

Focus and Uninformativity in (Yukatek Maya) Questions

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Abstract Cross-linguistically, questions frequently make crucial use of morphosyntactic elements which also occur outside of questions. Chief among these are focus, disjunctions, and wh-words with indefinite semantics. This paper provides a compositional account of the semantics of wh- and alternative questions in Yukatek Maya, which plausibly consist solely of these elements. Key to the account is a theory of disjunctions and indefinites (extending work by Groenendijk and Roelofsen (2009), Kratzer and Shimoyama (2002), Alonso-Ovalle (2006) and others) which recognizes the inherently *inquisitive* nature of these elements. While disjunctions and indefinites are inquisitive, they differ from questions since they are also *informative* in the truth-conditional sense. Compositionally, then, the role of focus in Yukatek Maya questions is to presuppose the informative component of an indefinite wh-word or disjunction, rendering the inquisitive component the question's sole novel contribution to the discourse. Functioning as a question, then, is a potentially emergent property resulting from the combination of inquisitiveness and uninformativity. Additionally, we show that the account can be readily extended to polar questions, analyzing them as covert alternative questions. Finally, the account predicts a subtly different semantics for negative polar questions, which leads to an understanding of the role of negation in certain negative polar questions in English and more generally.

Keywords Questions · Alternatives · Focus · Disjunction · Indefinites · Assertion

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1 Introduction

Ordinary matrix questions can be characterized as simultaneously making two contributions to a discourse: (i) evoking a non-singleton set of alternatives (roughly the question's answers) and, at least in ordinary cases, (ii) insisting that the addressee select one (or more) of these. Morphosyntactically, questions often employ constructions or morphemes which are unique to questions, i.e. *interrogative*. These interrogative components have traditionally been treated as being responsible for (ii) and sometimes for (i) as well (at least indirectly). In this paper, we present a semantics which derives both of these properties from the interaction of two different semantics components: focus and *inquisitive* elements (an indefinite in wh-questions, and a disjunction in alternative and polar questions).

Central to the account is a theory of indefinites and disjunctions couched in a first-order predicate logic extension of Groenendijk and Roelofsen (2009), which treats disjunction and indefinites as evoking sets of alternatives and *latently* raising the issue of which of these alternatives holds. In the absence of focus, sentences with indefinites and disjunctions not only raise the issue of which alternative holds, they also contribute the truth-conditional information that it's not the case that none of these alternatives holds. The fact that they are (potentially) truth-conditionally informative crucially distinguishes them from questions, which are not informative in this way. Compositionally, a question in our account consists of a set of alternatives produced by an indefinite or disjunction in a syntactic environment which renders these alternatives *uninformative* in the classical sense. Specifically, we argue that focus produces this uninformativity by presupposing the informative component of the indefinite/disjunction. Since the indefinite/disjunction's truth-conditional information is already taken to hold, the alternative set and the issue of which alternative holds remain as the sentence's sole at-issue contributions.

The core of this paper explores and motivates this view of questions as emergent by examining in detail a variety of questions in Yukatek Maya (YM), which involve little to no interrogative morphosyntax. For example, a wh-question in YM consists of two parts: (i) a wh-word which functions as an indefinite in other environments and (ii) a syntactic movement process whose semantic contribution outside of questions is that of a focus (or perhaps cleft) construction. We see this illustrated in (1) where *máax* 'someone/who' is the wh-word and the focus construction is detectable based upon the fronted position of *máax* as well as the appearance of the verb in the so-called agent focus form.¹

- (1) [máax]_F uk' le sa'-o'
 someone/who drink.AGENT.FOCUS the atole-DISTAL
 'Who drank the atole (a traditional corn beverage)?'

Such questions involve two elements — an indefinite and focus — which occur elsewhere in the language. We derive the fact that it functions as a question based solely on these two elements, without recourse to covert interrogative elements. More striking is the case of alternative questions which consist of a disjunction in the focus/cleft

¹ Elements in the focus-cleft syntactic position are notated with a subscript F, [...]_F, though this does not imply any sort of intonational prominence. The following abbreviations are used in glosses: A.#: Set A agreement marker (ergative/nominative), B.#: Set B agreement marker (absolutive/accusative), CL: classifier, DEF: definite article, IMP: imperfective aspect, NEG: negation, PFV: perfective aspect, PROG: progressive aspect, TERM: terminative aspect.

construction as in (2).

Scenario: There are two trees in the yard: a mango tree and a papaya tree.

- (2) [le kuul maangoh *wáa* le kuul puut]_F t-u ch'akah Juan
 DEF plant mango OR DEF plant papaya PFV-A.3 chop Juan
 'Was it the mango tree or the papaya tree that Juan chopped?'

Unlike in the case of wh-questions, however, a focused disjunction like (2) is able to function either as a question, as in (2), or as a disjunctive assertion, as in (3). The sentence is identical in the two examples², the only difference being the discourse context.

Scenario: There are three trees in the yard: a mango tree, a papaya tree, and an orange tree.

- (3) [le kuul maangoh *wáa* le kuul puut]_F t-u ch'akah Juan
 DEF plant mango OR DEF plant papaya PFV-A.3 chop Juan
 'It was the mango tree or the papaya tree that Juan chopped.' (not the orange tree)

In our account, the polyfunctionality of the focused disjunction in (2)/(3) is captured not as an instance of ambiguity or polysemy, but rather as the result of predictable interactions between a single denotation and different types of input contexts. In (2), since the proposed set of alternatives *exhausts* those which are present in the discourse context, the sentence is uninformative and functions as a question. In (3), on the other hand, the proposed alternative set is a proper subset of the contextually available alternatives and therefore functions as an assertion which proposes to eliminate the additional alternatives (the orange tree in (3)). The fact that this sort of polyfunctionality is possible in the case of focused disjunctions is readily expected because disjunctions, unlike indefinites, specify an exact number of alternatives.

The approach to alternative questions can also be readily extended to polar questions in YM by analyzing the latter as a species of alternative questions where only one disjunct is syntactically present. This, combined with a particular semantics for the unrealized disjunct allows us to account for polar questions with a focused element as in (4). For polar questions, however, there is another potential path to un informativity: creating a disjunction of the $p \vee \neg p$ as in (5).

- (4) [Juan *wáah*]_F uk' le sa'-o'
 Juan OR drink.AGENT.FOCUS the atole-DISTAL
 'Was it Juan who drank the atole?'
 (5) táan-*wáah* u yuk'ik le sa'-o' Juan
 PROG-OR A.3 drink DEF atole-DISTAL Juan
 'Is Juan drinking the atole?'

Compositionally accounting for the semantics of various questions in Yukatek Maya requires us to develop a finer-grained semantics which encodes not only *truth conditions*

² This includes the sentence's intonation as well. That intonation does not clearly distinguish the uses in (2) and (3) is not surprising given that focus more generally in Yukatek Maya has been shown to lack any particular intonational marking (Avelino (2008), Gussenoven and Teeuw (2007), Kuegler et al (2007) *inter alia*). Instead, intonational prominence in Yukatek Maya is given to topic phrases.

(informative content) but also *issues*. Because of the interaction of this fine-grained semantics with *negation*, we predict that negative polar questions will have subtly different semantics. We explore this prediction for high negation questions in English, which have been known since at least Ladd (1981) to differ from their positive counterparts in systematic ways.

Road map:

§2 develops a particular account of the issue-raising capacity of disjunctions and indefinites, creating an inquisitive semantics for first-order predicate logic extending Groenendijk and Roelofsen (2009)'s propositional logic; §§3-4 derive the interpretations of alternative and wh-questions in Yukatek Maya through the interaction of this semantics with the presuppositional semantics of the focus/cleft construction; §5 distinguishes two types of polar questions and provides a semantic account of each; §6 examines an application of the account to questions in English: (high negation) negative polar questions; and §7 concludes.

2 Inquisitive Semantics for Disjunction and Indefinites

Based on the morphosyntax of quantificational expressions in Japanese, Kratzer and Shimoyama (2002) argue that indefinites locally introduce a set of alternatives, while their existential quantificational force is provided by a non-local existential closure operator. While the syntax-semantics interface robustly supports this analysis within Japanese, it is argued to be applicable more generally. Extending it to indefinites in other languages, then, is justified empirically by appeal to phenomena where alternatives exhibit exceptional interactions with other elements elsewhere in the sentence such as free choice effects, exceptional wide scope, and quantificational variability effects.

Parallel arguments have been made regarding disjunction by Alonso-Ovalle (2006), Simons (2005), and others. These authors argue that treating disjunction as a set-collector rather than as the classical propositional logic operator, \vee , allows for parsimonious accounts of various phenomena such as the problem of free choice permission, quantificational variability, disjunctive counterfactual antecedents, and other effects similar to those found with indefinites. Furthermore, work by Rooth and Partee (1982), Schlenker (2006), and others has shown that these parallels extend to exceptional wide scope as well.

Empirically, these works demonstrate that the alternatives introduced by indefinites and disjunctions exhibit a wide array of non-local interactions which are unexpected under a semantics using only classical predicate logic. Theoretically, they make the persuasive case that these problems can be solved by treating disjunctions and indefinites as set-collectors, with their existential quantificational force being located elsewhere. While the empirical basis for this claim is quite strong for indefinites and disjunctions, the logical language of the Kratzer and Shimoyama (2002) account can also be applied to universal quantification, differing only in how many alternatives are required to hold (the same holds for Alonso-Ovalle (2006)'s account of disjunction *mutatis mutandis*). The nature of alternatives in this system does not preclude the closure operator from being universal rather than existential.

Kratzer and Shimoyama (2002) in fact propose a universal closure operator of exactly this sort for Japanese *-mo*. Outside of Japanese, however, there is little empirical support for such an account of universal quantification. Universal quantifiers do not

exhibit quantificational variability, exceptional scope, or other analogous effects. Even within Japanese, it has been argued by Yamashina and Tancredi (2005) that the purported universal operator (*-mo*) isn't really a universal quantifier at all, but a plural operator of a certain kind. Note also that conjunction similarly lacks behavior parallel to disjunction which would warrant a separation of alternatives from quantificational force.

In principle, we could address this concern by adopting the Hamblin semantics approach for indefinites/disjunctions while still treating universal quantifiers/conjunctions as true quantifiers. In this account, however, such a move is a stipulation rather than something that follows from any intrinsic difference between the two. We will see in what follows that Inquisitive Semantics (Groenendijk (2007), Mascarenhas (2008), Groenendijk and Roelofsen (2009), *inter alia*) allows us to retain the central insight of the Hamblin semantics account of indefinites and disjunctions while making a principled distinction between them and universals/conjunctions. The notion of alternatives in the two frameworks is to some extent shared, but the logic itself in Inquisitive Semantics ensures that only indefinites and disjunctions will introduce such alternatives.

The phenomena motivating a Hamblin semantics account all involve interactions between the alternatives introduced by an indefinite/disjunction and other elements *within* a single sentence. In Hamblin semantics, the effects of alternatives (in assertions at least) are restricted to the clause or sentence in which they are introduced. Formally, this is because they require an existential closure operator within the syntax in order to receive the appropriate truth conditions. In contrast, one of the central intuitions of recent work in inquisitive semantics (see especially Groenendijk and Roelofsen (2009)) is that a disjunction (and by extension an indefinite) not only introduces a set of alternatives, but also *raises the issue* of which alternative(s) holds. The use of this sort of alternative inherently raises the issue of which alternative holds, explaining why the semantics of indefinites and disjunctions make crucial use of them, whereas universal quantification and conjunction do not. For Groenendijk and Roelofsen (2009), this characterization is largely an analytical intuition. This issue-raising intuition, we argue, can be empirically corroborated by the felicity of ‘secondary responses’ as in (6). The (b) responses, we claim, are felicitous precisely because the assertions in (a) make use of a disjunction or indefinite.

- (6) a. Bill or Fred murdered Joe.
 b. It was Fred // Yeah, Fred // Fred // Probably Fred
- (7) a. Someone murdered Joe.
 b. It was Fred // Yeah, Fred // Fred // Probably Fred

Since they are of course assertions, the (a) examples do not require such responses (in contrast to questions). However, the use of the overt indefinite or disjunction in (6)-(7) raises the issue of who murdered Joe latently, which readily *allows* for the (b) responses. This intuition can be made much sharper by means of comparison with a passive sentence with a suppressed agent in (8). (8) seems to be truth-conditionally equivalent to (7), yet only (7) readily allows for such responses. Finally, true quantifiers like *every* and, perhaps more tellingly, *most* do not pattern with indefinites and disjunctions either as in (9)-(10).

- (8) a. Joe was murdered.
 b. #It was Fred // #Yeah, Fred // #Fred // #Probably Fred

- (9) a. Everyone talked to John.
 b. #It was Fred, Bill, and Jane // #Yeah, Fred, Bill, and Jane // #Fred, Bill,
 and Jane
- (10) a. Most students talked to John.
 b. #It was Fred, Bill, and Jane // #Yeah, Fred, Bill, and Jane // #Fred, Bill,
 and Jane

This diagnostic, then, gives empirical teeth to the intuition that, in addition to introducing a set of alternatives and asserting its non-emptiness, widest scope indefinites and disjunctions latently raise the issue of which one(s) hold. As we will see in the remainder of this section, while the universal quantifier, negation, and other such operators will not themselves *introduce* alternatives, they are crucially able to *interact* with them in limited ways, to be explored in what follows.

2.1 Atomic formulas and other classical expressions

The key technical shift to capture these intuitions is to have a sentence denote a set of *sets* of possible worlds rather than a set of possible worlds (in more intuitive terms, a sentence denotes a set of *alternatives*). In this way, we capture the alternative-evoking nature of disjunction and indefinites within the interpretation of the metalanguage, rather than the translation into the object language as in Kratzer and Shimoyama (2002).³ As noted in the introduction, then, we make no type-theoretic distinction between questions and assertions; each will denote a set of classical propositions. As we discuss in detail §2.5, this formal step is a natural one given a conception of assertion (Stalnaker (1978), Gunlogson (2001), Farkas (2003), Farkas and Bruce (2010)) as a *proposal* to update the common ground rather than an actual update. For sentences which are *classical* (those with no widest-scope indefinites or disjunctions), this set will be the singleton set containing one alternative: the classical denotation.

The remainder of this section presents the rule of semantic interpretation for classical expressions: those formed from only atomic formulas, negation, conjunction, material implication, and universal quantification. As these semantic rules serve only to return the singleton set containing the classical denotation, we do not yet see the effect of inquisitiveness at this stage. The semantic rules we present differ from those of Groenendijk and Roelofsen (2009) in two ways, one minor and one more substantial. The minor change is that we take possible worlds to be semantic primitives rather than Groenendijk and Roelofsen (2009)'s indices.

The more significant difference is that we extend their logic from a propositional one to a first-order predicate calculus. The motivation for this is to be able to capture the semantics of quantifiers, in particular the existential quantifier. Our basic

³ Locating alternatives in the metalanguage semantics also has the potential to avoid the technical problem Shan (2004) describes for Kratzer and Shimoyama-style Hamblin semantics. Shan argues that Hamblin semantics overloads free variables by using them for both binding and scope-taking. Empirically, this is problematic for sentences like 'Who saw nobody' on the assumption that this involves two free variables: one for the Hamblin alternatives introduced by *who* and one for *nobody* which is bound in quantifier raising. The present approach avoids this pitfall because, as in classical logics, indefinites are translated with a variable locally bound by the existential rather than a free variable. There are, of course, other ways of solving this technical problem (see Shan (2004), Eckhardt (2007) *inter alia*), but it is solved naturally in this framework.

approach in extending our logic to quantifiers is to take the universal quantifier to be, in essence, an infinite conjunction and the indefinite/existential to be an infinite disjunction. As Groenendijk and Roelofsen (2009) show in detail for disjunction and conjunction, the natural result of this extension is that existential quantification, but not universal quantification, will introduce alternatives and raise the issue of which alternative holds. The extension we propose is parallel to that proposed by Balogh (2009) for a pair-based (as opposed to set-based) inquisitive semantics. Since we are working with natural language, we assume finite models throughout, avoiding the complications tackled by Ciardelli (2009) for models with infinite domains. Nothing crucial hinges on this decision since Ciardelli's logic derives the same results for models which are finite.

Atomic formulas (simple version):

$$\mathbf{S1}: \llbracket R^n(\gamma_1, \dots, \gamma_n) \rrbracket^{\mathcal{M}, g, w} = \{ \{w' : \langle \llbracket \gamma_1 \rrbracket^{\mathcal{M}, g, w'}, \dots, \llbracket \gamma_n \rrbracket^{\mathcal{M}, g, w'} \rangle \in \llbracket R^n \rrbracket^{\mathcal{M}, g, w'} \} \}$$

The simple version of the formulation directly returns the set containing the classical denotation. This is exactly the desired result for expressions which are classical. The simple version, however, would not allow us to formulate definitions for issue-raising expressions in a parallel fashion. While this is of no empirical consequence, it will be useful to have uniform definitions across both classical and non-classical expressions (disjunctions and indefinites). As such, we will instead use the more complex but equivalent definition in **S1**.

Atomic formulas (final version):

$$\mathbf{S1}: \llbracket R^n(\gamma_1, \dots, \gamma_n) \rrbracket^{\mathcal{M}, g, w} = \text{ALT}\{\alpha \subseteq W \mid \text{for all } w' \in \alpha : \langle \llbracket \gamma_1 \rrbracket^{\mathcal{M}, g, w'}, \dots, \llbracket \gamma_n \rrbracket^{\mathcal{M}, g, w'} \rangle \in \llbracket R^n \rrbracket^{\mathcal{M}, g, w'}\}$$

The right side of **S1** returns all of the sets of worlds that are such that the classical denotation holds in each world in the set. The material in brackets alone, however, would allow for non-singleton denotations of the form $\{\{w_1, w_2\}, \{w_1\}\}$ where one would-be alternative is properly contained within another. In order to get a set of true *alternatives*, then, we need to take one more step: to eliminate any sets of worlds which are properly contained within another. Following Groenendijk and Roelofsen (2009), we accomplish this by adding the alternative closure operator in (11) outside the brackets as above. Indeed, this alternative closure will be needed within each semantic rule to avoid such aberrant alternatives.

$$(11) \quad \text{ALT}\mathcal{P} = \{\alpha \in \mathcal{P} \mid \text{for no } \beta \in \mathcal{P} : \alpha \subset \beta\}$$

Like the rule for atomic formulas, the semantic rules for negation, conjunction, and the universal quantifier will similarly produce a singleton set containing the classical denotation. It should be noted that negation in this system can no longer be straightforwardly defined as complementation over the space of possible worlds. Instead, negation requires us to quantify over the alternatives in the negated expression. When the expression being negated is classical, this amounts to set complementation. Something more interesting happens when we negate non-singleton denoting expressions as examined in §2.4.

Negation:

$$\mathbf{S2:} \llbracket \neg\varphi \rrbracket^{\mathcal{M}, g, w} = \text{ALT}\{\alpha \subseteq W \mid \text{for all } \beta \in \llbracket \varphi \rrbracket^{\mathcal{M}, g, w}: \alpha \cap \beta = \emptyset\}$$

When φ and ψ are classical, conjunction simply returns the singleton set containing the classical denotation as in **S3**. In cases where one or both of the conjuncts itself denotes multiple alternatives, the situation is more complicated. Since these complications are irrelevant for present purposes, we refer the reader to Groenendijk and Roelofsen (2009) (see especially pp. 7-9). Since we will be dealing with indefinites shortly, we will need to extend Groenendijk and Roelofsen (2009)'s propositional logic to a predicate logic. With regards to the universal quantifier, we accomplish this through the rule in **S4**. **S4** treats the universal quantifier as a conjunction of *unspecified* length. Whereas conjunction specifies an exact number of conjuncts, the number of 'conjuncts' in a universal quantifier is limited only by contextual domain restriction (and, in a technical sense, by the number of individuals in the domain of the model). Nothing about the linguistic form of universal quantification, however, indicates the number of individuals in the domain of quantification.

Conjunction:

$$\mathbf{S3:} \llbracket \varphi \wedge \psi \rrbracket^{\mathcal{M}, g, w} = \text{ALT}\{\alpha \subseteq W \mid \text{there is some } \beta \in \llbracket \varphi \rrbracket^{\mathcal{M}, g, w}: \alpha \subseteq \beta \text{ and there is some } \gamma \in \llbracket \psi \rrbracket^{\mathcal{M}, g, w}: \alpha \subseteq \gamma\}$$

Universal Quantifier:

$$\mathbf{S4:} \llbracket \forall u \varphi \rrbracket^{\mathcal{M}, g, w} = \text{ALT}\{\alpha \subseteq W \mid \text{for all } d \in \mathcal{D}_e: \text{there is some } \beta \in \llbracket \varphi \rrbracket^{\mathcal{M}, g[u/d], w}: \alpha \subseteq \beta\}$$

2.2 Disjunction

Unlike the above expressions, a disjunction introduces a non-singleton alternative set, raising the issue of which one holds. Recalling that our broader goal is to provide a compositional semantics for *focused disjunctions* in Yukatek Maya, the goal for this section is to provide a semantics for non-focused disjunctions. An example like (12), with a disjunction in the canonical subject position is, like its English translation, unambiguously interpreted as an assertion.

- (12) t-u yuk'ah le sa'-o' Juan wáa Daniel
 PFV-A.3 drink the atole-DISTAL Juan OR Daniel
 'Juan or Daniel drank the atole.'

Intuitively, our semantics should deliver two alternatives in this case, one per disjunct. The denotation for (12) that we are trying to derive then is a set containing two alternatives: {juan drank the atole, daniel drank the atole}. This is exactly what the semantic rule in **S5** provides⁴. In the most basic case where both φ and ψ are classical, this definition gives us two sets of worlds, one where the φ holds and one where ψ holds. If one or both of the two disjuncts is itself inquisitive, it will return more than

⁴ While we cannot define conjunction in a parallel fashion, as Groenendijk and Roelofsen (2009) point out, we could alternatively define disjunction in terms of set union as in (i)

$$(i) \quad \llbracket \varphi \vee \psi \rrbracket^{\mathcal{M}, g, w} = \llbracket \varphi \rrbracket^{\mathcal{M}, g, w} \cup \llbracket \psi \rrbracket^{\mathcal{M}, g, w}$$

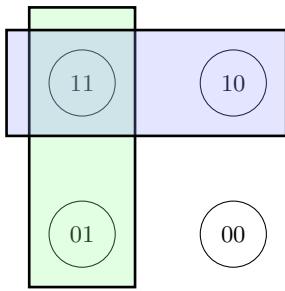
two alternatives. As in the above definition, ALT ensures that our alternatives will be true alternatives, precluding alternatives which contain other alternatives.

Disjunction:

$$\mathbf{S5:} \llbracket \varphi \vee \psi \rrbracket^{\mathcal{M}, g, w} = \text{ALT}\{\alpha \subseteq W \mid \exists \beta \in \llbracket \varphi \rrbracket^{\mathcal{M}, g, w} : \alpha \subseteq \beta \text{ or } \exists \gamma \in \llbracket \psi \rrbracket^{\mathcal{M}, g, w} : \alpha \subseteq \gamma\}$$

As noted above, the locus of alternatives in this framework is the semantics of the metalanguage rather than the translation into it. Given this, simply associating a formula with a sentence of natural language will not clearly illustrate the inquisitive alternatives. Instead, we can represent the interpretations of sentences pictorially as in (13) where circles represent possible worlds in the model, the numbers within circles are the truth values of two propositions (φ and ψ) in that world, and boxes represent distinct alternatives.

$$(13) \quad \llbracket \varphi \vee \psi \rrbracket^{\mathcal{M}, g, w} =$$



Whereas atomic formulas only contribute truth-conditional information, the semantic contribution of a disjunction can be thought of in terms of two components: an *inquisitive* component and a (truth-conditionally) *informative* component. A disjunction $\varphi \vee \psi$, then, is a *hybrid* expression since it contributes both sorts of information. Informativity is defined more or less in the standard way in terms of whether or not updating the common ground with a given formula *eliminates* worlds from the common ground. Formally, we see that $\varphi \vee \psi$ is (potentially) informative because the set of all of the worlds contained in one or another of its alternatives is potentially a proper subset of the worlds contained in the context set. That is, the proposal to update the common ground with $\varphi \vee \psi$ would, if accepted, possibly remove worlds from the common ground. Inquisitiveness is defined based on the number of alternatives that are in $\llbracket \varphi \vee \psi \rrbracket$. A formula is inquisitive, then, if the set of alternatives in its denotation is of cardinality greater than one.

Disjunctions pattern with atomic formulas and other classical formulas in that both are potentially informative, proposing to eliminate worlds from the context set. They differ from classical formulas, however, in that they also have an inquisitive component. In contrast, questions have only an inquisitive component but no informative component. To be interpreted as a question, then, an expression must be both *inquisitive* and *uninformative* as diagrammed in (14) (we will subsequently refer to this principle as the Inquisitive Principle).

- (14) Inquisitive Principle:

	Inquisitive	Uninquisitive
Informative	Assertion	Assertion
Uninformative	Question	(tautologous) Assertion

It seems obvious that a sentence which provides truth-conditional information, but raises no issues, should function as an assertion. Similarly, a sentence that raises an issue, but provides no truth-conditional information, should clearly function as a question. The only part of this chart which could conceivably be otherwise, it seems, are the cells representing sentences which are both inquisitive and informative (or both uninquisitive and uninformative). In terms of natural language, the decision here is quite clear; a sentence with a widest scope disjunction or a sentence which is a tautology both function in discourse like assertions. In more theoretical terms, this makes sense since the primary purpose of conversation is the exchange of *information*. A question is a useful and necessary part of this exchange, but only because it directs one's interlocutors to disclose particular pieces of truth-conditional information.

2.3 Indefinites

Like disjunctions, indefinites are hybrid expressions which are both inquisitive and informative. They raise the issue of which x satisfy φ and propose to eliminate worlds from the common ground where there is no x satisfying φ .

Indefinite:

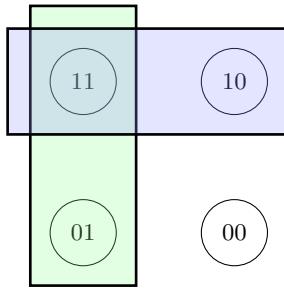
$$\mathbf{S6:} \llbracket \exists u \varphi \rrbracket^{\mathcal{M}, g, w} = \text{ALT}\{\alpha \subseteq W \mid \text{there is some } d \in \mathcal{D}_e \text{ s.t. } \exists \beta \in \llbracket \varphi \rrbracket^{\mathcal{M}, g[u/d], w} : \alpha \subseteq \beta\}$$

As with disjunctions, sentences with widest scope indefinites are interpreted as assertions according to the principle in (14). A sentence with an indefinite, like (15), introduces one alternative per d in \mathcal{D}_e (modulo contextual restriction). Like we saw with the semantic rule for the universal quantifier vis à vis conjunction, the rule for the existential treats it as a disjunction of an unspecified number of disjuncts. Whereas a disjunction is linguistically restricted to a specific number of alternatives, an indefinite introduce an alternative set whose cardinality is limited only by contextual restriction and the number of individuals in the model.

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

Assuming a model with only two individuals, Juan and Daniel, the indefinite will have the same denotation as the disjunction in (16).

$$(16) \quad \llbracket \exists u \varphi \rrbracket^{\mathcal{M}, g, w} =$$



This semantics treats a sentence with a widest scope indefinite as a proposal to update the common ground with a non-singleton set of alternatives. As a result such a sentence proposes a change to the common ground along two different dimensions: truth conditional information and issues. In the spirit of dynamic semantics, then, the semantic content of a sentence is modeled not only in terms of its truth conditions but as its context change potential (CCP), that is a function from input contexts to output contexts. Whereas CCP in dynamic semantics consists of truth conditional information and discourse referents, for us, a sentence's CCP consists of truth conditions and issues.

Just as in dynamic semantics, our definition of truth relative to a world of evaluation and a model requires that there is some (non-empty) output context following the proposed update's acceptance. More intuitively, a set of alternatives will be true if and only if there is some alternative which holds in the world of evaluation. Our definition for truth, then, does roughly the work that clause-level existential closure does in Kratzer and Shimoyama (2002), but without positing an additional element in the logical form itself.

$$(17) \quad \text{Definition of truth: } \varphi \text{ is true relative to a world } w \text{ and a model } \mathcal{M} \text{ iff } \exists \beta \in \llbracket \varphi \rrbracket^{\mathcal{M}, w}: w \in \beta$$

2.4 Non-inquisitive Closure

We have seen that disjunctions and indefinites both have the capacity to introduce new alternatives in a discourse, raising the issue of which holds. It's not the case, however, that all sentences containing one of these elements are inquisitive. For instance, an indefinite within the semantic scope of negation no longer intuitively raises an issue, even latently. Again, this intuition can be confirmed by the fact that secondary answers, as in (18), are infelicitous on the narrow scope reading of the indefinite (indeed, we would take such responses to disambiguate in favor of the wide-scope reading).

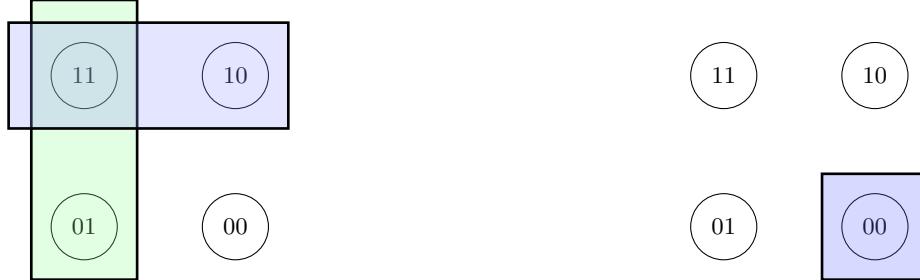
- (18) a. It is not the case that someone met Fred.
- b. #It was Bill // #Yeah, Bill // #Bill // #Probably Bill

The fact that it is only *widest scope* indefinites which raise issues follows formally from the semantic rule for negation, repeated in (19).

$$(19) \quad \llbracket \neg \varphi \rrbracket^{\mathcal{M}, g, w} = \text{ALT}\{\alpha \subseteq W \mid \text{for all } \beta \in \llbracket \varphi \rrbracket^{\mathcal{M}, g, w}: \alpha \cap \beta = \emptyset\}$$

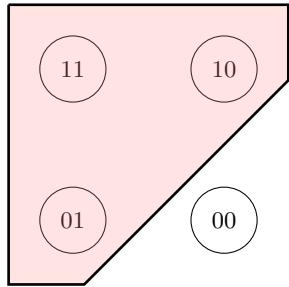
This definition ensures that no matter how many alternatives are in $\llbracket \varphi \rrbracket$, $\llbracket \neg\varphi \rrbracket$ will only contain one alternative (recalling again that alternative closure gives us the *maximal* set of worlds where no alternative in $\llbracket \varphi \rrbracket$ holds). We saw this above for the negation of an atomic formula, but it similarly holds for the negation of a disjunction or indefinite, (20).

$$(20) \quad \llbracket \exists u\varphi \rrbracket^{\mathcal{M}, g, w} \qquad \llbracket \neg\exists u\varphi \rrbracket^{\mathcal{M}, g, w}$$



Since negation always returns only a single alternative, double negation is no longer vacuous. $\llbracket \neg\neg\varphi \rrbracket$ has the same informative component as $\llbracket \varphi \rrbracket$, but eliminates the inquisitive component as seen in (21). Double negation necessarily preserves truth-conditional meaning, but not the overall context change potential of a sentence. This is parallel to the effect of double negation in certain dynamic logics (e.g. Brasoveanu (2007)'s ‘anaphoric closure’) which preserves truth conditions, but eliminates discourse referents introduced within the formula to which it applies. Since these properties of double negation will be useful to us in subsequent sections, we can define, following Groenendijk and Roelofsen (2009), a non-inquisitive closure operator $!$ as in (22).

$$(21) \quad \llbracket \neg\neg\exists u\varphi \rrbracket^{\mathcal{M}, g, w}$$



Non-inquisitive closure (!):

$$(22) \quad !\varphi := \neg\neg\varphi$$

As the name describes, non-inquisitive closure of a formula φ returns a singleton set with a single alternative comprised of all of the worlds contained in any of the alternatives in φ and no others. For any φ , then, $!\varphi$ has the same informative component as φ but with the inquisitive component eliminated. The inquisitive closure operator, then, allows us to capture formally the asymmetry noted above in (7)-(8) between a

sentence with an overt indefinite in (23) and a truth-conditionally equivalent one with an unexpressed passive agent, as in (24).

- (23) a. Someone murdered Joe.
 - b. It was Fred // Yeah, Fred // Fred // Probably Fred
 - c. Someone murdered Joe $\rightsquigarrow \exists x.\text{murder}'(x)$
- (24) a. Joe was murdered.
 - b. #It was Fred // #Yeah, Fred // #Fred // #Probably Fred
 - c. Joe was murdered $\rightsquigarrow !\exists x.\text{murder}'(x)$

2.5 Assertion and the common ground

Concomitant with this shift in the semantics of indefinites and disjunctions is a shift in our notion of common ground. Just as our denotations comprise both issues and information, so too will our common ground. As noted above, this shift is parallel to the move in dynamic semantics to retain in the discourse context any anaphoric information from previous sentences.

While it does not necessarily *follow* from the formal tools sketched thus far, the current semantic framework is a natural fit with a theory of assertion as a *proposal* to update the common ground rather than an actual update (Stalnaker (1978), Gunlogson (2001), Farkas and Bruce (2010) *inter alia*). Empirically, Farkas and Bruce (2010) motivate such a theory with the fact that at-issue assertions, like questions (and unlike presuppositions and appositives) allow for the addressee to respond using particle answers like *yes*, *yeah*, and *no*, as in (25). Questions and at-issue assertions differ with respect to whether or not such a response is necessary, but both permit such responses.

- (25) a. Anne: Sam is home.
- b. Ben: Yes // Yeah, he's home // No, he isn't home

For Farkas and Bruce (2010), questions and assertion differ at least in that the former are proposals which necessarily contain multiple alternatives while the latter necessarily denote proposals of a single alternative. At the same time, however, the empirical observation in (25) demonstrates one way in which questions and assertions are more similar than has been previously assumed by many researchers. Both are proposals to update the common ground, subject to the addressee's response. Inquisitive semantics capitalizes on this conception of assertion, modeling both questions and assertions as sets of sets of possible worlds (i.e. of type *stt*). Building on Farkas and Bruce (2010), we hold that not only questions, but also assertions with widest scope disjunctions or indefinites propose to add a non-singleton set of alternatives to the common ground. Empirically, we have already seen that the availability of secondary answers in (6) and (7) supports such a view.

Whether a given denotation will behave as a question or an assertion, then, is no longer predictable based solely on the number of alternatives in the proposed update. Instead, the difference between an assertion and a question in our account hinges on whether or not a response is required to (potentially) *eliminate* worlds from the context set, i.e. to be truth-conditionally informative. In a question, the proposed update *exhausts* the space of possible worlds, meaning the update will only *eliminate* worlds from the context set if the addressee provides some sort of *answer* to the question (roughly speaking, identifies a proper subset of the set of alternatives as live options). In

contrast, an assertion containing an indefinite, $\exists x.\varphi(x)$ proposes to update the common ground with a set of alternatives of the form $\varphi(x)$. Here, accepting the entire set of alternatives is itself *informative*, since doing so eliminates the worlds where there is no such x . An assertion with no inquisitive elements, then, is a special case where the proposed update contains a single set of possible worlds, and accepting the proposal would eliminate worlds where this alternative does not hold.

Given this, whether a sentence will function as a question or as an assertion in principle exhibits a limited degree of context sensitivity. It is exactly this context sensitivity which allows us to account for the behavior of focused disjunctions in Yukatek Maya (YM) which, recall, function either as questions or assertions depending on certain characteristics of the discourse context. In the account developed in §3, focused disjunctions in YM uniformly denote proposals to update the common ground consisting of two alternatives. Whether this proposal obliges an answer from the addressee — that is, functions as a question — depends on the relationship between this set of alternatives and those previously present in the common ground.

3 Focused Disjunctions in Yukatek Maya

In §2, we developed a theory of the semantics of inquisitive elements (indefinites/ disjunctions) where, in addition to their classical contribution, they introduce a set of alternatives and latently raise the issue of which alternative(s) in this set hold. The semantics of disjunctions and indefinites, then, contains a certain inquisitiveness at its core. The rest of the paper sets out to tackle the empirical challenges raised in the introduction by questions in Yukatek Maya, which involve little to no question-specific morphosyntax. The analysis we develop derives the questioning nature of these sentences from interactions between this inquisitive nature of indefinites and disjunctions and the independently observable semantics of focus.

The approach we take holds that questions consist of two main components: (i) a disjunction/indefinite which contributes both *informative* and *inquisitive* components and (ii) a focus construction which obviates the informative component by presupposing it to already hold. For wh-questions, to be discussed in §4, this allows us to explain how questions are constructed compositionally without positing covert morphology. Given the parallels explored above between indefinites and disjunctions, we can also make sense of why focused disjunctions in Yukatek Maya can be interpreted as questions. At the same time, however, the differences between indefinites and disjunctions allow us to predict that, unlike focused indefinites, focused disjunctions can also function as assertions depending on particular aspects of the context. The remainder of §3 explores these interactions in detail. §5 extends the account to positive polar questions in YM, analyzing them as covert alternative questions of a certain kind.

3.1 Questions, assertions and focused disjunctions

As we saw in (2)-(3) (repeated below as (26)-(27)), a single Yukatek Maya sentence with a focused disjunction can function either as a question or as an assertion depending on the context.

Scenario: There are two trees in the yard: a mango tree and a papaya tree.

- (26) [le kuul maangoh *wáa* le kuul puut]_F t-u ch'akah Juan
 DEF plant mango OR DEF plant papaya PFV-A.3 cut Juan
 'Was it the mango tree or the papaya tree that Juan chopped?'

Scenario: There are three trees in the yard: a mango tree, a papaya tree, and an orange tree.

- (27) [le kuul maangoh *wáa* le kuul puut]_F t-u ch'akah Juan
 DEF plant mango OR DEF plant papaya PFV-A.3 chop Juan
 'It was the mango tree or the papaya tree that Juan chopped.' (not the orange tree)

While this limited context sensitivity holds of disjunctions in the focus/cleft position, it is important to note that this does not hold of disjunctions in general in the language. Disjunctions which are not in the focus/cleft position function only as disjunctive assertions, just like their English translations. For example, a disjunction in argument position, as in (28), can only be interpreted as an assertion regardless of context.

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

Since this is so, we have no apparent reason to expect that the behavior of focus/clefted disjunctions in YM is due to a peculiarity of disjunction in the language more generally. Rather, all available evidence suggests that disjunction behaves the same in essential respects as in English, Spanish, and other well-studied languages. The possibility of interpretation as a question, then, arises as a result of the interaction of this semantics with that of the focus/cleft construction. We see this illustrated below in (29)-(30) with a focus/clefted version of (28).

Scenario A: 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.

- (29) [Juan wáa Daniel]_F uk' le sa'o'
 Juan OR Daniel drink.AGENT.FOCUS DEF atole-DISTAL
 'Was it Juan who drank the atole or was it Daniel?'

Scenario B: Addressee and speaker both agree that one of the speaker's three siblings (Juan, Daniel, and Maribel) drank the atole that was on the table.

- (30) [Juan wáa Daniel]_F uk' le sa'-o'
 Juan OR Daniel drink.AGENT.FOCUS DEF atole-DISTAL
 'It was Juan or Daniel who drank the atole.'

What is important to note about this alternation is that, despite initial appearances, it is not clear that it is a true semantic ambiguity. Once the discourse context is fixed, the

sentence can only function as either a question or as an assertion. More specifically, such sentences function as a question if and only if the set of alternatives in their proposed update — {drink-atole'(juan), drink-atole'(daniel)} — *exhaust* those which are possible in the context. The context change potential of (29)/(30) is identical in the two scenarios, uniformly consisting of a proposal to update the common ground with the two alternatives. Because these two alternatives exhaust those available in the context in (29), the proposed update can only enrich the common ground (i.e. eliminate worlds) if the addressee responds. In contrast, since there are more than two contextually available alternatives in the scenario in (30), the proposed update is itself informative, eliminating worlds where the third alternative holds (Maribel in this case).

Before examining this alternation formally, however, we first need to examine the semantics of the focus/cleft construction in its own right. In order to understand what happens to disjunctions in this position, we will need to examine the semantics of this construction apart from question, i.e. when non-inquisitive expressions occur there. We undertake this in §3.2 and also briefly contrast the semantic contribution of the YM focus/cleft construction with that of a superficially similar construction: the English *it*-cleft.

3.2 Focus/cleft position in Yukatek Maya

The term ‘focus’ in semantic literature has been used to refer to a host of constructions across languages with arguably different semantics (see Kiss (1998) for discussion of differing notions of focus). This section aims only to characterize the aspect of the Yukatek Maya focus/cleft construction which we claim is relevant for questions: its existential presupposition. We remain agnostic on the issue of what other semantic contributions the focus/cleft may have (e.g. Roothian alternatives). Compare the sentence in (31), which has an ordinary, non-inquisitive element in the focus position, with its unfocused counterpart in (32).

- (31) [Juan]_F uk' le sa'-o'
 Juan drink.AGENT.FOCUS the atole-DISTAL
 ‘It was Juan who drank the atole.’

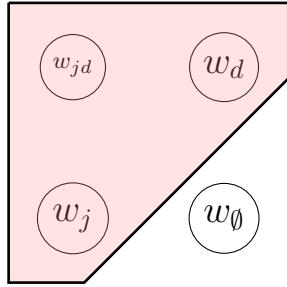
- (32) t-u yuk'ah le sa'-o'
 PFV-A3 drink DEF atole-DISTAL
 ‘Juan drank the atole.’

Morphosyntactically, there are several differences between (31) and (32) which indicate the presence of focus in (31) but not in (32). First, the focused element (the agent *Juan*) surfaces in preverbal position with no topic marking. Second, since the focused element is the agent, the verbal complex appears in the so-called ‘Agent-Focus’ form. Unlike in other Mayan languages, in Yukatek Maya this construction is not expressed by an Agent Focus morpheme, but rather by (i) the omission of the otherwise obligatory aspectual marker and the set A (nominative/ergative) agreement marker and (ii) the appearance of the verb itself without its usual status suffix *-ah*.

Semantically, (31) differs from (32) at least in that it bears an existential presupposition. Crucially, we analyze this existential presupposition as the classical existential one rather than the inquisitive existential. That is, the focus/cleft construction in (31) presupposes the truth-conditional *information* that there is some individual who drank

the atole, but not that this individual's identity is previously at-issue in the discourse. While it does not presuppose this, it is certainly consistent with such a scenario and, indeed, this is a common use of the focus/cleft position (much like intonationally marked focus in English). Given this, we can formalize the presupposition of (31) as in (33) where $!$ is the non-inquisitive closure operator defined in §2.4. For ease of exposition, we assume a model with only four worlds (w_{jd} , w_j , w_d , w_\emptyset) differing only in the truth values of the two propositions corresponding to 'Juan drank the atole' and 'Daniel drank the atole'. We indicate this with subscripts on worlds indicating the exhaustive list of who drank the atole in that world.

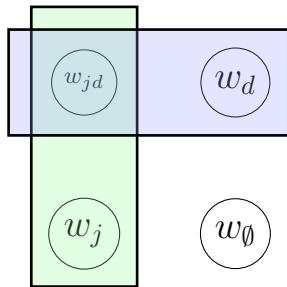
- (33) Presupposition of the Focus/Cleft for (32): $!\exists x:\text{drink-atole}'(x)$



We have claimed that the existential presupposition for the Yukatek Maya focus/cleft, like intonationally marked focus in English, is a non-inquisitive one. There is, however, no principled reason why a language should not have a presupposition which is itself inquisitive. Indeed, the English *it*-cleft seems to be such a construction. A sentence like (34) is felicitous only in contexts where the issue of who drank the atole had been active in the discourse (or the speaker wishes this to be accommodated), as encoded in the presupposition in (35).

- (34) It was John who drank the atole.

- (35) Presupposition of the *it*-cleft for (34): $\exists x:\text{drink-atole}'(x)$



This idea is closely related to Kripke (2009)'s idea that *it*-clefts presuppose something like a question under discussion in the prior linguistic context. In the approach currently being sketched, the presupposition is not a question per se, but is nonetheless inquisitive. This also puts some teeth on previously vague intuitions expressed by Geurts and van der Sandt (2004) that the presupposition of the English *it*-cleft is somehow 'more robust' or 'more anaphoric' than the presupposition of other focus constructions. Its presupposition is more robust than that of the Yukatek Maya focus/cleft

(or intonational focus in English) in that the latter has presuppositions which consists solely of truth-conditional information, rather than a hybrid one.⁵

Independent of examples involving inquisitive elements, we have seen that the focus/cleft construction can be shown to bear an existential presupposition comprised only of the truth-conditional component of the inquisitive existential. Recalling the definition of the non-inquisitive closure operator $!\varphi$ in terms of double negation, an even closer paraphrase is that the focus/cleft construction presupposes that it's not the case that no one drank the atole. When the focused element is classical (i.e. only has an informative component), as in (34), the at-issue effect of the sentence is to *identify* who drank the atole. The at-issue update is informative in this case because it proposes to take the conversation from a context set containing only worlds where someone drank the atole and update it to one including only worlds where Juan drank the atole.

3.3 Questioning Function

Having examined the semantics of examples with non-inquisitive elements in the focus/cleft construction, we turn to the semantics of examples where the focused element is itself inquisitive: disjunction. As we saw in §3.1, examples with a focused disjunction, like (30)/(29), can function either as a question or as an assertion depending on whether the alternatives in the disjunction exhaust those which are available from context. We examine first the contexts like (36) where (29)/(30) functions as a question.

Scenario A: 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.

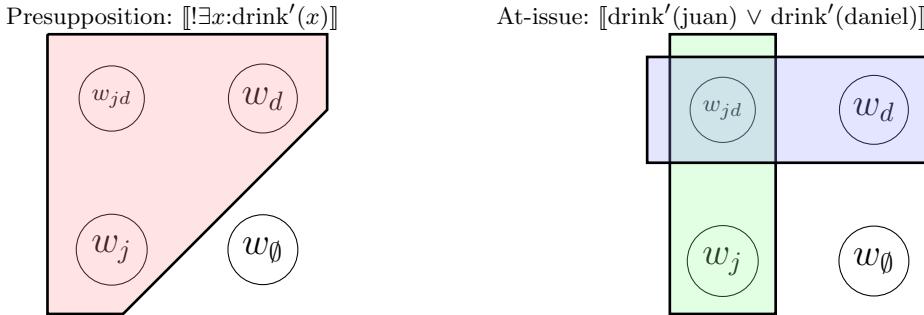
- (36) [Juan *wáa* Daniel]_F uk' le sa'-o'
 Juan OR Daniel drink.AGENT.FOCUS DEF atole-DISTAL
 'Was it Juan who drank the atole or was it Daniel?'

Since we again assume a model with only two individuals, Juan and Daniel, there cannot be worlds where anyone other than Juan and Daniel drank the atole. The focus/cleft presupposes that the input state for (36) (left) contains a single alternative comprised only of worlds where Juan or Daniel drank the atole. The at-issue content (right) introduces multiple alternatives but does not propose to eliminate worlds from the context set. The proposed update to the common ground, then, is not informative relative to the presupposed input state. The only at-issue contribution of the sentence, then, is the alternatives the disjunction introduces and the issue of which one holds. Since the proposal is uninformative and inquisitive, it is predicted correctly to function only as a question in this context per the 'inquisitive principle' in (14).

⁵ This also has the welcome benefit that we readily predict that inquisitive elements in the pivot of an *it*-cleft cannot (in the absence of intonational focus) function as questions as in (i)-(ii).

- (i) It was Juan or Daniel who drank the soda.
- (ii) It was someone/who who drank the soda.

- (37) Presupposition (left) and at-issue (right) semantics for (36):



Since the input state (including the presupposition) in this context consists solely of worlds where Juan or Daniel drank the atole, the focused disjunction in (36) is predicted to uniformly function as a question in this context. The question interpretation emerges from the combination of two independently motivated semantic accounts: (i) the inquisitive semantics account of disjunction and (ii) the informative presupposition of the YM focus cleft with no question-specific covert morphology required.

3.4 Assertive Function

The account of questioning uses of focused disjunctions relied crucially upon the relationship between the worlds contained in the alternatives of the disjunction and those which are present in the context set of the discourse. This limited context-dependence predicts that the same sentence will not necessarily function as question in all contexts. We saw this demonstrated above in (30), repeated as (38).

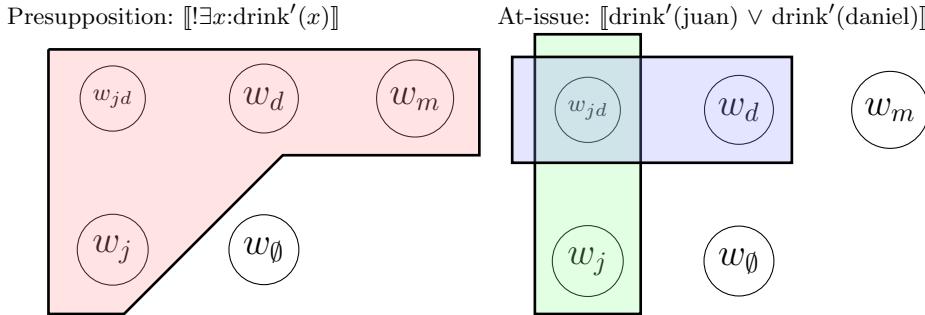
Scenario B: Addressee and speaker both agree that one of the speaker's three siblings (Juan, Daniel, and Maribel) drank the atole that was on the table.

- (38) [Juan *wáa* Daniel]_F uk' le sa'-o'
 Juan OR Daniel drink.AGENT.FOCUS DEF atole-DISTAL
 'It was Juan or Daniel who drank the atole.'

Here, the context contains worlds where some individual other than Juan or Daniel drank the atole, namely Maribel. As above, the focused disjunction is interpreted as a proposal to update the common ground with a set of two alternatives. In this context, however, this same update is informative in the absence of any response from the addressee and therefore functions as an *assertion*.

As always, the focus/cleft presupposes that w_\emptyset is already excluded from the context set. A disjunction like (30), however, has another potential route to informativity: eliminating worlds where someone else drank the atole (instead of Juan or Daniel). To formalize this context, assume a model where, in addition to the four worlds above, there is another world, w_m , where Juan and Daniel did not drink the atole, but Maribel did. As seen in (39), the presuppositional and at-issue components of the assertion reading are the same as the question reading in (38). That is, they propose to change the context in the same way.

- (39) Presupposition (left) and at-issue (right) semantics for (30):



While the semantic contribution remains the same in this scenario, (30) is *informative* in this scenario because it proposes to eliminate w_m from the presupposed input state. According to the interpretive principle in (14), then, (30) is correctly predicted to be interpreted as an *assertion* in this context because it is both inquisitive and informative relative to the presupposed input state (like an ordinary disjunction). It should be noted that like an ordinary disjunctive assertion, the focused disjunction in this context still *allows* the addressee to respond by selecting one of the two alternatives (Juan or Daniel). As with ordinary disjunctions in Yukatek Maya or even in English, however, the utterance produces no obligation to provide such a response.

Stepping back a bit, we see that focused disjunctions in YM at first blush appear to be *ambiguous* between two readings: a question reading and an assertion reading. In our account, however, the multifunctionality of focused disjunctions is not an instance of ambiguity at all. Rather, it results from a uniform context change potential of a focused disjunction — a proposal with two alternatives — which interacts with various input contexts in different, yet regular, ways.

Before turning to other types of questions, it should be noted that an alternative approach positing a covert Q-operator would struggle to account for these facts in a principled way. First, such an approach would require us to posit a phonologically null Q-morpheme despite the lack of direct evidence for such an item. Since the two elements crucial to our account — disjunction and focus — are cross-linguistically common in alternative questions, a principled account of this interaction is a desirable outcome. Worse yet, a covert Q-operator approach would force us to stipulate not only the presence of the null Q-morpheme when the focused disjunction functions as a question, but also its absence in contexts where such sentences function as assertions. In essence, this means that such a morpheme's presence in the logical form must be somehow *dependent* on the common ground/context set. An account along these lines, then, would not only commit the ordinary vice of positing covert morphology, but would also fail to capture the *context sensitivity* that the interpretation of focused disjunctions in YM in fact exhibit.

4 Wh-Questions

Thus far, we have developed an account of the alternation focused disjunctions exhibit between functioning as a question and as an assertion. In our account, this alternation comes about through the relationship between the disjunction and the context. Specifically, the alternation arose because disjunction introduces an alternative set of a

specified number of alternatives. Because the number of alternatives specified in this set may or may not be a proper subset of those available in the context, the focused disjunction may function as an assertion or a question. In this section, we extend the account to focused indefinite wh-words, which function as questions regardless of the discourse context, as seen in (40)-(41).

- (40) [máax]_F il-ech
who see.Agent.Focus-B.2
'Who saw you?'
- (41) [ba'ax]_F t-u yuk'ah
what PFV-A.3 drink
'What did he/she drink?'

In the rest of this section, we develop an account of ordinary wh-questions like (40)-(41) which derives their interpretation as questions from the combination of the semantics for indefinites posited in §2 with the existential presupposition of the focus/cleft. In addition to explaining why such sentences function as questions, the account must also explain why such sentences, unlike those with focused disjunctions, cannot function as assertions regardless of the discourse context. As we will see, this lack of context sensitivity follows naturally from the fact that indefinites are treated as disjunctions of *unspecified* length.

4.1 The components of wh-questions

Before presenting the formal account deriving the interpretation of focused indefinites as wh-questions, a few words are in order as to why it makes sense to treat wh-words as indefinites in YM and more generally. There are two mains types of evidence — typological and formal semantic. Typologically, research by Haspelmath (1997) and Bhat (2000) has shown that across languages, wh-words frequently also serve as indefinites, sometimes with additional morphology. This also holds in YM: wh-words occur as ordinary indefinites, non-specific or dependent indefinites, and free choice indefinites in (42)-(44) respectively.

- (42) yan máax t-u yuk'ah le sa'-o'
exists who PFV-A.3 drink DEF atole-DISTAL
'Someone drank the atole'
- (43) tak in hantik wáa ba'ax
want A.1 eat OR what
'I want to eat something or other'
- (44) he'en máax-ak h-u beeytal u bin ich kool meyah-e'
any who-SUBJ surely-A.3 can A.3 go into milpa work-TOP
'Anybody can go work in the milpa.' Tonhauser (2003), 7a

In addition to the tight morphological connection between wh-words and indefinites across languages, various formal semantic accounts of questions have treated wh-words as indefinites. Karttunen (1977), of course, does this quite directly. While Hamblin (1973) does not treat wh-words as indefinites, Kratzer and Shimoyama (2002)'s Hamblin semantics for indefinites has shown a tight connection between indefinites and wh-questions in the Hamblin approach. While Groenendijk and Stokhof (1984) do not

draw a close parallel to indefinites, other dynamic semantics accounts of question have. For example, van Rooij (1998) shows that the anaphoric properties of wh-words are quite parallel to those of indefinites. More recently, Haida (2008) has exploited this parallel in a fundamental way within a Groenendijk and Stokhof (1984)-based dynamic semantic framework.

For us, however, indefinites and wh-words are alike not only in their quantificational force and anaphoric properties, but also in their issue-raising capacity. We saw this quite directly reflected above in the possible responses to assertions with widest-scope indefinites. In our account, indefinites are not only *like* indefinites, they *are* indefinites. The inquisitive nature of wh-questions does not distinguish them from assertions with indefinites; it unifies them. What distinguishes the two is that wh-questions isolate this aspect of the indefinite whereas assertions with indefinites do not.

4.2 Wh-questions as focused indefinites

In the theory developed in §2, an indefinite, like a disjunction, contributes truth-conditional information and latently raises an issue. Just as in the case of focused disjunctions, the focus/cleft construction presupposes the truth-conditional portion of the indefinite, leaving the inquisitive component as the sentence's sole proposed at-issue contribution. Recall the semantic rule for interpreting existential quantification that we proposed in §2, repeated in (45):

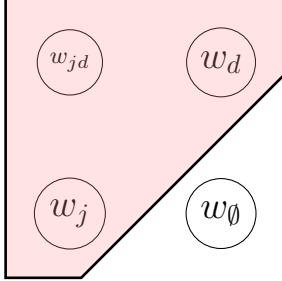
$$(45) \quad \llbracket \exists u \varphi \rrbracket^{\mathcal{M}, g, w} = \text{ALT}\{\alpha \subseteq W \mid \text{there is some } d \in \mathcal{D}_e \text{ s.t. } \exists \beta \in \llbracket \varphi \rrbracket^{\mathcal{M}, g[u/d], w} : \alpha \subseteq \beta\}$$

Just as our interpretive rule for disjunction returned the set containing the maximal sets of worlds satisfying either the left disjunct or the right one, the rule for the existential quantifier in (45) returns the set containing the maximal sets of worlds satisfying one of the propositions of the form $\varphi(x)$. The only difference here is that the alternatives come not from being overtly specified in the logical form, but from the assignment function the formula is interpreted relative to.

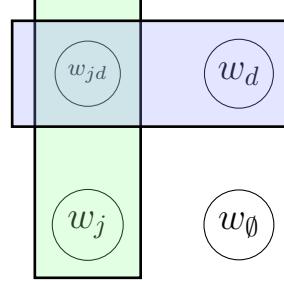
Consider a wh-question as in (46) consisting of a sentence with focused indefinite wh-word. If we assume, as above, a model \mathcal{M}_A with only two individuals in it, *juan* and *daniel*, the at-issue denotation for the focused indefinite will be as shown in the right diagram — the same as for a disjunction with two disjuncts. The existential presupposition also remains constant (left) obviating the informative potential for the proposed at-issue update just as in the case of the focused disjunction. According to the Inquisitive Principle, then, the update in (47) will function as a question since it is both *inquisitive* and *uninformative*.

- (46) [máax]_F uk' le sa'-o'
 someone/who drink.AGENT.FOCUS the atole-DISTAL
 'Who drank the atole?'

(47) Presupposition of (46) in \mathcal{M}_A

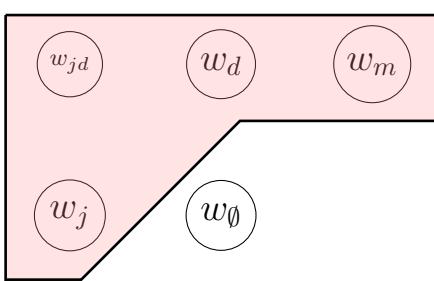


At-issue component of (46) in \mathcal{M}_A :

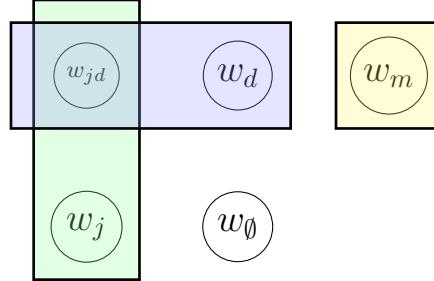


Given a model with only two individuals (or contextual restriction leaving us with two such individuals), the indefinite in the focus/cleft functions as a question just as the disjunction *juan wáa daniel* ‘Juan or Daniel’ did in (29). Unlike in the case of focused disjunctions, however, a sentence like (46) with a focused indefinite can only function as a question. To see why, let's consider the same example interpreted relative to \mathcal{M}_B with three individuals (*juan*, *daniel*, and *maribel*), as in (48)-(49).

(48) Presupposition of (46) in \mathcal{M}_B :



At-issue component of (46) in \mathcal{M}_B :



Whereas the focused two-disjunct disjunction, (30), is informative in this context and therefore interpreted as an assertion, the focused indefinite is still uninformative and therefore interpreted as a question. In the case of the disjunction, informativity was possible in such a context because the set of alternatives in the disjunction was *specified* in logical form to be a proper subset of those available in the context. The cardinality of the alternative set of the indefinite, however, is not specified in the logical form of the sentence itself. Rather, it arises via contextual domain restriction (and, of course, the model). In creating a predicate calculus extension of Groenendijk and Roelofsen (2009)'s inquisitive semantics for propositional logic, we characterized existential quantification as an ‘disjunction of unspecified cardinality’. It is precisely this difference between the ‘specified’ alternative set of disjunction and the ‘unspecified’ alternatives of the existential which produces the asymmetry between focused disjunctions and focused indefinites which we have seen.

5 Polar Questions in Yukatek Maya

Having examined the polyfunctionality of YM focused disjunctions in §3, we turn now to a closely related construction: the polar question. In addition to the clear semantic parallel between the polar questions and focused disjunctions, the two constructions in YM have much of their morphosyntax in common. The polar questions in both (49) and (50) make use of a word *wáa(h)* which is at least homophonous with the ordinary disjunctive coordinator.⁶

- (49) [Juan-wáah]_F uk' le sa'-o'
 Juan-OR drink.AGENT.FOCUS the atole-DISTAL
 'Was it Juan who drank the atole?'
 (50) táan-wáah u yuk'ik le sa'-o' Juan
 PROG-OR A.3 drink DEF atole-DISTAL Juan
 'Is Juan drinking the atole?'

Furthermore, as we will argue in detail in §5.1, *wáa* in polar questions like (49) (but not (50)) occurs immediately following a focus/clefted syntactic constituent. To capture these syntactic and semantic parallels, §5.2 pursues an analysis of polar questions with a focused element, like (49), as versions of focused disjunctions with a single overt disjunct. In polar questions like (50) with no focused element, the position of the disjunctive coordinator, *wáa*, is determined prosodically rather than syntactically. In §5.3 we develop an account of such polar questions where the very nature of polarity ensures that such disjunctions will be *uninformative* with no role needed for the existential presupposition of the focus/cleft.

5.1 Two classes of polar question in Yukatek Maya

Superficially, the two polar questions in (49)-(50) appear quite similar to one another, with the disjunctive coordinator *wáa(h)* appearing in second position in both. While it is not clear from these examples whether the generalization should be syntactic or prosodic, we might expect that a single generalization could capture the distribution of *wáa(h)* across both cases. As argued in AnderBois (to appear), we take the position of *wáa(h)* in polar questions to be syntactically determined in questions like (49) with a focus/clefted element, but prosodically determined in questions with no such element, as in (50). While the reader is referred to AnderBois (to appear) for more detailed arguments to this effect, we briefly outline the syntactic justification for this distinction.

The clearest argument that the position of *wáa(h)* is prosodically determined in polar questions without focus comes from examples, such as (51), involving an free variation of the phonological form of certain aspect markers such as the terminative aspect marker, *ts'o'ok*. In (51), this morpheme appears in a full CVC form which meets minimal word requirements and *wáa(h)* appears attached to it phonologically. In (52), we see the same morpheme appearing in a portmanteau of sorts, phonologically combined with the second person set A (Ergative/Nominative) agreement marker *a*. In this case, *wáa(h)* cannot surface attached to the aspect marker since it is prosodically light, and instead occurs immediately following the main verb.

⁶ The coda [h] in polar questions is part of a regular process of phonological phrase-final [h]-epenthesis, see AnderBois (2009) for details.

-
- (51) a. ts'o'ok-wáah a wa'alik ti leti'
 TERM-OR A.2 say to him
 'Did you already tell him?'

b. ?ts'o'ok a wa'alik-wáah ti leti'

- (52) a. ts'a wa'alik-wáa ti leti'
 TERM.A.2 say-OR to him
 'Did you already tell him?'

b. *ts'a-wáa wa'alik ti leti"

As there is no discernible semantic difference between (51) and (52), we conclude that the position of *wáa(h)* is prosodically conditioned. In contrast, polar questions with a focused element only allow *wáa(h)* to occur following the entire constituent, even if it is prosodically quite heavy, as in (53).

- (53) a. [le ts'ooya'an sakpile'en maak-wáah]_F t-u yuk'ah le
 DEF thin pale man-OR PFV-A.3 drink DEF
 sa'o'
 atole-DISTAL
 'Was it the thin, pale man who drank the atole?'
 b. *[le wáah ts'ooya'an sakpile'en maak]_F t-u yuk'ah le sa'o'
 c. *[le ts'ooya'an wáah sakpile'en maak]_F t-u yuk'ah le sa'o'
 d. *[le ts'ooya'an sakpile'en wáah maak]_F t-u yuk'ah le sa'o'

This dual distribution of *wáa(h)* demonstrates that the distinction we have made between polar questions with and without focus is a *syntactically* relevant distinction. In the rest of this section, we will see that this distinction also produces subtle differences in the *semantic* composition of such questions.

5.2 Polar Questions with Focus

Having established that polar questions with and without a focused element differ in their syntax, we now provide analyses of both types, starting with those with a focused element like (54). The approach we take is to treat such questions as versions of focused disjunctions consisting of a single overt disjunct (*juan* in (54)).⁷ While the disjunction

⁷ In addition to the semantic arguments below, a covert alternative question approach to such polar questions is supported by the fact that particle answers similar to 'yes', 'no', and 'maybe' are not licensed for such questions. This is so even though YM has words *hah* 'yes/true' and *ma* 'no' which function like English *yes* and *no* in other contexts (e.g. as responses to accept assertions). In this way, then, polar questions in Yukatek Maya pattern with English alternative questions like (iii) rather than English polar questions like (ii).

- (i) a. A: Juan wáa uk' le sa'-o'
 b. B: #hah/ #?ma'/ Juan/ ma' Juan-i'
 B: yes/ no/ Juan/ NEG Juan-IRREAL
 B: 'yes/ no/ Juan/ not Juan'
- (ii) a. A: Did Juan drink the atole?
 b. B: Yes/ No/ #Juan/ #Not Juan
- (iii) a. A: Did Juan or Daniel drink the atole?
 b. B: #Yes/ #No/ Juan/ Daniel

only possesses one syntactic disjunct, we claim in what follows that, semantically, it in fact has two disjuncts. The ‘empty’ disjunct is interpreted roughly as ‘anyone else’ as schematized in (55)⁸.

- (54) [Juan-wáah]_F uk' le sa'-o'
 Juan-OR drink.AGENT.FOCUS the atole-DISTAL
 ‘Was it Juan who drank the atole?’

- (55) [Juan wáa ANYONE ELSE]_F uk' le sa'-o'

This interpretation for the empty disjunct is the result of properties that have been argued to hold (at least pragmatically) of ordinary disjunctions across languages (see, for example, Zimmermann (2000), Geurts (2005), and Simons (2000)). More specifically, we take the empty disjunct to be interpreted as the *exhaustive* set of *like elements* which is *mutually exclusive* from the overt disjunct. We see this semantics for *wáa* plus the empty disjunct formalized in (56). The denotation as given combines with an individual (Juan in (55)) and returns a disjunction with two alternatives: the left one where the overt disjunct satisfies the predicate and the right one where ‘anyone else’ satisfies the predicate. Given this ‘default’ interpretation for disjunctions containing an empty disjunct, the analysis developed in previous sections correctly predicts that such sentences, unlike focused disjunctions more generally, can only function as questions.

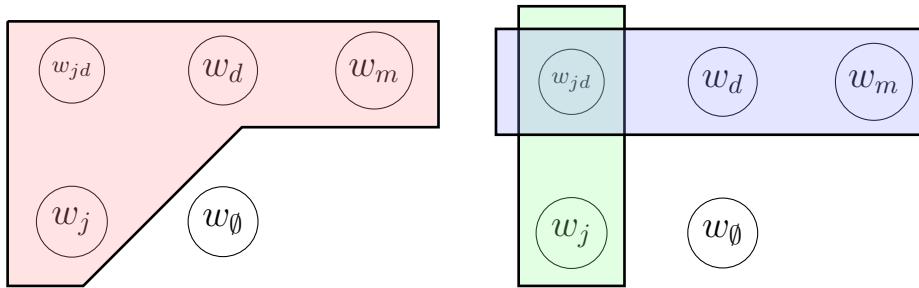
- (56) $\llbracket wáa \text{ ANYONE ELSE} \rrbracket = \lambda z_e. \lambda P_{(e, \text{stt})}. P(z) \vee \exists x. [P(x) \wedge x \neq z]$

Recall that the questioning nature of wh- and alternative questions in previous sections was derived from the combination of a hybrid expression contributing inquisitiveness — a disjunction or an indefinite — rendered uninformative by the presuppositional semantics of the focus cleft. Since polar questions involve the disjunctive coordinator, *wáa(h)*, our account takes inquisitiveness in polar questions to be contributed by disjunction. In the case of polar questions with a focused element, the existential presupposition of focus will again obviate the informative potential of the disjunction. The other path to informativeness we saw for focused disjunctions (proposing to exclude Maribel in the above example) does not arise because of the *exhaustive* interpretation of the empty disjunct.

Given the semantics we have attributed to the empty disjunct above, we predict correctly that single-disjunct focused disjunctions behave like focused indefinites (and unlike multiple-disjunct focused disjunctions); they can function only as questions as in the semantics for (54) in (57) (the presupposed input state is in the left figure, the at-issue component in the right figure). The fact that examples like (54) are always interpreted as questions, then, emerges as a special case of the more general assertion/question alternation we saw in focused disjunctions in §3.

⁸ N.B. While we make use of the strikethrough notation schematically, we do not take the empty disjunct to literally be the result of ellipsis.

- (57) $\exists x.\text{drink-atole}'(x)$ $\text{drink-atole}'(\text{j}) \vee \exists x.[\text{drink-atole}'(x) \wedge x \neq \text{j}]$



Recall that focused disjunctions were interpreted as assertions only if *informative* relative to the input state. For the focused disjunction like (58), the focus presupposition removes one potential route to informativity. The other route to uninformativity which disjunctions (but not indefinites) provide is to eliminate worlds from the input state where Juan and Daniel did not drink the atole, but some other individual did.

- (58) a. [Juan *wáa* Daniel]_F uk' le sa'-o'
 Juan OR Daniel drink.AGENT.FOCUS the atole-DISTAL
 Question: 'Was it Juan who drank the atole or was it Daniel?'
 b. Assertion: 'It was Juan or Daniel who drank the atole.'

For the Polar Question in (54), however, there is no possible way to achieve informativity. Focus again presupposes that the input state has no worlds where no one drank the atole. Since the empty disjunct is interpreted as the *exhaustive* set of other individuals disjoint from the overt disjunct, the second potential path to informativity is blocked in this case as well. Single-disjunct disjunctions, then, are inquisitive and cannot be informative relative to any possible input context. Since they are both inquisitive and uninformative, they will be interpreted as questions in all discourse contexts per the Inquisitive Principle.

It should be noted that whereas alternative and wh-questions in YM did not possess any question-specific syntactic elements, the same cannot quite be said of polar questions in the language. That is, the grammar of Yukatek Maya must contain the information that disjunctions with one disjunct are possible only in the focus/cleft position. Additionally, it must have grammaticalized⁹ the semantic rule for interpreting the ‘empty’ disjunct in (56). The key point is that what has grammaticalized is an inter-

⁹ Cross-linguistic support for this grammaticalization process can also be found in a parallel process that occurred historically with conjunction in Oceanic languages. Moyse-Faurie and Lynch (2004) document that in many Polynesian languages, a word historically related to the conjunctive coordinator can occur after a nominal with a meaning that can be described as ‘also’, ‘and others’, or ‘et cetera’. In many languages, the ordinary conjunctive coordinator for nominals and this post-nominal use are homophonous (e.g. Tokelauan, Samoan, West Uvean). In languages where the forms differ, the difference is often limited to the vowel being longer in the post-nominal use. Moyse-Faurie and Lynch (2004), for example, reconstruct *ma as the Proto Polynesian conjunctive and *mā with a long vowel as the post-nominal (an phrase-final) marker meaning ‘and others’. The post-nominal use, then, plausibly resulted from the conjunctive coordinator being used in a phrase-final position and undergoing phrase-final lengthening (in languages where the vowel length differs, it is always in this direction). The existence of a parallel grammaticalization process involving conjunction highlights the idea that the questioning nature of such polar questions is, in some sense, *emergent*. It is the result of the latent properties of disjunction more generally which have no analog in the case of conjunction.

pretrative procedure for single-disjunct disjunctions which consists of properties which hold of ordinary disjunctions, at least pragmatically. This makes sense of the cross-linguistically widespread connection between polar question particles and disjunctive coordinators (e.g. Bulgarian, Japanese, Korean, Latin, Polish, and Malayalam). While polar questions in YM do involve a bit of question-specific semantics, that semantics does not directly encode the questioning nature of such sentences. Rather, the semantic contribution of *wáa* in polar questions includes the semantic contribution of *wáa* in ordinary disjunctions plus certain implicatures of ordinary disjunctions. From these properties alone, the present theory predicts that such disjunctions will necessarily be uninformative and therefore will uniformly function as questions.

5.3 Polar Questions without Focus

We have analyzed polar questions with a focused element as single-disjunct disjunctions where the existential presupposition of the focus/cleft and the exhaustivity of the empty disjunct together remove both potential routes to informativity that disjunctions generally possess. We turn now to the second class of polar questions in YM, those like (59) which have no focused element. Recall from §5.1 that the position of *wáa(h)* in such questions is determined prosodically rather than directly by syntax.

- (59) táan-*wáah* u yuk'ik le sa'-o' Juan
 PROG-OR A.3 drink DEF atole-DISTAL Juan
 'Is Juan drinking the atole?'

In these cases, we claim it is the polarity of the sentence itself which is being disjoined semantically. Since positive polarity is not overtly realized, as in (59), and *wáa(h)* itself fails to meet minimal prosodic word requirements, it instead attaches to the first prosodic word. This explains why the phonological host of *wáa(h)* in an example such as (59) (the progressive aspect marker, *táan*) does not seem to be focused or otherwise semantically prominent in the sentence. This view is supported by negative polar questions, as in (60), where the polarity of the sentence is realized overtly. In these cases, *wáa(h)* attaches to this overt polarity as seen in (60).

- (60) ma'-*wáah* t-a beetik chuuhuk waah?
 NEG-OR Pfv-A.2 make sweet bread
 'Didn't you make a cake?'

While the basic question being asked remains the same, negative polar questions like (60), like their English translations, appear to convey a different sort of question than their positive counterparts. We return to such questions in §6, focusing on positive polar questions like (59) for the remainder of this section. In the case of polar questions with a focus-clefted element, we saw that the unpronounced disjunct was interpreted as the alternative comprised of the *exhaustive* set of *like elements* which are *disjoint* from the overt disjunct. Since what is disjoined in these cases is polarity, this means that the empty disjunct will be the negation of the overt polarity in the sentence. The whole disjunction for (59), for example, will have the semantics in (61).

- (61) {drink-atole'(juan), \neg drink-atole'(juan)}

More generally, disjunction of polarity will take the union of $\llbracket \varphi \rrbracket$ and (the single alternative-denoting) $\llbracket \neg\varphi \rrbracket$. In the case of polar questions where the polarity itself is what is disjoined, the semantics produced is the same as that contributed by Groenendijk and Roelofsen (2009)'s non-informative closure operator. The empty disjunct in these cases denotes the set containing the (maximal) set of worlds which does not overlap with any of the alternatives in the overt, positive alternatives. Negation by its very nature (i.e. the law of the excluded middle) eliminates the informative potential of a disjunction, playing the role that focus did in polar questions with a focused element and also wh- and alternative questions. Since they are both uninformative and inquisitive, they are unambiguously interpreted as questions according to the *inquisitive principle*.

Like any inquisitive semantics account of questions in natural language, something more needs to be said about why the above disjunctions of the form $p \vee \neg p$ function as questions, whereas certain other disjunctions of this sort, as in (62)-(63), function as tautologous assertions with some additional pragmatic effect (see Ward and Hirschberg (1991) for some discussion of these pragmatic effects).

- (62) John came to the party last night or he didn't (come to the party).
- (63) Bill is a linguist or he isn't.

While we leave a full account of such examples for future work, there is a key syntactic difference between them and polar questions: what portion of the clause is disjoined. In tautological disjunctions like (62)-(63), the two disjuncts are entire clauses (or elliptical versions thereof). In contrast, polar questions in Yukatek Maya appear to involve a disjunction of the polarity itself. Informally, we can draw from the pointwise compositional tools of Hamblin semantics and schematize this in (64). The polar question consists of a disjunction which introduces a set consisting of two alternatives (the identity function and negation) and applies this set to the propositional content of the question in a pointwise fashion. The tautological disjunctions, on the other hand, involve a disjunction which introduces a set of propositions where one happens to be the negation of the other.

$$(64) \quad \left\{ \begin{array}{l} \lambda P_{stt}.\neg P, \\ \lambda P_{stt}.P \end{array} \right\} (\varphi)$$

There are at least two potential ways to leverage this observation to better understand why all $p \vee \neg p$ disjunctions do not function as questions. First, we might claim that such disjunctions do not differ from polar questions semantically, only pragmatically. This seems to be supported by the observation that overt disjunctions of polarity itself make much worse tautologous disjunctions as in (65)-(66). Indeed, at least for many speakers, such disjunctions can only function as questions (when occurring with a particular intonational pattern as well) in the absence of an overt *either*.

- (65) #?John did or did not come to the party last night.
- (66) #?Bill is or isn't a linguist.

Alternatively, we could claim that polar questions, unlike tautologous disjunctions, do in fact involve a focus construction of sorts. In terms of the present account, then, polar questions would include an existential presupposition over the alternative set in (64). On this view, such sentences presuppose that there is some true alternative

in the set $\{p, \neg p\}$ and have the disjunction $p \vee \neg p$ as their at-issue component and therefore function as questions. We leave this issue open, as it in large part hinges on a detailed investigation of the possible syntactic forms of tautologous disjunctions, their intonational properties, and the range of pragmatic inferences conveyed by them.

6 Negative Polar Questions

The previous sections have developed an account of wh-, alternative, and positive polar questions in Yukatek Maya. The account relies crucially on an inquisitive semantics for disjunctions, and indefinites more generally, in which they contribute fine-grained alternatives, raising the issue of which one holds. In this theory, then, functioning as a question is a property which *emerges* from the interaction of this inquisitive semantics with the existential presupposition of focus. In analyzing questions in YM, this had two particular advantages. First, it allowed us to understand the fact that a focused disjunction can function either as a question or as an assertion depending on context. Second, it allowed us to understand how it is that a question can consist solely of two components, neither one of which is itself exclusively interrogative. While we have motivated the theory with the compositional account of the semantics of questions with little to no interrogative morphosyntax, the tools we have developed also help us understand properties of questions in languages which do have interrogative morphosyntax, such as English. In this section, we examine one such application: the meaning/use of (outer negation) negative polar questions in English.

6.1 A subtle semantic difference

Having derived the semantics of positive polar questions with no focused element as involving disjunction of polarity itself, we turn now to (high negation) negative polar questions. Standard theories of questions (e.g. Hamblin (1973), Karttunen (1977), and Groenendijk and Stokhof (1984)) predict the same semantics for these questions as for positive ones, consisting of two alternatives as in (67). They predict the denotation in (68) for high negation polar questions, which is interpreted identically in these theories since double negation is vacuous.

- (67) Positive polar question: $\{p, \neg p\}$

- (68) High negation polar question: $\{\neg p, \neg\neg p\} = \{\neg p, p\}$

Given the nature of negation in inquisitive semantics, however, the current theory actually predicts a subtly different semantics for negative polar questions, given in (70). As discussed in detail in §2.4, double negation in inquisitive semantics is no longer vacuous. Though it returns the same basic set of alternatives $\{p, \neg p\}$, it additionally eliminates the potential for fine-grained alternatives introduced by inquisitive elements within p . Rather than being vacuous, then, double negation in the present theory is interpreted as non-inquisitive closure.

- (69) Positive polar question: $\{p, \neg p\}$

- (70) High negation polar question: $\{\neg p, \neg\neg p\} = \{\neg p, !p\}$

We can see this semantic difference directly reflected in the range of felicitous secondary responses to positive and negative polar questions. A positive polar question, as in (71-a), readily allows for responses as in (71-b) which address the (latent) issue of what kind of cake John is baking. Since the issue is a latent one, such responses are not required or expected of the addressee, but nor are they precluded. In contrast, a negative question like (72-a) does not readily allow for such responses as in (72-b). To the extent that such responses are tolerated, they intuitively serve not to ‘better answer the question’, but rather to establish that the speaker is indeed authoritative with respect to the question at hand.¹⁰

- (71) a. Is John baking a cake?
 b. Yeah, chocolate // Yeah, vanilla.
- (72) a. Isn’t John baking a cake?
 b. #Yeah, chocolate // #Yeah, vanilla.

This asymmetry in secondary responses is captured by the different semantics in (69) and (70). The positive question leaves open the issue of what kind of cake John is baking, signaling it as a potential topic of discussion. The negative question, on the other hand, eliminates the fine-grained alternatives introduced by *a cake*, expressly signaling the non-issuehood of the question of which cake John baked. Another way to think of this, then, is that the asker of negative question explicitly limits the information they seek to the basic issue of whether *p* holds in some fashion or other or whether $\neg p$. In this approach, then, the high negation polar question does not involve *focus* on the polarity of the proposition, but instead involves *limiting* the question to it.

Having motivated a subtle semantic asymmetry between positive and negative questions, we will now argue that the main effect of high negation polar questions can be readily understood by the combination of this semantics and pragmatic reasoning based on this semantics. That is, the ‘Verum focus’ effect of high negation polar questions, as discussed by Romero and Han (2004), can be derived pragmatically based on this semantics without positing a VERUM focus operator in the logical form. That is, the interactions of negation with alternatives in inquisitive semantics explains the previously mysterious fact that the VERUM operator Romero and Han (2004) posit in questions is regularly encoded by negation across languages. Romero and Han (2004) demonstrate this for Bulgarian, German, Korean, Modern Greek, and Spanish and we can see similar Verum effects hold of negative polar questions in Yukatek Maya as in (73)-(74).

- (73) ma'-wáah t-a beetik chuuuhuk waah?
 NEG-OR PfV-A.2 make sweet bread
 ‘Didn’t you make a cake?’
- (74) ma'-wáah t-a wilik-e' u paax kisin?
 NEG-OR PfV-A.2 see-TOP A.3 instrument devil

¹⁰ Superficially similar responses to high negation polar questions in (i) do seem to be markedly better than those in (72-b). We leave a full account of the range of such ‘secondary’ responses and their licensing conditions to future work. Importantly, though, these responses differ from the infelicitous ones in (72-b) in that they make use of overt *inquisitive* element: the indefinite. Rather than resolving a previously live issue, then, we can think of such responses intuitively as introducing a new issue.

- (i) a. Isn’t John baking a cake?
 b. Yeah, a chocolate one.// Yeah, a vanilla one.

'Don't you see that it is the devil's instrument?' Andrade and Máas Collí (1999), p. 29

6.2 Negation and VERUM in high negation polar questions

Romero and Han (2004) characterize high negation polar questions like (75-b) as serving to, in some sense, double-check one of the answers of its positive counterpart in (75-a). In their analysis, this 'double-checking effect' consists of two components.

- (75) a. Is John baking a cake?
b. Isn't John baking a cake?

Semantically, such questions are distinguished by the presence of a 'meta-conversational' epistemic operator VERUM. Applied to a formula φ , this operator's semantics can be paraphrased informally as 'it is for sure that we should add to the common ground of discourse participants x that φ ' or $\text{FOR-SURE-}CG_x \varphi$. Following Ladd (1981)'s original empirical observations, high negation questions, then, are ambiguous between two readings depending upon the relative scope of negation and the VERUM operator. These two readings can be brought out by the inclusion of a positive polarity item (PPI) or negative polarity item (NPI), respectively. The first reading, brought out by the PPI *too* in (76-b), introduces the alternatives in (76-c). The second reading, brought about by the NPI *either*, is seen in (77). It is this aspect of the high negation question which we derive below from the semantic distinction in 6.1 combined with pragmatic reasoning.

- (76) a. A: Ok, now that Stephan has come, we are all here. Let's go!
b. S: Isn't Jane coming too?
c. $\{\text{FOR-SURE-}CG_x \text{Jane is coming}, \neg\text{FOR-SURE-}CG_x \neg\text{Jane is coming}\}$

Scenario: Pat and Jane are two phonologists who are supposed to be speaking in our workshop on optimality and acquisition.

- (77) a. A: Pat is not coming. So we don't have any phonologists in the program.
b. S: Isn't Jane coming either?
c. $\{\text{FOR-SURE-}CG_x \neg\text{Jane is coming}, \neg\text{FOR-SURE-}CG_x \neg\text{Jane is coming}\}$

Pragmatically, Romero and Han (2004) also distinguish high negation polar questions from positive polar questions in that the former convey the inference that the speaker had previously believed or expected that the positive answer held. This 'prior-expectation' implicature certain does hold of high negation polar questions, however, it is also seems to be present in *low* negation polar questions as well as in (78). That is, the 'prior-expectation' implicature seems to hold of *all* negative polar questions and is therefore separable from the issue of the Verum effects to be explored below.

- (78) Is John not coming to the party?
(Implicature: Speaker had previously thought that John was coming)

Our task in the rest of this section, then, is to show that the 'Verum effects' which Romero and Han (2004) capture with a VERUM operator in the semantics, can be derived pragmatically based upon the independently predicted semantics of double negation in inquisitive semantics. In section §6.1, we saw that the account developed in

prior sections predicts the semantics in (79)-(80) for positive and high negation polar questions. Furthermore, we saw that patterns of secondary answers gave us direct empirical support for this semantics.

- (79) a. Is John baking a cake?
 - b. Positive polar question: $\{p, \neg p\}$
 - c. $\{\text{John is baking a chocolate cake, John is baking a vanilla cake, \dots, John is not baking any cake}\}$
- (80) a. Isn't John baking a cake?
 - b. High negation polar question: $\{\neg p, \neg\neg p\} = \{\neg p, !p\}$
 - c. $\{\text{John is baking some cake or other, John is not baking any cake}\}$

While they are semantically distinct, the meanings of the two are not at all unrelated. Intuitively, the negative question eliminates finer-grained sub-issues within p , thereby limiting the information sought by the questioner to the polarity of the answer, positive or negative. Formally, the two denotations are related because the positive polar question in (79) *entails* the high negation polar question in (80). This is because the high negation question contributes only the issue of whether or not p , whereas the positive polar question's meaning includes this issue and the fine-grained alternatives contributed by p itself. To see this in detail, we need to briefly discuss how entailment is defined in inquisitive semantics, as in (81) (from Groenendijk and Roelofsen (2009)).

- (81) **Definition:** $\varphi \models \psi$ iff $\forall \alpha \in [\![\varphi]\!]: \exists \beta \in [\![\psi]\!]: \alpha \subseteq \beta$

To see that the positive polar question entails the negative one, then, we must check each alternative in the positive polar question and see if there is some alternative in the denotation of the high negation polar question which is a superset of it. Since both denotations contain $\neg p$, clearly this is satisfied for this alternative. The positive alternative, however, contains fine-grained alternatives corresponding in this example to various cakes which John may be baking. Each of these alternatives in p (of the form 'John baked x ') will necessarily be contained within the single alternative $!p$ (roughly 'John baked some cake or other'). This entailment relation will only necessarily hold in this direction since $!p$ may not be contained in any single alternative in the positive polar question. That is, the set of worlds where John baked some cake or other will not be a subset of any of the individual alternatives as in (79).

Since they stand in an entailment relation and differ minimally in their syntactic form (negative vs. positive polarity), the rational addressee takes the maxim of quantity to have been violated and therefore applies Gricean reasoning to understand why the speaker chose to utter the less informative high negation polar question rather than the more informative positive polar question. Since our semantics comprises both issues and information, we should first clarify how the Gricean picture applies to inquisitive content. Except in the case of Quantity, to be discussed in some detail below, the inquisitive pragmatics we assume is consonant with Groenendijk and Roelofsen (2009)'s formal pragmatics.

We review briefly the key pragmatic notions we assume as they apply to inquisitive content. The maxim of Quality for inquisitive content is a sort of sincerity condition, obliging the cooperative speaker to only ask about issues which are unresolved in his/her epistemic state (i.e. things which he/she is inquisitive about). As noted above, for Quantity, we assume a conservative extension to the inquisitive case which differs from the classic Gricean conception only in the definition of entailment, as outlined

above. For Relevance, the basic intuition is that issues raised in a discourse should help resolve the larger question under discussion. A cooperative speaker will only ask for information that helps drive the conversation forward towards the shared conversational goals of the discourse participants.

Given this definition for entailment, we see that high negation polar questions will always violate the maxim of Quantity since the speaker could have instead used the positive counterpart. The Verum effect, then, arises as a Relevance implicature when a speaker (*S*) utters a High Negation Polar Question (HiNegQ) with propositional content *p* in lieu of its positive counterpart (PosQ).

1. *S* uttered PosQ instead of HiNegQ, apparently violating the maxim of Quantity.
2. Taking *S* to be cooperative, *S* must have had a reason to violate Quantity, i.e. PosQ must violate some other maxim.
3. PosQ is at least as mannerly as HiNegQ since it differs only in the presence of negation.
4. Therefore, *A* assumes that uttering PosQ would violate the (inquisitive) maxim of Relevance.
5. Since *S* uttered HiNegQ, it must be that *S* finds the fine-grained sub-issues within *p* to be irrelevant.
6. That is, the information *S* seeks is *limited* to the basic issue of whether *p* holds or $\neg p$ does.

The quantity/relevance implicature, then, combined with the literal content of the high negation question, yields a question asking about the same basic issue as the positive question, but additionally conveying that the speaker's interest is *limited* to the polarity of the answer. With respect to the cake examples in (79)-(80), the speaker conveys the irrelevance of what kind of cake is being baked, instead 'limiting' the addressee's attention on the issue of whether or not John baked some kind of cake or other.

Crucially, the speaker may have different reasons for wishing to signal the irrelevance of the alternatives within *p*. They might, as described above, deem them to be irrelevant to the current conversational goals, resulting in the above 'reading' which double-checks the positive proposition, *p*. It is also possible, however, that the differences between the fine-grained alternatives within *p* are not of interest to the speaker because he/she believes them to all be equally *false*. This is the 'reading' where the speaker is double-checking $\neg p$. In this account, then, Ladd (1981)'s ambiguity of high negation polar questions is not a true semantic ambiguity, but rather the result of pragmatic computations proceeding based on different assumptions about the speaker's motivation for explicitly suppressing any fine-grained alternatives within *p*.

The account we have developed, then, derives the Verum effect in high negation polar questions from the semantics of (double) negation in our framework plus Gricean reasoning. Compositionally, then, we make sense of the crucial presence of *negation* in high negation polar questions, something which (by their own admission) remains mysterious for Romero and Han (2004). For us, the crucial role of negation is to deliver *double* negation in the affirmative alternative of the question, serving to eliminate any latent issues within it. While Romero and Han (2004) describe the Verum effect a type of *focus*, this effect in our account is only focus in the broadest, pre-theoretical sense, not in any formal semantic sense. Semantically, we do not posit a focus on negation, but rather that the semantics of double negation itself (i.e. non-inquisitive closure)

suppresses any latent issues within p . This has the effect of ‘focusing’ the conversation on the main issue of whether or not p .

Aside from understanding the compositional role negation plays in high negation polar questions, the current account also has two empirical advantages. First, we understand the distribution of English particle responses such as ‘yes’ and ‘no’ in response to such questions. While the distribution of particle responses like ‘yes’ and ‘no’ has been shown to be far more interesting than previously assumed (e.g. Farkas and Bruce (2010), Kramer and Rawlins (2008)), these responses plainly do not correspond to the cells in Romero and Han (2004)’s $\{\text{FOR-SURE-}\text{CG}_x p, \neg\text{FOR-SURE-}\text{CG}_x p\}$ as seen in (82). They instead seem to correspond to the same cells as in the positive polar question, $\{p, \neg p\}$. Since the main issue in positive and high negation polar questions is the same in our account, we expect that responses like ‘yes’ and ‘no’ should refer to these same alternatives.

- (82) a. Isn’t John baking a cake?
- b. Yes (he is) // No (he isn’t)
- c. *Yes (it is FOR-SURE- $\text{CG}_x p$) // No (it is FOR-SURE- $\text{CG}_x p$)

Second, unlike Romero and Han (2004), we do not predict high negation questions to behave the same as positive questions with the adverb *really*. For Romero and Han (2004), the VERUM operator contributed by high negation is identical with that contributed by (one reading of) the epistemic adverb *really*. While this assimilation may seem plausible in some cases, the two behave quite differently in other environments, such as ‘follow-up questions’ as in (83)-(84). In the dialogue in (83), the speaker in (a) asks the positive question and then follows up with (c) in order to gauge the speaker’s degree of certainty in the answer. In (84), we see that high negation polar question cannot serve the same follow-up role in a discourse. This is expected on the current account since the high negation question is fundamentally about the same issue, whereas a positive question with *really* truly does seem to involve an epistemic/doxastic modal element.

- (83) a. A: Is John baking a cake?
 - b. B: Yes, he is.
 - c. A: Is he really baking a cake? Are you sure?
- (84) a. A: Is John baking a cake?
 - b. B: Yes, he is.
 - c. A: #Isn’t he baking a cake? Are you sure?

Before moving on, we should comment on our extension of the maxim of quantity into inquisitive semantics, since it differs significantly from that of Groenendijk and Roelofsen (2009). Our account derives the VERUM/double-checking effect of high negation polar questions as a quantity implicature arising because the uttered sentence is entailed by its pragmatic competitor, the positive polar question. The implicature calculation above involved the assumption that this constituted a violation of the Gricean maxim of quantity which we can formulate as in (85) (or rather the submaxim ‘Make your contribution as informative as is required.’). Despite the shift in our notion of semantic content, this seems to be the most conservative extension of Grice’s quantity maxim to hybrid expressions. Quantity still refers to informativity, which is still modeled by entailment.

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- (85) Make your contribution as informative and inquisitive as possible.

In contrast, Groenendijk and Roelofsen (2009) argue that the Gricean quantity maxim should be essentially as in (86).

- (86) Make your contribution as informative and as uninquisitive as possible.

Groenendijk and Roelofsen (2009)'s intuition is that the issues raised by less inquisitive sentences are easier to resolve than those raised by more inquisitive sentences, so that less inquisitive sentences are the best way to ensure that some enhancement to the common ground will take place and are therefore preferred by Quantity. This conception of Quantity takes speakers to assume that their interlocutors are possibly unable to resolve issues that would be raised by more inquisitive sentences. In this sense, Groenendijk and Roelofsen (2009)'s version of Quantity generalizes to the worst case, forcing speakers to assume *always* that addressees are incapable of answering harder questions. While speakers surely do observe such a principle at times (otherwise speakers should simply ask 'What is the world like?'), we can regard this as the inquisitive counterpart to Grice's less-used second submaxim of Quantity, "Do not make your contribution more informative than is required."

For the inquisitive case, then, entailment still models Grice's maxim of Quantity with Groenendijk and Roelofsen (2009)'s 'ask less' dynamic being the inquisitive counterpart of 'don't say too much'. Empirically, the only support discussed for their version of Quantity is in predicting the unexpectedness of the 'neither' answer from the alternative question in (87).

- (87) Will ALF or BEA go to the party?
 a. Alf will go to the party .
 b.#?Neither Alf nor Bea will go.

Our approach to alternative questions in §3, however, predicts its infelicity in terms of the presuppositional semantics of alternative questions. Since 'neither' is not a semantic answer to the question, the infelicity of (87) comes about because the addressee denies or otherwise cancels the presupposition of the question rather than providing one of the expected answers.

7 Conclusion

We have provided an account of the semantics and pragmatics of the major types of questions in Yukatek Maya: wh-, alternative, polar questions with a focused element, and both positive and high negation ones with no focused element. Our account derives this question semantics based on the interaction of the semantic contribution of their two components: disjunctions/indefinites and focus. For indefinite/disjunctions, we make use of an independently motivated inquisitive semantics for disjunctions and indefinites in which they are hybrid expressions. That is, they not only make their classical, truth-conditional contribution, but also evoke a set of alternatives, raising the issue of which one holds. The role of focus, then, is to obviate the truth-conditional informative potential that these hybrid expressions ordinarily contribute by presupposing it to already hold. Functioning as a question, then, is an emergent property arising from a particular combination of truth-conditional uninformativity and inquisitiveness.

This view of questions had two particular advantages in the analysis of questions in Yukatek Maya. First, we make sense of the surprising fact that a sentence with a disjunction in the focus/cleft construction can function either as a question or as a (disjunctive) assertion. This alternation is conditioned by whether or not the alternatives in the disjunction exhaust those in the context, i.e. whether or not an update with the disjunction is informative in that context. The account therefore captures this variation not as the result of a covert ambiguity, but rather as a uniform context change potential which applies to different input contexts, yielding different yet regular results.

Second, with respect to wh-questions, we understand compositionally how an indefinite in the focus/cleft position comes to function as a question. While the complete lack of interrogative-specific morphosyntax in wh-questions is somewhat language-specific, the two parts which do occur in Yukatek Maya wh-questions — indefinite wh-words and focus — are quite widespread cross-linguistically. The account, then, takes indefinite wh-words to be the locus of alternatives in questions rather than focus, as has often been argued by previous approaches to this pattern both cross-linguistically (e.g. Beck (2006) and Cable (2007)) and within Yukatek Maya (Tonhauser (2003)).

In this regard, it is also worth contrasting the present account with previous inquisitive semantics accounts of questions (Mascarenhas (2008), Groenendijk and Roelofsen (2009), Ciardelli (2009) *inter alia*). Like the present work, these accounts build questions within the semantics from a hybrid core provided by an indefinite wh-word or a disjunction. Both accounts, then, share the core idea that a question is an indefinite or disjunction whose truth-conditionally informative component has been somehow removed or obviated. Where they differ is in the source and nature of this uninformativity. For the above authors, uninformativity arises in all cases because a question operator in the logical form inserts the alternative which would have been excluded. While no longer a *partition* semantics (since it is not necessarily transitive), this yields a question semantics which is similar to Groenendijk and Stokhof (1984) in that the alternative set of a question exhausts the entire space of possible worlds.

The present theory, in contrast, arises at uninformativity because the indefinite or disjunction's truth-conditional component is *presupposed*. The result of this decision is that the semantic contribution of an ordinary wh-question, for example, is much like that of Hamblin (1973). As in the Groenendijk and Stokhof (1984)-based inquisitive accounts, uninformativity plays a central role in functioning as a question. The difference in our theory is that it is uninformativity *relative to the sentence's presupposition* which matters. The alternatives of the question exhaust the limited space of possible worlds meeting the sentence's presuppositions. While Hamblin (1973) characterized wh-questions as having an existential presupposition, there was no semantic reason in his account for why such a presupposition would be *necessary*. For us, this presupposition, contributed by focus, is essential to achieving truth-conditional uninformativity, thereby isolating the inquisitive component of the sentence. The account of questions in Yukatek Maya has hopefully served to show that, at least in this language, this approach allows us to understand why certain sentences function as questions based solely on the semantics of their individual components and how they are combined.

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