}(\textsc{laughed}(\underline{a})) \vee \textsc{cleft}(\textsc{laughed}(\underline{b}))$. (Recall that '$\dagger$' is introduced by the combination CLOSED INT associated with alternative questions.) Figure 4.6(a) depicts the presuppositional meaning of this in our model.

As indicated, a clefted alternative question is taken to presuppose that one of its disjuncts holds exclusively, and to express the issue of which disjunct this is. This is derived in our model as follows. The *presupposition* of the sentence is the state $\text{presup}(\dagger(\textsc{cleft}(\textsc{laughed}(\underline{a})) \vee \textsc{cleft}(\textsc{laughed}(\underline{b}))))$. By the definition of '$\dagger$', this is defined as $\mathsf{info}(\textsc{cleft}(\textsc{laughed}(\underline{a})) \vee \textsc{cleft}(\textsc{laughed}(\underline{b})))$, which we know from above is the state $\{w_a\} \cup \{w_b\} = \{w_a, w_b\}$.

Recall that '$\dagger$' does not contribute anything to the at-issue content of its prejacent. Therefore, the *proposition* expressed by the sentence is the set $[\textsc{cleft}(\textsc{laughed}(\underline{a})) \vee \textsc{cleft}(\textsc{laughed}(\underline{b}))] = [\textsc{cleft}(\textsc{laughed}(\underline{a}))] \cup [\textsc{cleft}(\textsc{laughed}(\underline{b}))]$. We again know from the previous chapter that $[\textsc{cleft}(\textsc{laughed}(\underline{a}))] = \{\{w_a\}, \emptyset\}$, and similarly that $[\textsc{cleft}(\textsc{laughed}(\underline{b}))] = \{\{w_b\}, \emptyset\}$, so that the proposition reduces to the set $\{\{w_a\}, \emptyset\} \cup \{\{w_b\}, \emptyset\} = \{\{w_a\}, \{w_b\}, \emptyset\}$.

We now consider the clefted *wh*-question *Who was it that laughed?*. This translates as $?\exists x(\textsc{cleft}(\textsc{laughed}(\underline{x})))$. The meaning assigned to this in the current model is represented in Figure 4.6(b). As indicated, in this model, the question is taken to presuppose that *Someone laughed*, and to demand an answer exhaustively specifying the set of laughers. Thus far, the predictions align with intuition: a clefted *wh*-question is not felicitously answered in the negative, as indicated by (30-b). Nor can the exhaustiveness of an answer be felicitously denied, as indicated by (30-c).

(30) a. A: Who was it that laughed?
b. B: #(It was) no one.
c. B′: (It was) Alice. # Bob laughed, too.

Now, we have also predicted that the question presupposes that *Not everyone laughed.* This is not as intuitively correct: the response in (31-b) is somewhat marked—presumably for the same reason as *it*-clefts with *everyone* are—but is not as bad as (30-b).

(31) a. A: Who was it that laughed?
b. B: ?(It was) everyone.

To see how this prediction arises, we outline the derivation of the presupposition of (29) in the model, with respect to some assignment g. As usual, '?' is vacuous on presupposed content, and the presupposition is therefore $\text{presup}_g(\exists x(\textsc{cleft}(\textsc{laughed}(\underline{x}))))$. This is defined as $\bigcup\{s \mid s \Vdash_{g[x/d]} \textsc{cleft}(\textsc{laughed}(\underline{x}))$ for some $d \in \{\boldsymbol{a}, \boldsymbol{b}, \boldsymbol{c}\}\}$. We know from the previous expositions of the presuppositions of clefted atomic sentences that the maximal state satisfying $\textsc{cleft}(\textsc{laughed}(\underline{x}))$ with respect to $g[x/\boldsymbol{a}]$ is the state $\{w_a, w_b, w_c, w_{bc}\}$, and it is quickly seen that the corresponding state for $g[x/\boldsymbol{b}]$ is $\{w_a, w_b, w_c, w_{ac}\}$, and for $g[x/\boldsymbol{c}]$ the state $\{w_a, w_b, w_c, w_{ab}\}$. Neither state contains the world w_{abc} in which everyone laughed, so that the union of these states will not contain this world, either.

This also shows that the exclusion of the possibility that everyone laughed hinges on a specific feature of our model: the assumption that the domain consists exclusively of *singular* individuals. Singular individuals are individuals like *Alice* and *Bob*, in contrast to *plural* individuals (or *sums*), such as the individual *Alice and Bob.* If we had included also plural individuals in the domain, the presupposition of the *wh*-interrogative would have included also the state $\textsc{cleft}(\textsc{laughed}(\underline{abc}))$. Assuming that the focus semantic value of a focussed plural individual is the domain of individuals, this which would spell out as $\{w_a, w_b, w_c, w_{ab}, w_{ac}, w_{ab}, w_{abc}\}$, including the formerly missing world.

Nothing in our current account crucially hinges on the assumption that domains must consist of singular individuals. We will therefore assume that clefted *wh*-interrogatives are most naturally taken to range over the plural domain obtained from the singular domain by including the *sums* of each set of individuals, in the style of Link (1983).

To see the effect of this assumption, consider the model M^+ that is just like our previous toy model, but features the domain $D^+ = \{\boldsymbol{a}, \boldsymbol{b}, \boldsymbol{c}, \boldsymbol{a}\oplus\boldsymbol{b}, \boldsymbol{b}\oplus\boldsymbol{c}, \boldsymbol{a}\oplus\boldsymbol{c}, \boldsymbol{a}\oplus\boldsymbol{b}\oplus\boldsymbol{c}\}$, and where at any world where two or more individuals laughed, their individual sum laughed as well. The presuppositional meaning assigned to (29) in M^+ is depicted in Figure (31).

As indicated, a clefted *wh*-question is now taken to express an exhaustive *wh*-

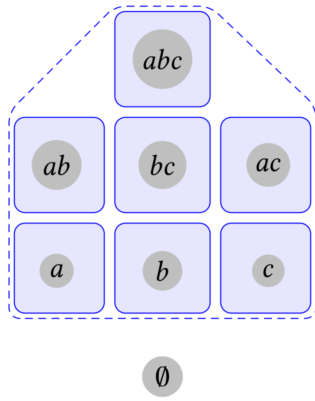


Figure 4.7: Presuppositional meaning assigned to *Who was it that laughed?* in the model M^{+}.

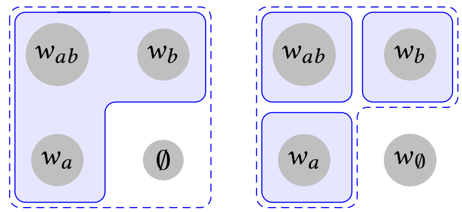
question with an existential presupposition, as desired. This is derived in M^{+} with respect to an assignment g as follows. By the same reasoning as before, the *presupposition* of the sentence amounts the state $\bigcup\{s \mid s \Vdash_{g[x/d]} \textsc{cleft}(\textsc{laughed}(\underline{x}))$ for some $d \in D^{+}\}$. This still includes the states $\{w_a, w_b, w_c, w_{bc}\}$, $\{w_a, w_b, w_c, w_{ac}\}$, and $\{w_a, w_b, w_c, w_{ab}\}$, but additionally includes the presupposition of $\textsc{cleft}(\textsc{laughed}(\underline{x}))$ with respect to $g[x/\boldsymbol{ab}]$, $g[x/\boldsymbol{bc}]$, and $g[x/\boldsymbol{ac}]$, which is the same state $\{w_a, w_b, w_c, w_{ab}, w_{ac}, w_{ab}\}$, and with respect to $g[x/\boldsymbol{abc}]$, which is the state $\{w_a, w_b, w_c, w_{ab}, w_{ac}, w_{ab}, w_{abc}\}$. The latter is also the union of the individual states, meaning that the presupposition of the interrogative reduces to this.

The *proposition* expressed by the sentence is $[?\exists x(\textsc{cleft}(\textsc{laughed}(\underline{x})))]_g$, defined as the union of $[\exists x(\textsc{cleft}(\textsc{laughed}(\underline{x})))]_g$ and $\wp(\mathsf{presup}_g(\exists x(\textsc{cleft}(\textsc{laughed}(\underline{x})))) - \mathsf{info}_g(\exists x(\textsc{cleft}(\textsc{laughed}(\underline{x}))))$. The former equals $\bigcup_{d \in D^{+}}[\textsc{cleft}(\textsc{laughed}(\underline{x}))]_{g[x/d]}$, which is easily seen to be the set $\{\{w_a\}, \{w_b\}, \{w_c\}, \{w_{ab}\}, \{w_{bc}\}, \{w_{ac}\}, \{w_{abc}\}, \emptyset\}$. Thus, $\mathsf{info}_g(\exists x(\textsc{cleft}(\textsc{laughed}(\underline{x})))) = \{w_a, w_b, w_c, w_{ab}, w_{bc}, w_{ac}, w_{abc}\}$, which is precisely the presupposition of $\exists x(\textsc{cleft}(\textsc{laughed}(\underline{x})))$. Therefore, the proposition expressed by the sentence reduces to $\{\{w_a\}, \{w_b\}, \{w_c\}, \{w_{ab}\}, \{w_{bc}\}, \{w_{ac}\}, \{w_{abc}\}, \emptyset\} \cup \{\{\emptyset\}\} = \{\{w_a\}, \{w_b\}, \{w_c\}, \{w_{ab}\}, \{w_{bc}\}, \{w_{ac}\}, \{w_{abc}\}, \emptyset\}$, as depicted.

This concludes our application of the semantics of *it*-clefts to the new types of constructions, and we can proceed to lay out the impact of these predictions on the data from Yucatec Maya.

4.2.2 Wh-questions

According to our assumptions, the non-clefted sentence in (32) has the structure given in (33-a) (CD abbreviates CLOSED DECL). This translates as indicated in (33-b), which is the same form as assigned to the English declarative *Someone drank the atole.* The



(a) $[\![(32)]\!] = [\![(33\text{-b})]\!]$ (b) $[\![(34)]\!] = [\![(36\text{-b})]\!]$

Figure 4.8: Presuppositional meanings assigned to (32) and (34).

presuppositional meaning of this in a model with Juan and Daniel is depicted in Figure 4.8(a).

(32) yan máax t-u yuk'-aj le sa'-o'
exists someone/who PFV-A.3 drink.STATUS DEF atole-DISTAL
Someone drank the atole.

(33) a. Structure: $[_S$ CD $[_{CP}$ $[_C$ $\mathrm{C_{DECL}}$ $[_{TP}$ *yan máax t-u yuk'-aj le sa'-o'*]]]]
b. (Simplified) translation: $!\exists x \textsc{drank}(a)(x)$

For the clefted sentence in (34), we predict two possible structures: the declarative one laid out in (35-a), and the interrogative one laid out in (36-a).

(34) $[\text{máax}]_F$ uk' le sa'-o'
someone/who drink.AGF the atole-DISTAL
Who drank the atole?

(35) a. Structure: $[_S$ CD $[_{CP}$ $[_C$ $\mathrm{C_{DECL}}$ $[_{TP}$ *[máax]$_F$ uk' le sa'-o'*]]]]
b. (Simplified) translation: $\textsc{cleft}(\exists x \textsc{drank}(a)(\underline{x}))$

(36) a. Structure: $[_S$ OI $[_{CP}$ $[_C$ $\mathrm{C^1_{INT}}$ $[_{TP}$ *[máax$_{[+Wh]}$]$_F$ uk' le sa'-o'*]]]]
b. (Simplified) translation: $?\exists x \textsc{cleft}(\textsc{drank}(a)(\underline{x}))$

The declarative structure translates into the IL-trivial formula (35-b): the logical skeleton of this always expresses a non-inquisitive, uninformative proposition.

Proof. Let M, g be an arbitrary model and assignment. The interpretation of the logical skeleton of (35-b) in M with respect to g is spelled out in (37).

(37) $[\![\textsc{cleft}(\exists x \boldsymbol{P}(\underline{x}))]\!]_{M,g} = \langle \pi, A \rangle$, where

- $\pi = \textsc{max}_{M,g}(\exists x \boldsymbol{P}(\underline{x})) \cap \mathsf{presup}_{M,g}(\exists x \boldsymbol{P}(\underline{x})) \cap \mathsf{info}_{M,g}(!\exists x \mathbf{P}(x))$
  if $\exists x \boldsymbol{P}(\underline{x}) \vDash\, !\exists x \boldsymbol{P}(\underline{x})$,
  $\emptyset$ otherwise
- $A = \wp(\textsc{min}_{M,g}(\exists x \boldsymbol{P}(\underline{x}))) \upharpoonright \pi$

It is easily seen that $\exists x \boldsymbol{P}(\underline{x}) \vDash\ !\exists x \boldsymbol{P}(\underline{x})$, so that $\pi = \mathrm{MAX}_{M,g}(\exists x \boldsymbol{P}(\underline{x})) \cap \mathsf{presup}_{M,g}(\exists x \boldsymbol{P}(\underline{x})) \cap \mathsf{info}_{M,g}(!\exists x \mathbf{P}(x))$. Thus, $\pi \subseteq \mathsf{info}_{M,g}(\exists x \mathbf{P}(x))$. Since $\mathrm{MIN}_{M,g}(\exists x \boldsymbol{P}(\underline{x})) = \mathsf{info}_{M,g}(\exists x \boldsymbol{P}(\underline{x})) = \mathsf{info}_{M,g}(\exists x \mathbf{P}(x))$, it follows that $\pi \subseteq \mathsf{info}_{M,g}(A)$. Since $\mathsf{info}_{M,g}(A) \subseteq \pi$ follows by the restriction $\upharpoonright \pi$, this entails that $\mathsf{info}_{M,g}(A) = \pi$, i.e., that (37) is *non-informative*. Since a power set is never inquisitive, (37) must further be *non-inquisitive*, so *trivial*. □

Note that this holds independently of the assumption that the quexistential lacks scalar alternatives: we know from the previous chapter that **It was [someone]$_F$ who drank the atole* would be equally IL-trivial.

By movement of the [+Wh] quexistential in (36-a) to a SpecC, the sentence (34) translates into our logical language as in (36-b). This is the same form as assigned to the English *wh*-question *Who was it that drank the atole?*, and the interpretation of this in the model of Juan, Daniel, and their individual sum is depicted in Figure 4.8(b). In accordance with AnderBois', we predict that the question presupposes existence. Unlike AnderBois'—but not in contradiction to his data—we additionally predict that the question is exhaustive. We return to discuss this prediction briefly in the section concluding this chapter.

4.2.3 Clefted disjunctions

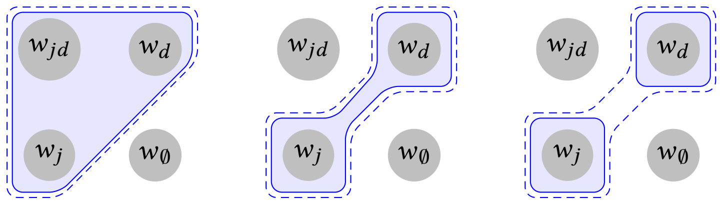
We assume that on a declarative reading, the non-clefted disjunctive sentence in (38) is given one of the equivalent translations (39-a) and (39-b), where the former is the same form as assigned to the English sentence *[Juan-or-Daniel]$_F$ drank the atole*, and the latter the same form as assigned to *[Juan]$_F$ drank the atole, or [Daniel]$_F$ drank the atole.*

(38)	t-u	yuk'-aj	le	sa'-o'	Juan	wáa	Daniel
	PFV-A.3	drink-STATUS	DEF	atole-DISTAL	Juan	or	Daniel
	Juan or Daniel drank the atole.						

(39) a. (Simplified) translation 1: $!(\mathrm{DRANK}(a)(j) \vee \mathrm{DRANK}(a)(d))$
b. (Simplified) translation 2: $!(!\mathrm{DRANK}(a)(j) \vee !\mathrm{DRANK}(a)(d))$

Since we know that neither of these are IL-trivial, it follows that the sentence in (38) can be read as a declarative. Of course, the sentence would be *contextually* trivial in a setting in which it is established that one (or more) of Juan and Daniel drank the atole. In this case, however, an interrogative reading of the sentence is also trivial: it would correspond to the polar question of whether one (or more) of Juan and Daniel drank the atole, contextually restricted to have only one alternative.

For the clefted disjunction in (40), we have four non-equivalent possible translations.



(a) (41) and (42) (b) (43) (c) (44)

Figure 4.9: Presuppositional meanings of the clefted disjunctions in Context 1.

(40) [Juan wáa Daniel]$_F$ uk' le sa'-o'
Juan or Daniel drink.AGF DEF atole-DISTAL
Was it/It was Juan or Daniel who drank the atole

First, it could read as a clefted monoclausal disjunctive declarative:

(41) a. (Simplified) translation: $\textsc{cleft}(\textsc{drank}(a)(j) \vee \textsc{drank}(a)(\underline{d}))$
b. English correlate: *It was [Juan-or-Daniel]$_F$ who drank the atole.*

Second, it could read as a disjunctive polar question with a cleft:

(42) a. (Simplified) translation: $?\textsc{cleft}(\textsc{drank}(a)(j) \vee \textsc{drank}(a)(\underline{d}))$
b. English correlate: *Was it [Juan-or-Daniel]$_F$ who drank the atole?*

Third, it could read as a clefted biclausal disjunctive declarative:

(43) a. (Simplified) translation: $!(\textsc{cleft}(\textsc{drank}(a)(j)) \vee \textsc{cleft}(\textsc{drank}(a)(\underline{d})))$
b. English correlate: *It was [Juan]$_F$ (who drank the atole) or (it was) [Daniel]$_F$ who drank the atole.*

Fourth, it could read as a clefted alternative question:

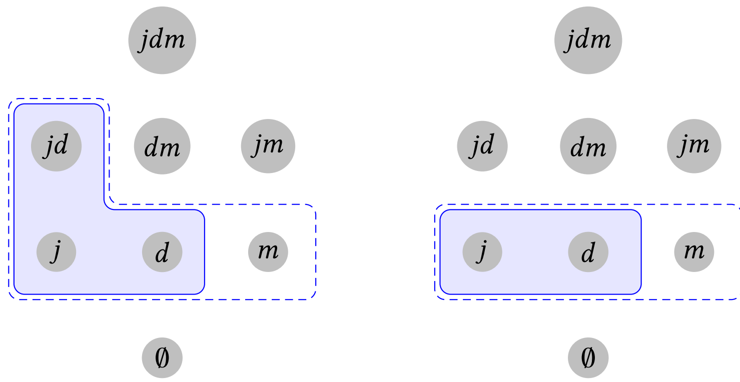
(44) a. (Simplified) translation: $\dagger(\textsc{cleft}(\textsc{drank}(a)(j)) \vee \textsc{cleft}(\textsc{drank}(a)(\underline{d})))$
b. English correlate: *Was it [Juan]$_F$ (who drank the atole) or (was it) [Daniel]$_F$ who drank the atole?*

Figure 4.9 depicts the presuppositional meanings assigned to these sentences in AnderBois' Context 1.

- Context 1: Addressee and speaker both agree that one of the speaker's two brothers (Juan and Daniel) drank the atole that had been on the table.

  (40) = *Was it Juan or Daniel who drank the atole?*

In this context, every reading except reading (44), as an alternative question, comes out as contextually trivial. Under our assumptions, then, this reading is forced in the given



(a) (41) (b) (42)

Figure 4.10: Presuppositional meanings of clefted disjunctive declaratives in Context 2.

context. This is in accordance with the data, capturing also that the question excludes the possibility that both disjuncts hold.

Figure 4.10 illustrates the presuppositional meanings assigned to the two declarative readings of (40) in Context 2.

- <u>Context 2</u>: Addressee and speaker both agree that one of the speaker's siblings (Juan, Daniel and Maribel) drank the atole that had been on the table.

  (40) = *It was Juan or Daniel who drank the atole.*

In this context, both readings are informative: neither has a presupposition excluding the possibility that Maribel (and Maribel alone) drank the atole, but both express propositions excluding this possibility.

Our assumptions thereby license us to conclude that these are the only two readings of the clefted disjunctive sentence in Context 2. Whether there is a preferred reading among these is underdetermined by the discussion in AnderBois (2012): while it is noted that the interrogative reading of the sentence excludes the possibility of both disjuncts holding, neither the same nor the contrary is explicitly stated for the declarative reading. Presumably, this indicates that both readings are possible, which is predicted.

4.2.4 Polar questions

We consider first the polar question in (45), lacking focus/clefting.

(45)	táan-wáaj	u	yuk'-ik	le	sa'-o'	Juan
	Prog-or	A.3	drink-Status	Def	atole-Distal	Juan

Is Juan drinking the atole?

Under our assumptions, this has four different possible readings:

(46) a. $!(!(\langle ? \rangle \textsc{drank}(a)(j))) = !(\textsc{drank}(a)(j) \vee \neg \textsc{drank}(a)(j))$
b. $!(\langle ? \rangle !(\textsc{drank}(a)(j)))) = !(\textsc{drank}(a)(j) \vee \neg \textsc{drank}(a)(j))$
c. $?(!(\langle ? \rangle \textsc{drank}(a)(j))) = ?(!(\textsc{drank}(a)(j) \vee \neg \textsc{drank}(a)(j)))$
d. $?(\langle ? \rangle !(\textsc{drank}(a)(j)))) = ?(\textsc{drank}(a)(j) \vee \neg \textsc{drank}(a)(j))$

Reading (46-a) is derived from the structure classified as declarative in which the unary disjunction occurs *within* the sole list item. It is easily seen that this is IL-trivial: it expresses the same as the English tautology *Juan drank or did not drink the atole*, but does so invariantly. The negated disjunct is generated from the non-negated disjunct by the disjunction, and its interpretation is therefore dependent on the latter.

Reading (46-b) is derived from the structure classified as declarative, in which the unary disjunction occurs *outside* of the sole list item. This is clearly equivalent to (46-a), and thereby IL-trivial.

Reading (46-c) is derived from the structure classified as interrogative, in which the unary disjunction occurs *within* the sole list item. Since '?' in this case applies to a non-informative sentence, and does not affect presuppositional content, it cannot contribute inquisitiveness by adding an alternative. Thus, this sentence too is IL-trivial.

Reading (46-d) is derived from the structure classified as interrogative, in which the unary disjunction occurs *outside* of the sole list item. In this case, '?' applies to an already inquisitive but uninformative sentence, which means that it is vacuous. The resulting sentence is therefore inquisitive, and corresponds to the English polar question *Did Juan drink the atole?* This can also be seen by noting that (46-d) is equivalent to $?\textsc{drank}(a)(j)$.

We therefore predict that reading (46-d) is forced as the only grammatical reading of (45), in accordance with the data.

We now consider the polar question in (47), with focus/clefting.

(47)	[Juan	wáa]$_F$	uk'	le	sa'-o'
	Juan	or	drink.AgF	Def	atole-Distal

Was it Juan who drank the atole?

Under our assumptions, this sentence too has four possible readings.

(48) a. $!(!(\textsc{cleft}(\langle ? \rangle . \textsc{drank}(a)(\underline{j}))))$
$= \textsc{cleft}(\textsc{drank}(a)(\underline{j}) \vee \neg \textsc{drank}(a)(\underline{j}))$
b. $!(\langle ? \rangle !(\textsc{cleft}(\textsc{drank}(a)(\underline{j}))))$
$= !(\textsc{cleft}(\textsc{drank}(a)(\underline{j})) \vee \neg \textsc{cleft}(\textsc{drank}(a)(\underline{j})))$
c. $?(!(\textsc{cleft}(\langle ? \rangle . \textsc{drank}(a)(\underline{j}))))$
$= ?(\textsc{cleft}(\textsc{drank}(a)(\underline{j}) \vee \neg \textsc{drank}(a)(\underline{j})))$
d. $?(\langle ? \rangle (!(\textsc{cleft}(\textsc{drank}(a)(\underline{j})))))$
$= ?(\textsc{cleft}(\textsc{drank}(a)(\underline{j})) \vee \neg \textsc{cleft}(\textsc{drank}(a)(\underline{j})))$

Reading (48-a) derives from the structure classified as declarative, in which the unary disjunction occurs *within* the sole list item. This is easily seen to be IL-trivial: it corresponds to *It was [Juan-or-not-Juan]$_F$ who drank the atole*, which is trivial given its existential presupposition. In the case of (48-a), this triviality is determined by the logical vocabulary only (especially, the unary disjunction), so that the sentence classifies as IL-trivial.

Reading (48-b) derives from the structure classified as declarative, in which the unary disjunction occurs *outside* of the sole list item. Its disjuncts are complementary, which makes for non-informativity, and this together with the non-inqusitive closure introduced by '!' makes for triviality. Again, since the non-informativity derives from the disjunction, the triviality reflects IL-triviality.

Reading (48-c) derives from the structure classified as interrogative, in which the unary disjunction occurs *within* the sole list item. Just as for (46-c) above, the fact that '?' applies to an IL-trivial sentence makes it vacuous, so that the resulting sentence is itself IL-trivial.

Reading (48-d) is derived from the structure classified as interrogative, in which the unary disjunction occurs *outside* of the sole list item. In this case, '?' applies to an uninformative sentence, which means that it is vacuous. The resulting sentence is therefore inquisitive, and corresponds to the polar question *Was it Juan who drank the atole?* This can also be seen by noting that (48-d) is equivalent to $?\textsc{cleft}(\textsc{drank}(a)(\underline{j}))$.

We therefore predict that reading (48-d) is forced as the only grammatical reading of (47), in accordance with the data.

4.3 Conclusion

In this chapter, we have proposed a (mainly) semantic account of the strategies of question formation in Yucatec Maya. We showed that even by treating sentences in the language as overall structurally ambiguous between declarative and interrogative, we could find a systematic means of determining the given reading of a sentence by purely semantic considerations. When the default, declarative reading comes out as IL-trivial, the interrogative reading is forced. This accounted for the formation of both *wh*- and polar interrogatives. Additionally, if a default, declarative reading comes out as contextually trivial—uninformative and non-inquisitive in the given context of communication—and the corresponding interrogative reading is not contextually trivial, the interrogative reading is also forced. This accounted for the formation of alternative questions.

The account was inspired by AnderBois (2012)'s account of questions in Yucatec Maya, and improved on this in several ways. At a general level, it showed that the rather exotic pattern of question formation of the language can be derived through more standard assumptions about sentence structure and the semantics of clefts. At a construction-specific level, it derived the exclusivity of alternative questions, which was missing from AnderBois' treatment. Most importantly, the new account managed to avoided the *under*generation of question readings resulting from AnderBois' Inquisitive Principle II, according to which alternative questions would not classify as questions, and the *over*generation of question readings resulting from AnderBois' Inquisitive Principle I, according to which non-clefted disjunctions and sentences with wide-scope indefinites classify as questions.

Our treatment of *wh*-interrogatives in the language stood out, in two ways. First, as it was an instance of our general treatment of clefted *wh*-interrogatives, it required the (implicit) assumption that the quexistential read as ranging over a plural domain. I admit that this may seem ad-hoc, but do not currently see a better way to account for the intuitive reading of these questions.

Second, we predicted that, like clefted *wh*-interrogatives in general, *wh*-questions in Yucatec Maya demand *exhaustive* answers. While this is neither confirmed nor disconfirmed by the data at hand, it sets these questions apart from *wh*-questions in English, which can be non-exhaustive. It is worth to point out that we would obtain a more uniform treatment if we assumed that the focus/cleft construction in these cases has the semantic contribution associated with *focus* rather than that of CLEFT. The upcoming chapter will propose a treatment of focus as exhaustive, but in which the movement of [+Wh]-quexistentials out of the focus domain cancels the exhaustive effect. As we will see, this would yield an interpretation of the resulting *wh*-interrogative as non-exhaustive, just as ordinary *wh*-interrogatives are taken to be in Inquisitive Semantics.

Chapter 5

Focus and quexistentials

In the majority of the languages of the world, indefinite and interrogative pronouns are either identical in form, or derivationally related (Haspelmath, 1997; Bhat, 2004). We have already seen an example of the former: in Yucatec Maya, words like *máax* and *báax* can function both as indefinites (reading as *(some)one* and *(some)thing*, respectively) and as interrogative pronouns (reading as *who* and *what*, respectively). The latter includes languages like Greek, in which indefinites like *kati* (*something*) and *kapios* (*someone*) are derived from interrogative pronouns, in this case *ti* (*what*) and *pios* (*who*):

(1) Ti efages?
what ate.2SG
What did you eat? (Iatridou et al., 2018)

(2) Efages kati
ate.2SG something
You ate something. (Iatridou et al., 2018)

In this chapter, we will be concerned with languages in which some indefinite and interrogative pronouns are morphologically identical. Following Iatridou et al. (2018), we will refer to forms that can function both as indefinite and as interrogative pronouns as *quexistentials*. This class of languages include many beside Yucatec Maya, spread across the language families of the world. In a survey based on several previous typological studies, Gärtner (2009) found that 62 languages out of a sample of roughly 150 featured quexistentials, including among the larger languages Mandarin Chinese, Russian, Pashto, Thai, Korean, and German.[1]

[1]This is the full set, collected by Gärtner (2009) from Cheng (1991), Haspelmath (1997), Haspelmath (2013), Bhat (2000), Bhat (2004), and Bruening (2007): Aghem, Assuriní, Atayal, Belorussian, Burushaski, Chinese, Diyari, Djaru, Dutch, Dyirbal, Old English, Finnish Sign Language, Galibi, German, Goajiro, Gooniyandi, Gothic, Classical Greek, Guaraní, Hmong Njua, Hopi, Jaminjung, Kaingang, Kamaiurá, Khmer, Klamath, Koasati, Korean, Lakhota, Latin, Lithuanian, Mangarayi, Mapuche, Maricopa, Martuthu-

There is considerable cross-linguistic variation in how languages disambiguate between the different readings. We saw that Yucatec Maya forces the interrogative reading through placing a quexistential in a focus/cleft construction, which rendered the existential indefinite reading IL-trivial. Languages may also single out the interrogative use of a quexistential by overtly marking a sentence as interrogative, typically through the use of a question particle. This is the case in Lakhota, where the quexistential *táku* (*something/what*) functions as an indefinite pronoun in a sentence without interrogative marking, but as an interrogative pronoun in a sentence with the question particle *he* (van Valin, 1993):

Lakhota (van Valin, 1993).

(3) š´ųka ki **táku** yaxtáka he
dog the *quex* bite INT
What did the dog bite?

(4) š´ųka ki **táku** yaxtáka
dog the *quex* bite
The dog bit something.

In *wh*-fronting languages, placing the quexistential in the leftmost position fulfills a similar function. In Dutch, the quexistential *wat* (*what/something*) may read as an indefinite pronoun when occurring in situ, but must function as an interrogative pronoun when fronted (Iatridou et al., 2018):

Dutch (Iatridou et al., 2018).

(5) **wat** heb je gegeten
quex have you eaten
What did you eat?

(6) je heb **wat** gegeten
you have *quex* eaten
You have eaten something.

A third common strategy, often used as an alternative to fronting, is to signal the interrogative use of the quexistential through placing it in *focus*. This is an established strategy in a diverse set of languages, such as Korean (Yun, 2013), Russian (Iatridou et al., 2018), and German (Haida, 2007):[2]

nira, Masalit, Mising, Mundari, Newari, Panare, Panyjima, Pashto, Passamaquoddy, Eastern Pomo, Ancash Quechua, Russian, Vedic Sanskrit, Santali, Shoshone, Siuslaw, Old Church Slavonic, Slovene, Takelma, Thai, Ukrainian, Warndarang, Wintu, Xinh Mul, Yaqui, Yidini, Yindjibarndi, Yup'ik.

[2] Yun (2013) reports that the *wh*-reading in (8) has the *prosodic characteristics* of focus—pitch raised on the *quex*-morpheme and reduced on the following morpheme—but argues that it is the dephrasing, rather than the pitch boost, that is the main disambiguating factor for the quexistential. It is not clear whether

Korean (Yun, 2013).

(7) nay-ka **nwukwu**-hako kyelhonha-myen ton-ul pat-a
I-Nom *quex*-with marry-if money-Acc get-Int
I will get money if I marry someone, or
There is someone such that if I marry them, I will get money.

(8) nay-ka [**nwukwu**]$_F$-hako kyelhonha-myen ton-ul pat-a
I-Nom *quex*-with marry-if money-Acc get-Int
Who will I get money if I marry?

Russian (Iatridou et al., 2018).

(9) vasja **čto** [s"yel]$_F$
Vasja *quex* ate
Did Vajsa eat something?

(10) vasja [**čto**]$_F$ s"yel
Vasja *quex* ate
What did Vasja eat?

German (Haida, 2007).

(11) wer [mag]$_F$ **was**
who likes *quex*
Who likes something?

(12) wer mag [**was**]$_F$
who likes *quex*
Who likes what?

Building on observations like these, Iatridou et al. (2018) suggest the following, cross-linguistic generalization:

Focus Generalization. A focussed quexistential cannot be interpreted as an existential indefinite pronoun.

There is, however, one known exception to this generalization. Certain languages allow focussed quexistentials to receive existential indefinite interpretations on the condition that the quexistential is saliently contrasted with a *scalar alternative* to the existential indefinite (Floris Roelofsen, p.c.). In Dutch, focussed *wat* is typically unable to receive an indefinite reading. However, an indefinite reading is possible in case the linguistic context makes scalar alternatives to *wat* (indefinite reading as *something*) particularly salient, as in (13):

this dephrasing indeed has the semantic effects associated with focus, but I have abstracted over this here.

(13) Peter heeft wel [wat]$_F$ gegeten, maar niet [veel]$_F$/[alles]$_F$.
Peter has eaten something, but not much/everything.

Note however that this is not a possibility in all languages using focus marking as an indicator of the interrogative reading. Even in German, a close relative to Dutch, contrasts like the above are not licensed:

(14) *Peter hat [was]$_F$ gegessen, aber nicht [viel]$_F$/[alles]$_F$.

The strategy of signaling the interrogative reading of a quexistential through focus marking may seem somewhat random, in contrast to the alternative means of overtly marking a sentence as interrogative. In this chapter, we will show that given certain independently motivated assumptions about the semantic effects of narrow focus, the focus generalization, as well as the known exception, follows. We have already seen that clefting paired with an indefinite pronoun, like English *someone*, makes for a systematic form of triviality. I will propose that the pairing of narrow focus with a quexistential does very much the same, to the effect that the quexistential needs to receive an interpretation as an interrogative pronoun in order to avoid triviality.

The ideas to be presented are very much inspired by—but not drawn from—ongoing work by Sabine Iatridou, Kees Hengeveld and Floris Roelofsen, part of which was presented in Iatridou et al. (2018), and other parts which were communicated to me in personal correspondence by Floris Roelofsen. Given that this work, especially including data collection, is ongoing, the data on which this chapter is based on is still limited. Thus, the conclusions to be drawn are somewhat more speculative than those of the previous chapters. The aim will be to make explicit a proposal for the data at hand, hopefully providing a perspective that can be a useful point of departure with respect also to future discoveries.

The chapter is structured as follows. Section 5.1 summarizes the key semantic and syntactic assumptions about focus and quexistentials that we will make use of in the explanation of the Focus Generalization (and its exceptions). Section 5.2 puts these assumptions to work, arguing that the cases where a focussed quexistential must read as an interrogative pronoun are such that the alternative reading is IL-trivial. Section 5.3 concludes.

5.1 Prerequisites

We begin by outlining the key semantic and syntactic assumptions about focus and quexistentials that we will make use of in the explanation of the Focus Generalization.

5.1.1 The syntax and semantics of free narrow focus

Focus occurring without overt association with a focus sensitive operator, like in (15), is known as *free focus*.

(15) [Alice]$_F$ laughed.

It is common to differentiate free focus along two dimensions: *size* (narrow versus broad) and *type* (informational versus identificational) (Gussenhoven, 2008; Kiss, 1998). The focus marking in (15) is an example of narrow focus, which is conveyed in English by prosodic stress on or within a simple constituent. Focus of this size may be interpreted either as informational or as identificational.[3] Informational focus serves a mere discourse function, marking material as conveying *new, non-presupposed* information. This is the most natural interpretation of the focus marking in (16):

(16) You won't believe this: [Alice]$_F$ laughed!

Identificational focus, on the other hand, has a semantic effect: it conveys that the marked material should be interpreted contrastively or exhaustively with respect to some focus alternative(s). This is the most natural interpretation of the focus marking in (17-b), in which Speaker B's utterance is taken to convey that nobody other than Alice (in the relevant domain) laughed.

(17) a. A: Who laughed?
b. B: [Alice]$_F$ laughed.

Evidence that this exhaustive effect is semantic, rather than just pragmatic, comes from noting that it survives in a *downward entailing* environment, such as the antecedent of a conditional:

(18) If you order the cake [or]$_F$ the ice cream, it will cost 3 Euros. But if you order both, it will cost more.

Without giving the disjunction an exclusive interpretation, this sequence of sentences comes out as contradictory. As forcefully argued by Chierchia et al. (2012), the fact that it does not cannot be explained in terms of Gricean implicatures: implicatures are calculated from full sentences (strictly, from *assertions* of sentences), not from embedded clauses, like the conditional antecedent.

Identificational focus is often taken to come with an existential presupposition, typically of the form that the property expressed by the "backgrounded", non-focussed material, is instantiated (Geurts and van der Sandt, 2004). Indeed, a construction like

[3] Often, though, even more (sub)types of narrow focus are distinguished, as discussed for instance by Gussenhoven (2008). The suggested two-way distinction is however well-established, and provides sufficient fineness of grain to suit our current purposes.

(19) invites the inference that *Someone (other than Alice) laughed.*

(19) [Alice]$_F$ didn't laugh.

Broad focus is typically—if not exclusively—of the information type, and is used to convey that a larger piece of material, such as the full sentence in (20-b), is new information.

(20) a. A: What happened?
b. [Alice laughed]$_F$.

In the present setting, we are concerned exclusively with narrow focus. Following several previous proposals (e.g., Szabolcsi, 1994; Chierchia, 2004; Haida, 2007; Horvath, 2013), we will capture the semantic contribution of such focus by assuming that it covertly associates with a (phonologically null) *exhaustivity operator*, which on our account will be responsible both for generating the existential presupposition, and for the exhaustive at-issue contribution. We can capture the intended contribution of this operator—called Exh, for lack of imagination—using previously defined operations:

(21) $[\![\text{Exh}(\varphi)]\!] = \langle \pi, A \rangle$, where

$\bullet \pi = \mathsf{info}(\textsc{efc}(\varphi))$

$\bullet A = \wp(\textsc{max}(\varphi) \cap \textsc{min}(\varphi)) \restriction \pi$

Following Horvath (2013), we assume that Exh is the syntactic head of a projection *ExhP* (*Exhaustivity Phrase*), residing between the CP and the TP. We assume that this projection is not present by default, but needs to be licensed by the presence of a focussed element in the TP, due either to syntactic requirements (that is, feature checking/valuation) or general semantic-pragmatic requirements of non-redundancy.

When a focus marked constituent is c-commanded by Exh—meaning that the constituent will occur in its semantic scope—the operator will use the focus semantic value of the TP including the focus marked constituent to yield an exhaustive at-issue contribution, similarly to the overt operator *only*. [4] We assume that Exh is like overt *only* in a further sense, namely in that must c-command the *highest* site of the focus marked constituent with which it associates (Erlewine, 2014, for instance p. 115). Thus, in case the (only) focus marked constituent *moves* to a site above Exh, the operator has no associate, and will not be licensed. This assumption will let us treat *wh*-questions featuring focussed quexistentials as non-exhaustive, in closer correspondence to our standard treatment of such questions in Presuppositional Inquisitive Semantics.

To illustrate this, the identification focus interpretation of (17-b), *[Alice]$_F$ laughed*, will have the syntactic structure laid out in (22-a), where CD abbreviates CLOSED DECL.

[4] Horvath's approach also involves *movement* of the focussed constituent to the specifier of the ExhP, but this is not needed here.

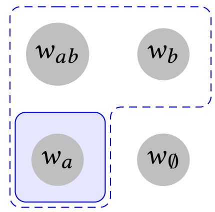


Figure 5.1: Presuppositional meaning of the identification focus interpretation of (17-b): *[Alice]$_F$ laughed.*

(22) a. Structure: $[_S$ CD $[_{CP}$ $[_C$ C_{DECL} $[_{ExhP}$ $[_E$ (Exh) $[_{TP}$ *[Alice]$_F$ laughed*]]]]]]
b. Formal translation: $!!\text{Exh}(\textsc{laughed}(\underline{a})) = \text{Exh}(\textsc{laughed}(\underline{a}))$

The interpretation of (22-b) in our model with Alice and Bob is given in Figure 5.1, and its derivation is simple. By definition of Exh, the presupposition is simply the existential focus closure of $\textsc{laughed}(\underline{a})$, which is $\exists u \textsc{laughed}(u)$. We know from earlier that $\textsc{max}(\textsc{laughed}(\underline{a})) = \{w_a, w_b\}$ and that $\textsc{min}(\textsc{laughed}(\underline{a})) = \{w_a, w_{ab}\}$, so that the proposition expressed is the set $\wp(\{w_a, w_b\} \cap \{w_a, w_{ab}\}) \upharpoonright \exists u \textsc{laughed}(u) = \{\{w_a\}, \emptyset\}$.

5.1.2 The syntax and semantics of quexistentials

We will generalize the assumptions made about quexistentials in Yucatec Maya, and treat quexistentials cross-linguistically as inquisitive existentials:

(23) *quex* $\rightsquigarrow \lambda P.\exists x P(x)$

Whether a given quexistential functions as an indefinite or an interrogative pronouns will again be captured as an ambiguity at the level of grammatical features. We assume that quexistentials have an optionally active [Wh]-feature, such that their default interpretation is as [-Wh] elements, but that a [+Wh] reading can be forced in certain contexts: namely, when the reading as [-Wh] is IL-trivial. The assumption that [-Wh] is default conforms to the observation that across languages, the interrogative reading tends to be the one that requires marking. By our assumptions about the interrogative clause type marker, this means that a quexistential may be targeted for movement to SpecC only when it is [+Wh]. Otherwise, it stays *in situ.*

As foreshadowed in our discussion of quexistentials in Yucatec Maya, we assume that in general, quexistentials are not scalar items. This conforms to the observation that quexistentials are not, *in general*, felicitously contrasted with other one-place quantifier expressions. Instead, the default focus semantic value of a focussed quxistential will be the same as for the corresponding interrogative pronoun; a domain of (Montagovian) individuals.

However, we have observed that languages like Dutch allow focussed quexistentials to contrast with the Horn scale mates of the corresponding indefinite pronoun, provided that these scalar alternatives are sufficiently salient.[5] Thus, some quexistentials, such as Dutch *wat*, seem to be *optionally* scalar. Following Chierchia (2013)'s treatment of indefinite pronouns, we will capture this by assuming that quexistentials which are able to contrast with scalar alternatives have an optionally active grammatical [s] feature. When this feature is not active, indicated by [-s], the expression cannot contrast with scalar alternatives. When the linguistic context makes scalar alternatives sufficiently salient, for instance by featuring contrastively focussed instances of these alternatives, the feature is activated, indicated by [+s].

In the formal language, we indicate the difference as usual by underlining the quantifier, in case the quexistential it translates is [+s], or the variable, in case the quexistential is [-s]. We summarize these assumption below.

(24) $[\![[quex_{[-s]}]_F]\!]^f_g = [\![\lambda P.\exists xP(\underline{x})]\!]^f_g = \{[\lambda P.P(x)]_{g[x/d]} \mid d \in D_e \}$

(25) $[\![[quex_{[+s]}]_F]\!]^f_g = [\![\lambda P.\underline{\exists} xP(x)]\!]^f_g = \{[\lambda P.\exists xP(x)]_g, [\lambda P.\forall xP(x)]_g\}$

Thus, the focus semantic value of a [+s] quexistential is the set of the ordinary semantic values of the Horn scale mates of the relevant existential indefinite pronoun. Making the same simplifying assumptions as for non-quexistential indefinite pronouns, this includes the extremes of the Horn scale.

With these assumptions in place, we can begin to outline their consequences for the semantics of constructions with focussed quexistentials.

5.2 Quexistentials in focus

As we have seen, (narrow) focus marking of a quexistential may serve to disambiguate it, and thereby disambiguate the *type* of the sentence in which it occurs. In our examples from Korean, repeated below, focus marking distinguished the interrogative sentence in (27) from the declarative sentence in (26):

(26) nay-ka nwukwu-hako kyelhonha-myen ton-ul pat-a
I-NOM *quex*-with marry-if money-ACC get-INT
I will get money if I marry someone, or
There is someone such that if I marry them, I will get money. (Yun, 2013)

(27) nay-ka [nwukwu]$_F$-hako kyelhonha-myen ton-ul pat-a
I-NOM *quex*-with marry-if money-ACC get-INT
Who will I get money if I marry? (Yun, 2013)

A quexistential can also occur in an unambiguously interrogative sentence, in which case focus marking may serve differentiate between the reading of the sentence as a

[5] This seems to hold also for Mandarin Chinese and Slovene, but as noted not for German, nor for Russian, according to the data collected by Sabine Iatridou, Kees Hengeveld, and Floris Roelofsen.

polar interrogative (without focus on the quexistential) and a *wh*-interrogative (with focus marking on the quexistential). This was the case for our examples from Russian, repeated below:

(28) vasja čto [s"yel]$_F$
Vasja *quex* ate
Did Vajsa eat something? (Iatridou et al., 2018)

(29) vasja [čto]$_F$ s"yel
Vasja *quex* ate
What did Vasja eat? (Iatridou et al., 2018)

Finally, a quexistential can occur in an unambiguous *wh*-interrogative. In this case, focus marking may distinguish between a reading of the sentence as a single *wh*-interrogative, and a reading of the sentence as a multiple *wh*-interrogative. In our examples from German, repeated below, focus marking on the quexistential *was* serves to license the reading of the sentence as the multiple *wh*-interrogative:

(30) wer mag [was]$_F$
who likes *quex*
Who likes what? (Haida, 2007)

Without focus marking on this constituent, the sentence reads as a single *wh*-interrogative:

(31) wer [mag]$_F$ was
who likes *quex*
Who likes something? (Haida, 2007)

We will discuss each of these cases in turn, beginning with the case where focus marking serves to differentiate between a declarative and interrogative sentence. Our goal is to show the following for a number of simple potential sentence structures: whenever a [-Wh, -s] quexistential is focus marked, it yields an IL-trivial sentence. In addition, we want to derive the correct, non-IL-trivial readings for the given sentences in which a [-Wh] quexistential is not focus marked, is focus marked and [+s], or is [+Wh].

5.2.1 Declaratives versus *wh*-interrogatives

We will treat sentences as list structures, featuring in the relevant cases either the classifier-completion marker combination CLOSED DECL (abbreviated CD), or the combination OPEN INT (abbreviated OI), together with a body with one list item, a CP. The CP consists of whichever clause type marker the list classifier requires, potentially together with an ExhP headed by an exhaustivity operator EXH. Below this is the TP, which in the simplest case consists of a quexistential $quex_{[\pm s, \pm \mathrm{Wh}]}$ and a (possibly complex) predicate P.

What we want to show is that given this basic structure, the combination of a focussed quexistential and the declarative list classifier makes for IL-triviality, *unless* the quexistential is [+s] or [+Wh]. Without focus, as in (26), the sentence is a non-IL-trivial declarative, and the quexistential should function as an existential indefinite. If the quexistential is focussed and [+s], the sentence should be a non-IL-trivial declarative, and the quexistential function as an existential indefinite. If the quexistential is focussed and [+Wh], the sentence should be a non-trivial interrogative, and the quexistential read as an interrogative, as in (27).

To show this, we will consider four variations on the basic structure. First, we consider the simple case of a declarative list with a non-focussed quexistential:

(32) a. Structure: $[_S$ CD $[_{CP}$ $[_C$ $\mathrm{C_{DECL}}$ $[_{TP}$ $quex_{[\text{-s, -Wh}]}$ (P)]]]]
b. (Simplified) translation: $!\exists x\mathrm{P}(x)$

Second, we consider the case of a declarative with a focussed quexistential, contrasting with its default, non-scalar focus alternatives:

(33) a. Structure: $[_S$ CD $[_{CP}$ $[_C$ $\mathrm{C_{DECL}}$ $[_{ExhP}$ $[_E$ EXH $[_{TP}$ $[quex_{[\text{-s, -Wh}]}]_F$ (P)]]]]]]
b. (Simplified) translation: EXH($\exists x\mathrm{P}(\underline{x})$)

Third, we consider the case of a declarative with a focussed quexistential, contrasting with its scalar focus alternatives:

(34) a. Structure: $[_S$ CD $[_{CP}$ $[_C$ $\mathrm{C_{DECL}}$ $[_{ExhP}$ $[_E$ EXH $[_{TP}$ $[quex_{[\text{+s, -Wh}]}]_F$ (P)]]]]]]
b. (Simplified) translation: EXH($\underline{\exists} x\mathrm{P}(x)$)

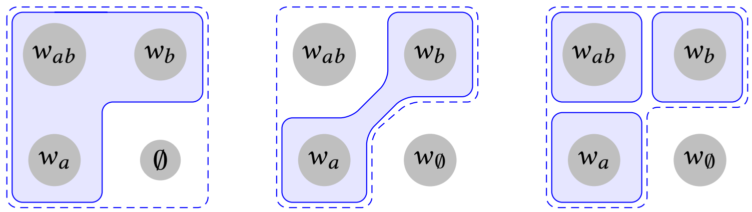
Fourth, we consider the case of an interrogative with a focussed [+Wh] quexistential:

(35) a. Structure: $[_S$ OI $[_{CP}$ $[_C$ $\mathrm{C^1_{INT}}$ $[quex_{[\text{-s, +Wh}]}]_F$ (P)]]]]
b. (Simplified) translation: $?\exists x\mathrm{P}(\underline{x})$

Since *quex* is in this case [+Wh], it will move above C, meaning that there is no focussed element within the c-command domain of a potential EXH. In this case, the operator is not licensed, and we therefore assume that the structure does not include an ExhP. Also, since our claim is that the [+Wh] reading is only an option in case the [-Wh] reading is IL-trivial, and the [+s, -Wh] reading is by hypothesis *not* IL-trivial, we only consider the [+Wh]-case where the quexistential is [-s].

Given that P is an arbitrary predicate, these translations are in effect logical skeletons. It is easily seen that sentences with the logical skeleton in (32-b) are not IL-trivial: for instance, this is the logical skeleton of the English sentence *Someone laughed.* The meaning of this in our usual two-person model is illustrated in 5.2(a).

We move on to consider the case where the sentence is classified as a declarative, and the quexistential is focus marked, but [-s]. A simple structure like this has the logical form in (33-b). Now, a sentence with this logical skeleton must be IL-trivial: (33-b)



(a) $[\![(32\text{-b})]\!]_{M,g}$ (b) $[\![(34\text{-b})]\!]_{M,g}$ (c) $[\![(35\text{-b})[\![_{M,g}$

Figure 5.2: Presuppositional meanings of (32-b), (34-b), and (35-b).

always expresses a non-inquisitive, uninformative proposition. Non-inquisitiveness follows from our definition of Exh, and it therefore suffices to show that a proposition expressed by (33-b) cannot be informative.

Proof. Let M, g be an arbitrary model and assignment. The semantic value of (33-b) in M with respect to g is given in (36).

(36) $[\![\text{Exh}(\exists x\text{P}(\underline{x}))]\!]_{M,g} = \langle \pi, A \rangle$, where

- $\pi = \mathsf{info}_{M,g}(\text{EFC}(\text{Exh}(\exists x\text{P}(\underline{x}))))$
- $A = \wp(\text{MAX}_{M,g}(\exists x\text{P}(\underline{x})) \cap \text{MIN}_{M,g}(\exists x\text{P}(\underline{x}))) \upharpoonright \pi$

We want to show that $\mathsf{info}_{M,g}(A) = \pi$. Since $\text{EFC}(\text{Exh}(\exists xP(\underline{x}))) = !\exists u(\exists x\text{P}(u)) = !\exists u\text{P}(u)$, π is the set $\mathsf{info}_{M,g}(!\exists u\text{P}(u))$. Note that this equals $\text{MIN}_{M,g}(\exists x\text{P}(\underline{x})) = \mathsf{info}_{M,g}(\exists x\text{P}(\underline{x}))$, so that we only need to show that $\pi \subseteq \text{MAX}_{M,g}(\exists x\text{P}(\underline{x}))$ to show that $\pi = \mathsf{info}_{M,g}(A)$.

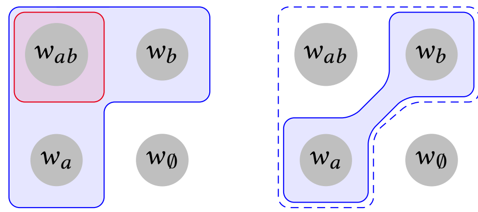
Note that $\mathsf{overlap}(\exists x\text{P}(\underline{x})) = \{\mathsf{info}_{M,g}(p) \mid p = [\text{P}(x)]_{g[x/d]} \text{ for some } d \in D\}$, which is precisely the alternatives of $[\exists x\text{P}(\underline{x})]_{M,g}$. Consequently, no states in $\mathsf{overlap}(\exists x\text{P}(\underline{x}))$ are innocently excludable, yielding $\text{MAX}_{M,g}(!\exists x\text{P}(\underline{x}))) = W - \emptyset = W$. This entails that $\pi \subseteq \text{MAX}_{M,g}(\exists x\text{P}(\underline{x}))$, which is what we wanted to show. □

Perhaps needless to say, we cannot 'save' this reading from IL-triviality by interpreting the quexistential as [+Wh]: this only results in a change of the logical form when there is an interrogative complementizer. Thus, at least for sentences of the simple structure discussed here, focus marking of a [-s, ±Wh] quexistential in a declarative sentence results in IL-triviality.

We now consider the analogous logical skeleton, repeated from (34-b), where the quexistential has active scalar alternatives.

(37) $\text{Exh}(\underline{\exists} xP(x))$

A sentence with this logical skeleton is not IL-trivial: it can be used to exclude the focus alternative expressed by a sentence of the form $\forall xP(x)$. For instance, the above



(a) $[\![(38)]\!]^f$ (b) $[\![(38)]\!]$

Figure 5.3: Focus semantic value and presuppositional meaning of (38).

is equivalent to the logical skeleton of the sentence

(38) [Someone]$_F$ laughed. $\rightsquigarrow$ Exh($\underline{!\exists}xP(x)$)

where the focus marking is interpreted as identificational.

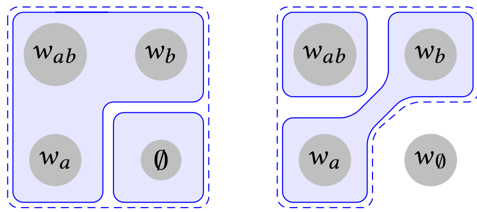
Figure 5.3(a) depicts the focus semantic value of (38) in our usual two-person model. On our simplifying assumptions, this value contains two propositions: the one expressed by *Everyone laughed*, whose alternative is depicted in red, and the one expressed by *Someone laughed*, whose alternative is depicted in blue. Figure 5.3(b) illustrates the presuppositional meaning of (38). The presupposition corresponds to the information conveyed by *Someone laughed*, and the proposition expressed innocently excludes the state corresponding to the information conveyed by *Everyone laughed*. Hence, we predict that a quexistential that contrasts with a scalar alternative in a structure like this may still receive the interpretation as an existential indefinite.

We now consider the case where the sentence is an interrogative, and *quex* is [+Wh]. The logical skeleton of such a sentence will look as in (39), repeated from above.

(39) $?\exists x\mathrm{P}(\underline{x}))$

This has the basic form of a single *wh*-interrogative in our framework, although with a—semantically redundant—focus marking. A sentence with this logical skeleton is not IL-trivial: this is the logical skeleton of the *wh*-interrogative *Who laughed?*, modulo the focus marking. In our usual model, the meaning of this is as depicted in Figure 5.2(c).

In sum, then, our hypotheses panned out: at least for sentences of the basic structure described in the beginning of the section, the following holds. If a [-s] quexistential in a declarative sentence is focussed, its interpretation either as [-Wh] or [+Wh] results in IL-triviality. We also saw that a [-s, +Wh] can be focussed in an *interrogative* sentence without IL-triviality. To be able to conclude that this reading is in general forced for a sentence with a focussed [-s] quexistential, we also need to show that if a [-s] quexistential in an interrogative sentence is focussed, its interpretation as *[-Wh]* results in IL-triviality. This is done in the next subsection.



(a) $[\![(40\text{-b})]\!]_{M,g}$ (b) $[\![(42\text{-b})]\!]_{M,g}$

Figure 5.4: Presuppositional meanings of (40-b) and (42-b).

5.2.2 Polar versus *wh*-interrogatives

We now turn to the case where focussing of a quexistential differentiates between the reading of an interrogative sentence as a polar question (without focus on the quexistential) and the reading as a *wh*-interrogative (with focus on the quexistential). We know from the previous subsection that an interrogative with a [+Wh] quexistential reads as a *wh*-question.

Thus, we will only consider the three following structures. First, we consider the simple case of an interrogative with a non-focussed quexistential:

(40) a. Structure: $[_S\ \textsc{oi}\ [_{CP}\ [_C\ \mathrm{C}_{\textsc{int}}\ [_{TP}\ \textit{quex}_{[\text{-s, -Wh}]}\ (\mathrm{P})\ ]]]]$
b. (Simplified) translation: $?!\exists x \mathrm{P}(x)$

Second, we consider the case of an interrogative with a focussed [-Wh] quexistential, contrasting with its default, non-scalar focus alternatives:

(41) a. Structure: $[_S\ \textsc{oi}\ [_{CP}\ [_C\ \mathrm{C}_{\textsc{int}}\ [_{ExhP}\ [_E\ \textsc{Exh}\ [_{TP}\ [\textit{quex}_{[\text{-s, -Wh}]}]_F\ (\mathrm{P})\ ]]]]]]$
b. (Simplified) translation: $?\textsc{Exh}(\exists x \mathrm{P}(\underline{x}))$

Third, we consider the case of an interrogative with a focussed [-Wh] quexistential, contrasting with its scalar focus alternatives:

(42) a. Structure: $[_S\ \textsc{cd}\ [_{CP}\ [_C\ \mathrm{C}_{\textsc{decl}}\ [_{ExhP}\ [_E\ \textsc{Exh}\ [_{TP}\ [\textit{quex}_{[\text{+s, -Wh}]}]_F\ (\mathrm{P})\ ]]]]]]$
b. (Simplified) translation: $?\textsc{Exh}(\underline{\exists} x \mathrm{P}(x))$

Sentences with the form of (40-b) and (42-b) are easily seen to be meaningful. For instance, the former is equivalent to the logical skeleton of the sentence *Did someone laugh?*, and the latter to the logical skeleton of the sentence *Did [someone]$_F$ laugh?* Their presuppositional meanings in our toy model are given in Figure 5.4.

Now, we saw in the previous section that $\textsc{Exh}(\exists x \mathrm{P}(\underline{x}))$ is IL-trivial. This is the content of the ExhP of (41-b). Recall that by our Principle of IL-triviality, a sentence with an IL-trivial *constituent* is ungrammatical. Thus, (41-b) must be ungrammatical. (It is also easy to see that (41-b) itself must be IL-trivial, given the definition of '?'.)

This shows that for sentences of these simple forms, the following holds. If a [-s] quexistential in an interrogative sentence is focussed, its interpretation as [-Wh] results in IL-triviality. This leaves the combination (focussed [-s, +Wh]-quexistential + interrogative clause type) as the only grammatical combination for focussed [-s] quexistentials, in line with the Focus Generalization.

5.2.3 Single versus multiple *wh*-interrogatives

Finally, we will consider the case where focus on a quexistential distinguishes between the reading of a sentence as a single *wh*-interrogative and a multiple *wh*-interrogative.

We again consider four variations on a basic structure. First, we consider the simple case of a *wh*-interrogative with one [+Wh] element, *wh*-, and one non-focussed quexistential, *quex*:

(43) a. Structure: $[_S$ OI $[_{CP}$ $[_C$ $\mathrm{C}^1_{\mathbf{INT}}$ $[_{TP}$ $\textit{wh-}_{[+Wh]}$ $\textit{quex}_{[\text{-s, -Wh}]}$ (P)]]]]

b. (Simplified) translation: $?\exists x(!\exists y\mathrm{P}(y,x))$

Second, we consider the case of a *wh*-interrogative with one [+Wh] element *wh*- and a focussed [-Wh] quexistential, contrasting with its default, non-scalar focus alternatives:

(44) a. Structure:
$[_S$ OI $[_{CP}$ $[_C$ $\mathrm{C}^1_{\mathbf{INT}}$ $[_{ExhP}$ $[_E$ Exh $[_{TP}$ $\textit{wh}_{[+Wh]}$ $[\textit{quex}_{[\text{-s, -Wh}]}]_F$ (P)]]]]]]

b. (Simplified) translation: $?\exists x(!\textsc{Exh}(\exists y\mathrm{P}(\underline{y},x)))$

Third, we consider the case of a *wh*-interrogative with one [+Wh] element *wh*- and a focussed [-Wh] quexistential, contrasting with its scalar alternatives:

(45) a. Structure:
$[_S$ OI $[_{CP}$ $[_C$ $\mathrm{C}^1_{\mathbf{INT}}$ $[_{ExhP}$ $[_E$ Exh $[_{TP}$ $\textit{wh}_{[+Wh]}$ $[\textit{quex}_{[\text{+s, -Wh}]}]_F$ (P)]]]]]]

b. (Simplified) translation: $?\exists x(!\textsc{Exh}(\underline{\exists} y\mathrm{P}(y,x)))$

Fourth, we consider the case of an interrogative with a focussed [+Wh] quexistential:

(46) a. Structure: $[_S$ OI $[_{CP}$ $[_C$ $\mathrm{C}^2_{\mathbf{INT}}$ $[_{TP}$ $\textit{wh}_{[+Wh]}$ $[\textit{quex}_{[\text{-s, +Wh}]}]_F$ (P)]]]]

b. (Simplified) translation: $?\exists x\exists y(\mathrm{P}(\underline{y},x))$

The relative positioning of the [+Wh]-elements (lowest last) in the logical form is derived from the structure after movement, as outlined in Chapter 2.

We first consider the logical skeleton corresponding to a *wh*-interrogative with a focussed [-Wh, -s] quexistential, (46-b). We can see that sentences with this skeleton must contain an IL-trivial subconstituent, the ExhP $\textsc{Exh}(\exists y\mathrm{P}(\underline{y},x))$. While x is free here, it should be clear that regardless of how we instantiate this variable, the result is trivial. We will therefore count this too as IL-trivial, and conclude that sentences with the logical skeleton in (46-b) are unacceptable as a whole.

In contrast, the remaining logical skeletons are not trivial. (43-b) is the logical skeleton of a single *wh*-interrogative like *Who likes something?*, and (45-b) is the logical skeleton of a single *wh*-interrogative like *Who likes [something]$_F$?* (46-b) is the logical skeleton of a multiple *wh*-interrogative like *Who likes what?* on a mention-some reading, modulo the (semantically redundant) focus marking.

This confirms our hypothesis, for *wh*-interrogatives of the basic logical forms outlined. When a [-s] quexistential in a *wh*-interrogative is focussed, its interpretation as [-Wh] yields an ungrammatical sentence, in virtue of containing an IL-trivial subconstituent. We also saw that a [+s, -Wh] quexistential or [-s, +Wh] quexistential can be focussed in a *wh*-interrogative without IL-triviality.

Given the results from the previous subsections, we can conclude that the following holds, for sentences with the basic structures considered.

- If a [-s] quexistential is focussed, it can only be successfully interpreted as [+Wh], and the sentence in which it occurs as an interrogative. Otherwise, the sentence would be ungrammatical, either in virtue of being IL-trivial itself, or in virtue of having an IL-trivial constituent.

- If a [+s] quexistential is focussed, it can be successfully interpreted as [-Wh].

The Focus Generalization follows from the first point, and its exceptions from the second.

5.3 Conclusion

In this chapter, we have outlined a potential explanation of the *Focus Generalization* for quexistentials suggested by the work of Iatridou et al. (2018), according to which focussed quexistentials cannot be interpreted as existential indefinite pronouns. We have seen that for a set of basic types of declarative and interrogative constructions, the typical inability of focussed quexistentials to receive indefinite readings follows from the fact that the indefinite readings would come out as *ungrammatical*, either in virtue of being IL-trivial, or in virtue of containing an IL-trivial constituent. For this set of constructions, we could further derive the known exception to the Focus Generalization: quexistentials with active *scalar alternatives* may still receive an indefinite interpretation. When scalar alternatives are active, focussing of a quexistential read as an existential indefinite may be *informative*, as it can exclude stronger scalar alternatives to the quexistential. When scalar alternatives are not active, however, no focus alternatives can be excluded. Together with the *existential presupposition* assumed to be triggered by focus marking, this results in a quexistential read as an existential indefinite being systematically uninformative. If the quexistential is instead interpreted as an interrogative pronoun, it can contribute *inquisitiveness*. This prevents IL-triviality, and thereby potentially ungrammaticality.

Our explanation is still tentative, and makes certain predictions whose accuracy cannot be determined solely on the basis of the data presented in this chapter. Importantly, we predict that quexistentials occurring in *syntactic islands* cannot, in effect, function as *wh*-pronouns, whether focussed or not. Such quexistentials should be unable to move to SpecC, and thereby be unable to take the wide scope needed for the *wh*-reading. Further data collection is needed in order to assess this prediction. In addition, many quexistentials are *polarity sensitive items*, and need to be licensed as such (see e.g., Chierchia and Liao, 2014, for a discussion of quexistentials in Mandarin Chinese). Investigating whether the proposal outlined here is compatible with the assumptions needed to account for the behavior of polarity sensitive quexistentials must, however, be left for future work.

Chapter 6

Conclusion

In this thesis, we have investigated the connection between a particular type of logical triviality, *inquisitive logical triviality*, and grammaticality. Inquisitive logical triviality, or *IL-triviality*, was a property taken to characterize sentences which are trivial along two dimensions—the *informative* dimension, and the *inquisitive* dimension—purely in virtue of the logical constants occurring in the sentence, and the presuppositions that these constants trigger. It was proposed that sentences which are IL-trivial, or contain an IL-trivial constituent, are, as a consequence, ungrammatical. This claim was indirectly justified by showing that it has an explanatory value with respect to various patterns of (un)grammaticality involving indefinite and interrogative pronouns.

The first such pattern arose from combinations of the exclusive particle *only* and *it*-clefts with focussed indefinite pronouns, as well as with focussed instances of other determiner phrases. This pattern has by and large gone unnoticed in the previous literature, and we showed that through giving a semantics for *only* and *it*-clefts within Presuppositional Inquisitive Semantics, the pattern could be explained in terms of IL-triviality. The types of constructions judged to be ungrammatical were shown to indeed be IL-trivial, and the types of constructions judged to be grammatical were shown to not be IL-trivial. The proposed treatment of *only* and *it*-clefts were shown to improve on previous treatments, not only with respect to constructions involving indefinite pronouns or determiner phrases, but also with respect to interrogative constructions and constructions involving disjunction.

The second pattern concerned question formation in Yucatec Maya, a language without interrogative-specific morphosyntax. It was proposed that this system of question formation relies heavily on the ungrammaticality induced by IL-triviality, to the effect that interrogative readings of sentences are mainly triggered by the corresponding declarative reading being ungrammatical in virtue of IL-triviality. The account was shown to improve on its predecessor, AnderBois (2012), mainly with respect to predictions, but also with respect to the economy of the assumptions, making use of the same semantics for clefts in Yucatec Maya as that proposed for the English *it*-cleft.

The third pattern concerned quexistentials, and the typical inability of these expressions to read as existential indefinites when focus marked. It was proposed that this inability resulted from the combination of focus and the existential indefinite reading yielding IL-triviality. In contrast, interpreting a focussed quexistential as an interrogative pronoun was shown to yield meaningful constructions, corresponding to the interrogative readings that such focussing is attested to trigger. It was further predicted that a focussed quexistential may still receive an indefinite reading in case it has active scalar alternatives, in accordance with observations.

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